

8-2009

The Inner Experience Of Older Individuals

Todd Michael Seibert
University of Nevada, Las Vegas

Follow this and additional works at: <https://digitalscholarship.unlv.edu/thesesdissertations>



Part of the [Cognition and Perception Commons](#)

Repository Citation

Seibert, Todd Michael, "The Inner Experience Of Older Individuals" (2009). *UNLV Theses, Dissertations, Professional Papers, and Capstones*. 1208.
<http://dx.doi.org/10.34917/2797482>

This Dissertation is protected by copyright and/or related rights. It has been brought to you by Digital Scholarship@UNLV with permission from the rights-holder(s). You are free to use this Dissertation in any way that is permitted by the copyright and related rights legislation that applies to your use. For other uses you need to obtain permission from the rights-holder(s) directly, unless additional rights are indicated by a Creative Commons license in the record and/or on the work itself.

This Dissertation has been accepted for inclusion in UNLV Theses, Dissertations, Professional Papers, and Capstones by an authorized administrator of Digital Scholarship@UNLV. For more information, please contact digitalscholarship@unlv.edu.

THE INNER EXPERIENCE OF
OLDER INDIVIDUALS

by

Todd Michael Seibert

Bachelor of Arts
Gettysburg College
1998

Master of Arts
University of Northern Colorado
2002

A dissertation submitted in partial fulfillment
of the requirements for the

Doctor of Philosophy Degree in Psychology
Department of Psychology
College of Liberal Arts

Graduate College
University of Nevada, Las Vegas
August 2009

UMI Number: 3372141

INFORMATION TO USERS

The quality of this reproduction is dependent upon the quality of the copy submitted. Broken or indistinct print, colored or poor quality illustrations and photographs, print bleed-through, substandard margins, and improper alignment can adversely affect reproduction.

In the unlikely event that the author did not send a complete manuscript and there are missing pages, these will be noted. Also, if unauthorized copyright material had to be removed, a note will indicate the deletion.



UMI Microform 3372141
Copyright 2009 by ProQuest LLC
All rights reserved. This microform edition is protected against
unauthorized copying under Title 17, United States Code.

ProQuest LLC
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106-1346



THE GRADUATE COLLEGE

We recommend that the dissertation prepared under our supervision by

Todd Michael Seibert

entitled

The Inner Experience of Older Individuals

be accepted in partial fulfillment of the requirements for the degree of

Doctor of Philosophy

Psychology

Russell T. Hurlburt, Committee Chair

Christopher Heavey, Committee Member

David Copeland, Committee Member

Jennifer Keene, Graduate Faculty Representative

Ronald Smith, Ph. D., Vice President for Research and Graduate Studies
and Dean of the Graduate College

August 2009

ABSTRACT

The Inner Experience of Older Individuals

by

Todd Michael Seibert

Dr. Russell T. Hurlburt, Examination Committee Chair
Professor of Psychology
University of Nevada, Las Vegas

Older individuals are susceptible to the development of numerous age-related neurodegenerative disorders including Alzheimer's Disease and Vascular Dementia. This is continuing to become a more serious social, financial, medical, and psychological problem as the average life span continues to increase across the world. Nevertheless, very little is known about the inner experience of older individuals. This study used Descriptive Experience Sampling (DES) to investigate the inner experience of twelve older individuals with and without cognitive impairment. Five of six unimpaired individuals were able to engage successfully in DES compared to only one individual with cognitive impairment. The findings suggest that DES is extremely sensitive to cognitive impairment and older individuals may lack certain aspects of inner experience.

TABLE OF CONTENTS

ABSTRACT	iii
LIST OF TABLES	viii
ACKNOWLEDGMENTS	ix
CHAPTER 1 INTRODUCTION.....	1
CHAPTER 2 REVIEW OF RELATED LITERATURE.....	5
Alzheimer’s Disease – History, Presentation, and Course	5
The Neurology of Alzheimer’s Disease.....	21
Risk Factors in Alzheimer’s Disease	23
Pre-Clinical Alzheimer’s Disease	25
Mild Cognitive Impairment	28
Diagnosis of Alzheimer’s Disease.....	30
Psychopharmacological Interventions	39
Non-pharmacological Interventions.....	43
Tracking Alzheimer’s Disease.....	55
Inner Experience in Alzheimer’s Disease.....	56
The Inner Experience of Alzheimer’s Disease – The First Person Perspective	73
Vascular Dementia.....	85
Cognition in Normal Aging	91
Neurology in Normal Aging.....	95
Methodological Problems in Normal Aging Research	97
Inner Experience in Normal Aging.....	97
Inner Experience Research	100
The Importance of Understanding the Inner Experience of Individuals with and without Cognitive Impairment.....	118
CHAPTER 3 METHOD	121
Participants.....	121
Materials	122
Procedure	123
Results.....	125
CHAPTER 4 UNIMPAIRED PARTICIPANT “ANNA”	126
Feelings.....	127
Sensory Awareness.....	130
Unsymbolized Thinking.....	130

Inner Speech.....	131
Inner Seeing	131
Multiple Awareness	133
Unusual Aspects of Experience	133
Discussion.....	136
CHAPTER 5 UNIMPAIRED PARTICIPANT “BENJAMIN”	137
Sensory Awareness	138
Unsymbolized Thinking.....	140
Unvocalized Inner Speech	141
Worded Thinking.....	143
Multiple Awareness	143
Discussion.....	144
CHAPTER 6 UNIMPAIRED PARTICIPANT “CLARA”	146
Unsymbolized Thinking.....	147
Inner Speech.....	148
Inner Seeing	149
Feelings.....	151
Worded Thinking.....	151
Just Doing	152
Sensory Awareness	153
Content Themes	154
Discussion.....	155
CHAPTER 7 UNIMPAIRED PARTICIPANT “DOLLY”	160
Unsymbolized Thinking.....	161
Inner Speech.....	162
Feelings.....	163
Other Forms of Awareness	163
Discussion.....	163
CHAPTER 8 UNIMPAIRED PARTICIPANT “ELLEN”	165
Unsymbolized Thinking.....	169
Difficulty Apprehending Experience.....	170
Symbols.....	171
Content Themes	171
Discussion.....	173
CHAPTER 9 UNIMPAIRED PARTICIPANT “FAY”	175
Discussion.....	179
CHAPTER 10 IMPAIRED PARTICIPANT “GARY”	182
Worded Thinking.....	185
Inner Seeing	189
Feelings.....	190

Unsymbolized Thinking.....	191
Lack of Variability in Content.....	191
Discussion.....	192
CHAPTER 11 IMPAIRED PARTICIPANT “HENRY”	194
Discussion.....	197
CHAPTER 12 IMPAIRED PARTICIPANT “IRVING”	199
Discussion.....	209
CHAPTER 13 IMPAIRED PARTICIPANT “JUNE”.....	213
Discussion.....	237
CHAPTER 14 IMPAIRED PARTICIPANT “KAREN”.....	242
Discussion.....	249
CHAPTER 15 IMPAIRED PARTICIPANT “LILLY”	251
Discussion.....	255
CHAPTER 16 ACROSS PARTICIPANT RESULTS AND DISCUSSION	256
The Ability of Older Individuals to Participate in DES.....	256
The Inner Experience of Older Individuals Who Could Perform the DES Task Successfully.....	271
The Inner Experience of Older Individuals Who Could Not Perform the DES Task Successfully.....	279
Diagnostic and Treatment Implications	289
Limitations of the Current Study	292
Suggestions and Future Research	295
APPENDIX A SUMMARY OF SAMPLES	299
Anna’s Samples	299
Benjamin’s Samples.....	308
Clara’s Samples	314
Dolly’s Samples.....	321
Ellen’s Samples.....	324
Fay’s Samples	331
Gary’s Samples.....	338
Henry’s Samples.....	345
Irving’s Samples	348
June’s Samples.....	354
Karen’s Samples	354
Lilly’s Samples	354
APPENDIX B SELECTED TRANSCRIPTS	355
Fay.....	355
Henry.....	358

Irving.....	361
June.....	366
Karen.....	374
REFERENCES.....	381
VITA.....	424

LIST OF TABLES

Table 1	Percentages of characteristics in Anna's samples of inner experience.....	127
Table 2	Percentages of characteristics in Benjamin's samples of inner experience...	138
Table 3	Percentages of characteristics in Clara's samples of inner experience	147
Table 4	Percentages of characteristics in Dolly's samples of inner experience	161
Table 5	Percentages of characteristics in Ellen's samples of inner experience.....	168
Table 6	Percentages of characteristics in Gary's samples of inner experience	185
Table 7	Participants' ability to perform the DES task successfully.....	257
Table 8	Percentages of characteristics across older and college-age individuals.....	272

ACKNOWLEDGEMENTS

There were countless people involved in this project, without whom it would not have been possible to complete. Most notably, the participants in this study, who courageously allowed an intimate glimpse into their inner worlds; my advisor, Dr. Russell Hurlburt, whose unending passions for this project and all things DES continues to be an inspiration; my committee members, Dr. Christopher Heavey, Dr. David Copeland, and Dr. Jennifer Keene; my wife, Jessica Emick, whose support and love kept me sane and kept the project moving during its most difficult points; my parents, Michael and Linda Seibert, and family, whose pride continues to keep me motivated; and my colleagues at UNLV who provided endless sharing and understanding of the journey.

This project is dedicated to the participants in this study, each of whom was a true honor and joy to work with, their loved ones and caregivers, and all past, current, and future older individuals.

CHAPTER 1

INTRODUCTION

Approximately 4.5 million people in the United States had Alzheimer's Disease (AD) in the year 2000 (Hebert, Scherr, Bienias, Bennett, & Evans, 2003). Because human lifespan is increasing at a substantial rate and the risk of developing AD increases greatly with age, AD is quickly becoming a public health disaster (Lopez et al., 2000). Average life expectancy in industrialized nations is increasing at a historic rate (National Institute on Aging, 2000). In 2003, the average life expectancy for individuals living in the United States was 77.6 years (National Center for Health Statistics, 2005). This number is expected to climb quickly as medical science continues to make important advances in health care (National Institute on Aging, 2000). It is predicted that life expectancy in industrialized nations will reach 82.9 years by the year 2050 (National Institute on Aging, 2000).

Approximately 0.7 percent of people who are 65 years of age have AD, 12 to 13 percent of people at age 85 have the disease, approximately 23 percent at age 90, and 38 to 39 percent at age 95 (APA, 2000). If there is no discovery of a cure for AD or a way to prevent AD, the number of individuals in the United States with AD in 2050 is expected to triple relative to 2000 to 13.2 million people (Hebert et al., 2003). Currently, caring for individuals with AD costs an estimated \$100 billion a year in the United States (National Institute on Aging, 2006). This number is likely to increase substantially as the

baby-boomers move into advanced stages of aging (Graff-Radford, 2003; National Institute on Aging, 2006). When one combines the rapidly increasing life span of humans and the prevalence of AD in relation to age, there is clearly a potentially disastrous situation in front of us. In fact, AD is already being called “the disease of the century” (Whitehouse, Maurer, & Ballenger, 2000).

The need for effective treatment and management of the disorder is urgent (Parasuraman, 2004). Fortunately, the scientific community has recognized the urgency of the situation and significant research has focused on the risk factors of the disease (Ballard, 2002). Unfortunately, the scientific community’s understanding of the disease, specifically its ability to detect, prevent, and treat the disease, although recently much improved, has not increased in harmony with the number of those the disease affects. Cures for the disease have not been found and do not appear to be on the horizon.

Small developments in the diagnosis and treatment of AD can have a substantial impact on the mental and physical health of individuals with AD, their families, as well as a major financial impact (Leifer, 2006). Even a small slowing of decline could save billions of dollars. Ernst, Hay, Fenn, Tinklenberg, and Yesavage (1997) estimated that if treatment could improve the scores of individuals with AD on the Mini-Mental State Exam (MMSE) (Folstein, Folstein, & McHugh, 1975) by 2 points, a modest increment, \$7,000 per year could be saved per AD patient. This translates to saving approximately 31.5 million dollars currently and a projected 92.4 million dollars in 2050 in the United States alone. Therefore, although a cure or prevention for AD is ideal, even small steps in improving diagnosis and treatment can have a tremendous benefit to the community as a whole.

Research has clearly shown that AD is a degenerative disease that develops far before it is readily apparent or diagnosable (Kawas et al., 2003). Some studies suggest that both cognitive and neurological signs (i.e., neurofibrillary tangles and amyloid plaques, sometimes called senile plaques) of AD can be present up to 50 years before it is diagnosed (Snowden et al., 1996). Snowden et al. (1996) studied autobiographies written by nuns upon entering a convent at an average age of 22 years. The researchers analyzed the last ten sentences of each autobiography and calculated the idea density (i.e., the average number of ideas expressed in every ten words) in these sentences. The study showed that idea density in the nuns' writing correlated highly negatively with the later development of AD. In fact, low idea density was present in childhood in 90 percent of those who developed AD while low idea density was present in only 13 percent of those who did not develop AD. Furthermore, individuals who eventually develop AD make significantly more errors on a test of non-verbal memory (the Benton Visual Retention Test) up to 15 years before a diagnosis of AD (Kawas et al., 2003). LaRue and Jarvick (1980) found that certain subtests of the WAIS predicted dementia two decades before symptomatology arose. Sixty-seven percent of individuals who scored in the bottom fourth of Coding eventually experienced dementia, 75 percent who scored in the bottom fourth of Vocabulary developed dementia, and 85 percent of those scoring in the bottom fourth of Similarities eventually experienced dementia (LaRue & Jarvick, 1980). Although these studies suggest that there are cognitive differences among individuals who eventually develop AD and those who do not, effective early diagnosis remains elusive.

Neurobiological evidence also suggests that the process of AD may be in place well before it can be clinically diagnosed. The hippocampus and brain regions associated with the hippocampus are especially altered well before clinical diagnosis can be made (Braak & Braak, 1995), and multiple cortical and subcortical areas appear to exhibit dysfunction before AD can be diagnosed (Backman, Jones, Berger, Laukka, & Small, 2005). Furthermore, amyloid plaques may be present and continue to accumulate before the symptomatology of AD can be detected (Zamrini, De Santi, & Tolar, 2004). Finally, evidence of inflammation associated with neuronal death is often observed before the development of neurofibrillary tangles and amyloid plaques and well before clinical symptoms appear (Rosenberg, 2005). Because the disease process begins before clinical symptoms appear, preclinical diagnosis is crucial so that treatments can be used to change the course of the disease's progression (Desai & Grossberg, 2005).

CHAPTER 2

REVIEW OF RELATED LITERATURE

Alzheimer's Disease – History, Presentation, and Course

AD was first identified by Alois Alzheimer in 1907 when he published the case of Auguste D., a 51 year old woman Alzheimer treated in Frankfurt, Germany (Maurer, Volk, & Gerbaldo, 2000). Alzheimer noted symptoms in the woman that included cognitive deficiencies that became progressively worse over time, disorientation to time and place, hallucinations, delusions, and a general inability to function in a socially appropriate manner (Maurer et al., 2000). After 4 ½ years of being in Alzheimer's care, Auguste D. died (Maurer et al., 2000). At this time Alzheimer performed an autopsy and discovered that Auguste D.'s brain contained neurofibrillary tangles and amyloid plaques (Maurer et al., 2000). It was this key finding of neurofibrillary tangles and amyloid plaques that allowed for an enhanced understanding of this disease (Morris & Becker, 2004a). Emil Kraepelin first coined the term "Alzheimer's Disease" in 1910 (Maurer et al., 2000).

The DSM-IV-TR (APA, 2000) classifies dementia of the Alzheimer's type, or AD, as a memory impairment that must be accompanied by aphasia (language disturbance), apraxia (motor disturbance), agnosia (inability to identify objects), or deficiencies in executive functions. Furthermore, cognitive difficulties must progress in a gradual and

continuous manner (APA, 2000). The DSM-IV-TR also differentiates between early onset (appearing under 65 years of age, also called familial AD due to apparent hereditary nature) and late onset (appearing after 65 years of age, also called sporadic AD due to apparent non-hereditary nature) as well as with and without behavioral disturbances (APA, 2000). AD is the most common form of dementia (APA, 2000; Misciagna, Masullo, Giordano, & Silveri, 2005; The Dementia Study Group of the Italian Neurological Society, 2000; Morris & Becker, 2004b; Leifer, 2003).

The most used diagnostic criteria for AD are those developed by the National Institute of Neurological and Communicative Disorders and Stroke-Alzheimer's Disease and Related Disorders Association (NINCDS-ADRDA; Lopez et al., 2000; The Dementia Study Group of the Italian Neurological Society, 2000). The NINCDS-ADRDA criteria are used to diagnose either probable or possible AD (Morris & Becker, 2004b; Lopez & Becker, 2004). Probable AD is diagnosed when AD seems to be the only likely cause of the dementia (Morris & Becker, 2004b; Lopez & Becker, 2004). Possible AD is diagnosed when it appears that AD may be present but the onset and/or course of the disease is atypical (Lopez et al., 2000) or the dementia could be due at least in part to another neurodegenerative disorder (Morris & Becker, 2004b). The reliability and validity of these standards have proven to be excellent in a variety of studies (Mayeux et al., 1998).

As mentioned above, there are many cognitive deficits associated with AD. Some theorize that this is due to a general factor that is compromised in AD that affects cognitive functioning globally. Many researchers identify slowing of processing speed as a likely candidate for this general factor, although there is substantial disagreement about

this issue in the literature (see Baddeley, Baddeley, Bucks, & Wilcock, 2001 for a review). Auditory memory problems can often be accounted for by a decrease in the speed of processing of auditory information (Just & Carpenter, 1992). Specifically, there appears to be a deficiency in processing the semantic component of words (Just & Carpenter, 1992).

Still, the most identifiable deficiency in AD is memory impairment, not slow processing speed, although processing speed could be a mediating factor in memory impairment. The one cognitive symptom that is required for a diagnosis of AD is substantial memory impairment (APA, 2000). Accordingly, the most common initial clinical presentation of AD is subjective report of forgetfulness (Petersen, 2003). The ability to form new memories is usually depleted first, but later in the course of AD retrieval of already formed memories typically deteriorates greatly (Kopelman, 1985). As AD progresses, virtually all areas of memory are impaired (Greene, Hodges, & Baddeley, 1995). Nevertheless, in spite of the tremendous amount of research done on this topic, the exact cognitive nature of the memory impairment in AD is not entirely clear (Overman & Becker, 2004).

The course and presentation of AD is highly variable among individuals and there is much debate regarding what deficiencies most typically manifest first in AD.

Historically, episodic memory has been identified as the symptom that presents first and is the most readily noticed in early AD. Nevertheless, many other symptoms appear to be present very early in the course of the disease, including problems with semantic memory, working memory, attention, inhibition, learning, and language. Deficiencies in episodic memory are often the most pervasive problem in people with AD (Overman &

Becker, 2004; Collette & Van Der Linden, 2004; Rusted & Clare, 2004) and are typically the most severe cognitive deficits in the early stages of the disease (Overman & Becker, 2004). Tests of delayed episodic recall can often effectively distinguish between AD and normal aging early in the progress of AD (Germano & Kinsella, 2005). Although individuals with AD often seem to remember the fact that a particular event occurred, they often do not remember it directly or ascribe any personal relevance to the memory (Overman & Becker, 2004). Individuals with AD often exhibit difficulty remembering when they had initially viewed a picture or group of pictures, a key part of successful episodic memory (Rickert, Duke, Putzke, Marson, & Graham, 1998).

It was once believed that difficulties in episodic memory were primarily due to retrieval, but research over the past decade has suggested that deficient encoding is the primary difficulty in episodic memory for individuals with AD (for a review, see Germano & Kinsella, 2005). Still, the deficiency in episodic memory appears to be due to both encoding and retrieval problems (Overman & Becker, 2004). There is evidence that forgetting is not increased in episodic memory, but rather information either does not enter memory or is not encoded properly in the acquisition phase (Perry, Watson, & Hodges, 2000).

Semantic memory is also impaired throughout the course of AD (Garrard, Patterson, & Hodges, 2004; Overman & Becker, 2004) and is often present in the early stages of AD (Ramsden, Kinsella, Ong, & Storey, 2008). Semantic fluency deficits can be a sensitive measure of early AD (Ramsden et al., 2008). The reason for this difficulty is still debated among researchers. Some argue that it is due to a break down of meaningful links between semantically-related information while others argue that access to the

memories themselves are compromised (for a review, see Findler, 2000). Inhibition problems may be part of the reason for semantic memory deficits as well. Individuals with AD exhibit increased difficulty in learning word-lists (for a review, see Overman & Becker, 2004) with high rates of intrusion errors (i.e., reporting words that were not present on the word list) when recalling lists of words as well as low rates of recognition (Overman & Becker, 2004). High rates of intrusion also occur when freely recalling stories (Overman & Becker, 2004).

Semantic memory problems associated with AD often occur in an ordered manner. Typically more specific information in semantic memory is lost or impaired first with more general semantic information following (Margolin, Pate, & Friedrich, 1996). For example, studies have shown that individuals in the early stages of AD have significant impairment in object-naming tasks that require the retrieval of a specific referent (Martin & Fedio, 1983) and have difficulty making distinctions between words that are similar semantically (Warrington, 1975). However, tasks requiring the use of knowledge of a more general nature, such as tests of vocabulary, remain relatively unimpaired in early AD (Martin & Fedio, 1983), although individuals with AD eventually exhibit dysfunction in this area as the disease progresses (Margolin et al., 1996).

There is conflicting evidence regarding the existence, extent, and nature of implicit memory impairment in individuals with AD (Meirin & Jelicic, 1995). A meta-analysis of research on implicit memory in AD suggests that there is a small decrease in implicit memory in individuals with AD (Meirin & Jelicic, 1995). This meta-analysis also found that the level of impairment fluctuated as a function of the type of test. Individuals with AD did not show impairment on word-based implicit memory tests that were perceptual

in nature (such as word-stem priming tasks) that did not exceed a ten minute gap between the initial presentation and the later retrieval phase (Meirin & Jelcic, 1995). However, implicit memory was impaired when it involved conceptual tasks, free association, category generation, and tasks that were non-verbal in nature (Meirin & Jelcic, 1995). Implicit memory seems to be relatively unaffected in Mild Cognitive Impairment (MCI), even in those who later converted to AD (Perri, Serra, Carlesimo, & Caltagirone, 2007).

Memory difficulties in AD can also be viewed through the three stages of memory, sensory memory, short-term or working memory, and long-term memory. There is very little research on sensory memory in AD. However, there has been some research that has shown that electrical activity that is related to auditory sensory memory is impaired in individuals with AD. Specifically, the amplitude of the event related potential elicited by tones that are related to auditory sensory memory are decreased in individuals with AD, suggesting a possible increase in the rate of sensory memory decay (Pekkonen, Jousmaki, Kononen, & Reinikainen, 1994).

There is still debate regarding the nature of a decrease in working memory capacity and efficiency in normal aging (for a review, see Lund, 1997). However, there is strong evidence that supports the existence of working memory dysfunction throughout the course of AD as well as very early in the progress of the disease (see Belleville, Chertkow, & Gauthier, 2007). Manipulation of information, divided attention, and inhibition, all key components of effective working memory, are impaired even in mild AD (Belleville et al., 2007). Deficiencies in passive short-term storage of information is also found in individuals with mild AD (Belleville et al., 2007) although there is some conflicting evidence about this deficit (see Germano & Kinsella, 2005). There is strong

evidence to suggest that the central executive portion of working memory is impaired in AD and is among the first cognitive functions to decline in AD, although the reason for this decline is not entirely clear (Germano & Kinsella, 2005).

Manipulation of information in working memory via elaboration and rehearsal seems to be especially impaired in individuals with AD. People with AD do not seem to benefit from contextual cues at the time of encoding, including elaboration, rehearsal, and other encoding strategies (Findler, 2000; Sadasivan, 1989). Furthermore, verbal memory deficiencies in AD have been hypothesized to be partially due to slower rates of subvocal rehearsal (Hulme, Lee, & Brown, 1993). Vocal rehearsal was found to require more frontal lobe activation in individuals with AD compared to unimpaired older individuals, suggesting a decrease in efficiency and use of resources in AD when rehearsal is required (Woodard et al., 1998).

One key component of forming successful memories is converting information stored temporarily in working memory to long-term memory. There is evidence that this conversion is problematic in AD. For example, the primacy effect is often reduced in individuals with AD, indicating that information can be stored for a short period of time but is often not successfully transferred from working memory into long-term storage (for a review, see Overman & Becker, 2004; Findler, 2000). It appears that problems in episodic memory may be at least partially due to the inability to transfer information effectively from working memory to long-term memory (Overman & Becker, 2004). It is possible that individuals with AD do not use techniques of elaboration properly, thus not allowing information to be effectively encoded and moved to long-term memory (Overman & Becker, 2004).

Deficits in immediate memory are more noticeably compromised than problems with long-term memory in individuals with AD at the early stages of the disease. However, as the disease progresses, long-term memories become substantially affected. Still, problems with long-term memory can be seen early in the disease via neuropsychological testing (Ramsden et al., 2008). Individuals with AD perform worse on tests of delayed memory than elderly individuals with no cognitive impairment as well as older individuals with other types of dementia, such as Vascular Dementia (VaD) and fronto-temporal dementia (Braaten, Parsons, McCue, Sellers, & Burns, 2006). Individuals with AD often make source monitoring errors when recalling information as well (Benjamin & Craik, 2001). As mentioned above, problems with long-term memory seem to be at least partially due to difficulties transferring information from working memory to long-term storage (Findler, 2000).

Another way to think of memory dysfunction in AD is to view it in terms of the three processes necessary to form successful memories; encoding, storage, and retrieval. Although the memory deficits observed in AD were once thought to be primarily due to retrieval, it appears that encoding problems play an even larger role (for a review, see Germano & Kinsella, 2005). It appears that problems with memory that are presented in an auditory manner are largely due to encoding (Lund, 1997). There is also some evidence that encoding of semantic information can be highly compromised, even more so than in some other types of dementia (Granholm & Butters, 1988). Individuals with AD also seem to require deeper encoding to make full use of cues in cued retrieval conditions (Lipinska & Backman, 1997). Nevertheless, the literature is highly

contradictory regarding the extent and nature of encoding deficits in individuals with AD at various stages of the disease (see Lund, 1997).

There is also highly conflicting evidence regarding the existence of a reduced capacity to passively store information in AD (for a review, see Germano & Kinsella, 2005). Most research suggests that the primary deficits in memory in AD are due to problems with encoding and retrieval where storage is not a primary issue (for a review, see Germano & Kinsella, 2005).

There is evidence that individuals with AD have difficulty with the retrieval stage of the memory process. Some researchers have suggested that a primary difficulty in memory for individuals with AD is an inability to organize information in memory via effective retrieval strategies (Findler, 2000). However, there is conflicting evidence regarding the extent and nature of retrieval deficiencies in AD. Deficiencies in free recall are highly prevalent throughout AD while the evidence is mixed regarding the presence of a decline in recognition although some researchers suggest that cued recognition offers virtually no benefit to individuals with AD (Massman, Delis, Butters, Dupont, & Gillan, 1992). Retrieval deficits have been exhibited in both immediate and delayed word recall tasks (Overman & Becker, 2004). Still, other authors suggest that individuals with AD experience difficulties with both recognition tasks and retrieval tasks supposedly due to an inability to successfully consolidate information (Lezak, 1995) and utilize effective retrieval strategies (Ramsden et al., 2008).

Perhaps one of the best representations of the retrieval process in individuals with AD is the word-stem completion priming effect in older individuals and individuals with AD. The word-stem completion priming effect occurs when individuals study a list of words

and are then given word-stems from the list. People are more likely to respond with a word from the previously studied list than another word. For example, if individuals are given the word stem “tru” and the word “trust” was presented in the studied list, it is most likely that individuals will complete the word as “trust” instead of other possibilities, such as “truck” or “trumpet.” Deficiencies in word-priming are thought to represent an underlying deficiency in retrieval (Fleischman et al., 1999).

Individuals can either be given direct instructions to use the word stem to remember a word from the list (explicit instructions) or are simply asked to complete the word stem with the first word that comes to mind (implicit instructions). When explicit instructions are used, older individuals typically remember fewer words from the list than younger individuals but under implicit instructions there is typically no difference (see Fleischman et al., 1999). Priming in individuals with AD appears to be similar to normal elderly when AD is mild, but there is less of a priming effect as dementia severity increases (Fleischman et al., 1999). This is thought to be evidence for a progressive retrieval deficit in AD that continues as the disease progresses (Fleischman et al., 1999).

As mentioned above, memory is not the only impairment that occurs very early in the course of AD. Executive functioning is well established as an early symptom of AD (Collette & Van Der Linden, 2004; Salthouse & Becker, 1998) and includes deficiencies in inhibition (Overman & Becker, 2004) and attention (Parasuraman, 2004). Executive functioning difficulties have been demonstrated in pre-clinical AD and have been shown on a wide variety of measures in early AD, including dual-task paradigms and the Stroop test (for a review, see Collette & Van Der Linden, 2004). Neuropsychological batteries have shown deficits in executive functioning in non-diagnosed individuals who

eventually develop AD relative to those who do not develop AD (Fabrigoule et al., 1998). Deficiencies in executive functioning specifically are suggested to be a factor that contributes to the existence of a number of other cognitive deficiencies (Salthouse & Becker, 1998).

Two important cognitive functions that fall under the umbrella of executive functioning are attention and inhibition. Deficits in attention have been established in normal aging as well as in AD (Pignatti et al., 2005). However, normal older individuals show no more decrease in comprehension when there is distracting background noise than younger individuals (Van Gerven, Meijer, Vermeeren, Vuurman, & Jolles, 2007) and often do not exhibit deficiencies in dual-task paradigms compared to younger individuals (Baddeley, Bressi, Della Sala, Logie, & Spinnler, 1991). In individuals with AD, attention is affected broadly and is often the first non-memory related cognitive function to noticeably decline, even before language deficits (Perry & Hodges, 1999; Parasuraman, 2004). Many researchers feel that the deficiencies in working memory that are experienced in individuals with AD are due to problems with attention, making AD primarily a disorder of attention (Parasuraman, 2004).

Attention deficiencies may progress in an ordered manner in AD with attentional switching abilities being decreased first and the ability to sustain attention being affected last (Norman & Shallice, 1987). Compared to unimpaired individuals, those with AD show a steeper decline in the ability to switch attention in dual-task paradigms when there is especially high cognitive demand (Baddeley et al., 1991; Ramsden et al., 2008). In fact, attentional switching seems to be differentially impaired to a greater extent than other forms of attention in AD (Ramsden et al., 2008). This specific difficulty with

cognitive functioning and attention in conditions of high cognitive demand is interpreted by some as evidence for a decline in general cognitive resources in individuals with AD (for a review, see Ramsden et al., 2008). This suggests that cognitive dysfunction that is related to attention will increase as the amount of information that needs to be processed and ignored increases.

Visual-spatial switching is also compromised in AD (for a review, see Findler, 2000). Visual-spatial problems with attention in AD have been documented in a variety of ways, including visual-spatial attentional shifting, finding objects among similar objects in visual search tasks, abnormal eye movements in visual scanning tasks, focusing on small parts of the visual field, decreased examination of novel aspects of complex visual scenes, and decreased examination of facial expressions that show emotion (for a review, see Parasuraman, 2004). Individuals with AD have difficulty focusing on visual information in the periphery of the visual field as well as switching attention to this area, especially under conditions that require a high amount of cognitive processing (Norman & Shallice, 1987). Other problems with attention include a reduction in the speed and accuracy in letter search tasks that could represent problems with sustained attention in individuals with AD (Baddeley et al., 2001) and a relatively difficult time resisting distraction in general (see Germano & Kinsella, 2005).

Inhibition is also compromised in individuals with AD, and is even commonly deficient in normal aging (Pignatti et al., 2005). Deficiencies in the ability to successfully perform in dual-task situations in people with AD can be viewed as evidence for inhibitory dysfunction (Morris, 1996). Furthermore, individuals with AD tend to make errors of intrusion in memory tasks, suggesting a deficiency in the ability to inhibit

incorrect responses (Overman & Becker, 2004; Finlder, 2000). This suggests that at least part of the memory deficit experienced by those with AD is due to deficits in inhibition (Overman & Becker, 2004). Also, although individuals with AD do not seem to be distracted by irrelevant background speech at a greater level than normal elderly or even younger individuals, when individuals with AD are tested on higher-order cognitive processes with the presence of significant irrelevant background speech, they show more slowing relative to unimpaired older and younger adults (Van Gerven et al., 2007). Still, the exact nature of inhibition difficulties is unclear as conflicting evidence has been produced, although problems with interference and semantic inhibition appear to be present in most individuals with AD (for a review, see Collette & Van Der Linden, 2004).

Clearly, because memory is compromised in AD universally, so is the ability to learn. The inability to learn new information is a hallmark sign of early AD (for a review, see Germano & Kinsella, 2005). Learning impairments are present in the very early stages of AD and continue to decline until they are entirely lost as the disease progresses (Martin, Brouwers, Cox, & Fedio, 1985). These impairments are broad and occur across a wide range of modalities (Greene, Baddeley, & Hodges, 1996). For example, Greene et al. (1996) found that individuals with AD exhibited a much flatter learning curve in both verbal and visual-spatial information requiring both recognition and recall at delayed and immediate intervals compared to older individuals without AD. This deficit in learning appears to be primarily due to encoding deficits at the time of acquisition rather than problems with forgetting (for a review, see Germano & Kinsella, 2005).

Some researchers view the hallmark symptom of episodic memory decline as an inability to learn from contextual information at the time of encoding (Germano &

Kinsella, 2005). Impaired learning at acquisition appears to be deficient in the early stages of AD (Grober & Kawas, 1997) suggesting substantial encoding deficiencies in AD, although the reason for this acquisition deficit is not well understood (Germano & Kisella, 2005). Individuals with AD often do not benefit from repeated learning trials as much as younger individuals or normal elderly (Findler, 2000) and repeated trials do not benefit normal elderly as much as younger individuals (Lund, 1997). Deficits in learning seem to be largely due to both deficiencies in encoding and an inability to transfer information from working memory to long-term memory (Findler, 2000). Verbal learning in general seems to decrease with age (Van der Elst, Van Boxtel, Van Breukelen, & Jolles, 2005).

Deficiencies in language are also a common component of AD throughout the disease and is also present to a lesser extent in normal aging. Although many people associate AD primarily with difficulties with memory, linguistic problems are perhaps just as pervasive while declines in language functioning in the normal elderly population often appear insignificant and uncommon (Meguro et al., 2001). Still, older individuals process both written and spoken language more slowly than the general population (Just & Carpenter, 1992). The most common linguistic problem in AD is nominal aphasia, the inability to think of a person's name (Kertesz, 2004; for a review, see Sabat, 1994a), and problems writing meaningful letters (Bayles & Tomoeda, 1991). These three problems are typically the first linguistic problems to appear in AD (Bayles & Tomoeda, 1991). Nominal aphasia specifically has a clearly progressive pattern that begins early in the disease and declines steadily (Cummings & Benson, 1989).

There are often four phases of language disturbance in AD: anomia (or nominal) aphasia (difficulty naming objects in spite of intact speech fluency), transcortical sensory aphasia (poor comprehension despite largely intact speech production), Wernicke's aphasia (difficulty understanding speech and producing meaningful speech), and global aphasia (aphasia in most or all domains; Mathews, Obler, & Alber, 1994). Other common linguistic problems include the inability to complete sentences, difficulty with reading comprehension, a tendency to produce meaningless sentences (part of Wernicke's aphasia), the inability to spell words correctly (Bayles & Tomoeda, 1991), and problems generating word lists that are lexically and categorically related (Barr & Brandt, 1996). Some research shows that spelling problems develop in three ordered phases; lexical, then phonological, then peripheral (Lambert, Eustache, & Viader, 1996). This is important not only to the initial detection of AD but also may indicate how far along the individual may be in the progress of the disease. Phonological and syntactic language functions are often relatively well preserved over the course of AD (for a review, see Sabat, 1994a).

Difficulty with the expression and processing of emotion and anosognosia also occurs in AD. Individuals with AD often have difficulty interpreting non-verbal signals of emotion in others, although this is likely due to cognitive declines that are not within the affective realm and not a direct compromise of affective processing (Zaitchik & Albert, 2004). Anosognosia, or the lack of awareness that one has a neurological disease, is common in individuals with AD and varies in degree among individuals (Morris & Hannesdottir, 2004). Anosognosia is especially problematic in AD because individuals

cannot alter their potentially dangerous behavior in response to knowledge of the disease (Morris & Hannesdottier, 2004).

Non-cognitive symptoms also appear in AD. A number of disturbances in motor function are possible in AD, although the presentation of these disturbances often differs greatly among individuals (Kidron & Freedman, 2004). Common motor disturbances include rigidity, tremors, seizures, motor retardation, disturbances in gait, apraxia, agnosia, and difficulties grasping and sucking (Kidron & Freedman, 2004). Other non-cognitive symptoms include changes in personality and behavior as well as deficits in the ability to perform activities of daily living (Desai & Grossberg, 2005). The development of maladaptive behavior patterns can be especially dangerous for individuals with AD and problematic for caregivers (The Dementia Study Group of the Italian Neurological Society, 2000). Psychotic symptoms are also present in a subset of individuals. Sixteen percent of individuals with AD have delusions whereas 10 to 13 percent experience hallucinations (Allen & Burns, 1995). Depression is also present in a majority of individuals with AD (Allen & Burns, 1995).

The overall course of AD is highly variable among individuals. Typically, individuals with AD will lose about 3 to 4 points from their scores on the MMSE for every year they have the disease (APA, 2000; Lopez et al., 2002; Hogan & Patterson, 2002). However, many researchers have suggested that in between the slow progression of AD there are periods of plateau where there is little noticeable cognitive decline. After an initial plateau phase that often occurs after a subtle decline in memory, many individuals decrease at a steady rate, although this rate often varies among individuals (Haxby, Raffaele, Gillette, Shapiro, & Rapoport, 1992). Rates of decline can be up to

four times different among individuals (Haxby et al., 1992). There can be a number of plateau phases during the course of AD and typically plateaus occur before the decline of non-memory cognitive functioning (Haxby et al., 1992). Although AD progresses somewhat idiosyncratically, it typically lasts from 7 to 15 years ending in death (Bouchard & Rosser, 1999).

Symptoms that occur in the later stages of AD often involve a further decrease of cognitive abilities on a global scale as well as the presence of emotional difficulties such as depression and anxiety (Allen & Burns, 1995). Psychotic symptoms including hallucinations and delusions often occur in the later stages of AD as well (Allen & Burns, 1995).

The Neurology of Alzheimer's Disease

Neurologically, AD is characterized by the presence of neurofibrillary tangles (made of phosphorylated tau protein; Desai & Grossberg, 2005), amyloid plaques (consisting of amyloid protein; The Dementia Study Group of the Italian Neurological Society, 2000), neuronal degeneration, loss of synapses (Desai & Grossberg, 2005; Gomez-Isla & Hyman, 2003; Lopez & Bell, 2004), and abnormalities in amyloid metabolism (Lopez & Bell, 2004). A number of neurotransmitters are also depleted in AD. These neurotransmitters include acetylcholine (AChE), glutamate, noradrenaline, and serotonin (Curran, Kopelman, & Rusted, 2004), although the AChE system typically exhibits the greatest dysfunction (Desai & Grossberg, 2005). Depletion in AChE is the most consistently depleted neurotransmitter in AD and could be responsible for associated amnesia in the disease (Curran et al., 2004).

Neurofibrillary tangles and amyloid plaques are considered the neurological hallmarks of AD (Citron, 2002) and must be sufficiently present upon autopsy in order to verify a diagnosis of AD. Amyloid plaques are abnormal masses of tissue partially composed of amyloid that are present throughout AD as it progresses (Morris, 2004). Neurofibrillary tangles are dispersed throughout the brain in AD and are present in myriad cortical and subcortical structures that are responsible for cognition and memory function (Morris, 2004). These neurological hallmarks of AD do not appear to exert a one-to-one effect on AD symptomatology and can affect the severity of AD differently for different people. Individuals can have these neurological abnormalities without exhibiting cognitive or behavioral symptoms of AD (The Dementia Study Group of the Italian Neurological Society, 2000). Fifty to sixty percent of individuals who meet the neurological criteria for a diagnosis of AD (i.e., exhibit sufficient neurofibrillary tangles and amyloid plaques) show no signs of significant cognitive decline (Desai & Grossberg, 2005). It is suggested that the amount of neurofibrillary tangles is correlated to dementia severity but that the presence of amyloid plaques does not correlate with severity of AD symptoms (Gomez-Isla & Hyman, 2003). Also, neurofibrillary tangles may be correlated with neuronal loss while plaques do not seem to exhibit this correlation (Gomez-Isla & Hyman, 2003).

Inflammatory processes in the brain also occur over the course of AD (Rosenberg, 2005). Some researchers believe that inflammation is the key physical process involved in the development of AD and its related symptoms. The neuro-inflammatory hypothesis of AD states that declines in functioning and dysfunction of the central nervous system are due to inflammatory processes in the central nervous system (Rosenberg, 2005).

Inflammatory processes have been shown to be related to cognitive and functional difficulties in AD (Rosenberg, 2005). Inflammation appears to be related to the presence of amyloid plaques and neurofibrillary tangles and causes neuronal death (Rosenberg, 2005).

It appears that the earliest neurological abnormalities associated with AD occur in the medial temporal lobe, especially in the hippocampal formation and entorhinal cortex (Kato, Knopman, & Liu, 2001; Gomez-Isla & Hyman, 2003; Overman & Becker, 2004; Rosenberg, 2005). These deficits are thought to be at least partially responsible for memory difficulties in AD (Gomez-Isla & Hyman, 2003). Eventually, the entorhinal cortex can exhibit a loss of 70 percent of its neurons (Gomez-Isla & Hyman, 2003). The amygdala also typically becomes highly compromised in AD (Morris, 2004). As AD progresses, degeneration spreads to cortical areas (Gomez-Isla & Hyman, 2003; Rosenberg, 2005). Affected cortical areas include the superior temporal sulcus, although this region is typically is not compromised until the moderate stages of AD (Gomez-Isla & Hyman, 2003). As AD enters its later stages neuronal atrophy becomes spread throughout the brain (Morris, 2004).

Risk Factors in Alzheimer's Disease

A number of risk factors exist for the development of AD, including increasing age, a family history of AD, genetic mutations in presenilin-1 and presenilin-2 (which are related to abnormalities on the metabolic precursor of amyloid), and the existence of the apolipoprotein E-4 (APOE) allele (Graff-Radford, 2003). Further risks include female

gender, history of head injury, low education, low intelligence, and small head size (Cummings, Vinters, Cole, & Khachaturian, 1998).

Recently, substantial research has focused on the APOE allele as a risk factor for the development of AD. Risk for the development of AD is increased by the APOE allele (Saunders et al., 1993; Bondi et al., 1995), perhaps by increasing the quantity of deposits of amyloid in the brain (Cummings et al., 1998). The APOE allele appears to be the biggest risk factor for the development of AD (Leifer, 2003). Individuals who are carriers of the APOE allele develop AD at a 29 percent rate compared to 9 percent for individuals who are not carriers of the allele (Cummings & Cole, 2002).

Cognitive abnormalities can sometimes be observed in non-demented individuals with the APOE allele. Individuals with the APOE allele have shown varied scores on tests of verbal and visual-spatial ability with some individuals exhibiting deficiencies in verbal processing while others exhibit deficiencies in visual-spatial processing (Jacobson, Delis, Bondi, & Salmon, 2005). This suggests that individuals with the APOE allele may constitute two subgroups that have different deficits in verbal and non-verbal attention (Jacobson, et al, 2005) as well as in verbal and non-verbal learning and memory (Jacobson et al., 2005). This finding is consistent with neurological studies that have suggested asymmetrical hemispheric degradation in individuals with the APOE allele and inconsistent findings regarding the presence of memory deficits in individuals with the APOE allele (Jacobson et al., 2005). Further neurological abnormalities can be observed in non-demented individuals with the APOE allele. An increase in hippocampal activity during memory tasks has been observed in non-demented carriers of the APOE allele (Dickerson et al., 2005). Non-demented carriers of the APOE allele also perform worse

on tests of episodic memory than do individuals who do not have the APOE allele (Bondi et al., 1995). This difficulty in episodic memory appears to reflect ineffective cognitive organization when trying to learn new information (Bondi et al., 1995). Difficulties in executive functioning are also exhibited in non-demented APOE carriers, such as difficulties with divided attention (Rosen, Bergeson, Putnam, Hawell, & Sunderland, 2002), inhibition, and switching attention (Wetter et al., 2005). Also, individuals with the APOE allele exhibit deficiencies in working memory before dementia has developed (Parasuraman, Greenwood, & Sunderland, 2002).

Pre-Clinical Alzheimer's Disease

AD progresses gradually; recently research has focused on potential transitional stages between normal aging and AD (Gomez-Isla & Hyman, 2003). Substantial research has focused on individuals in the preclinical stages of AD (i.e., individuals with subtle cognitive and/or behavioral abnormalities who do not yet exhibit AD symptomatology but who will eventually develop AD; Small, Herlitz, & Backman, 2004). Deficits are seen consistently 2 to 3 years before the development of clinically diagnosable AD (Small et al., 2004) and up to 50 years before diagnosis (Snowden et al., 1996) and exist in multiple cognitive and linguistic domains (Backman et al., 2005). A meta-analysis of studies assessing preclinical cognitive changes in those who would eventually go on to develop AD indicated that there is a global decline in cognitive functioning (Backman et al., 2005). Large deficiencies in individuals with preclinical AD appeared in the realms of episodic memory, executive functioning and perceptual speed whereas moderate deficiencies were found in visual-spatial skill and attention

(Backman et al., 2005). Likewise, factor analysis of the Personnes Ages Quid study suggested that deficits in a general cognitive factor were associated with the development of dementia 2 years later (Fabriogoule et al., 1998).

Although there are a number of cognitive deficits associated with preclinical AD, the most apparent deficit is a dysfunction in both verbal and non-verbal episodic memory (Small et al., 2004; Backman, Small, & Fratiglioni, 2001). Specifically, individuals with AD or those who are in the preclinical stages of AD appear to have difficulty transferring episodic information from short-term storage to long-term storage (Backman & Small, 1998), although the increased ability of individuals with AD to recognize information relative to freely recalling information suggests a retrieval deficit as well (Jacoby, Toth, & Yonelinas, 1993). The Bronx Aging Study also showed that individuals who went on to develop AD exhibited difficulties in both episodic memory and verbal fluency 2 years before development of the disease (Masur, Sliwinski, Lipton, Blau, & Crystal, 1994). Tests that assess episodic memory function, such as the Wechsler Memory Scale (associative learning; Wechsler, 1945), the Benton Visual Retention Test (Benton, 1963), the Auditory Verbal Learning Test (Vakil & Blachstein, 1993), as well as a number of word-list and picture recall tests may be especially effective in identifying individuals who are at risk for AD as episodic memory problems are often the earliest identifiable symptoms of AD (Small, Herlitz, Fratiglioni, Almkvist, & Backman, 2000).

Other deficiencies are apparent in preclinical AD. In one study low scores on global cognitive performance, short-term visual memory, and abstract reasoning were predictive of the eventual development of dementia up to 3 years before clinical symptoms emerged (Fabriogoule, Lafont, Letenneur, Rouch, & Dartigues, 1996). Dysfunction in attentional

processes may also be present in early and preclinical AD (Parasuraman, 2004). This attentional dysfunction may be due in part to problems with executive functioning, as difficulties with this area are common in preclinical AD (Fabrigoule et al., 1998). Also, as is the case with individuals at risk for AD via the presence of the APOE allele, a number of studies have shown that preclinical AD may be characterized by discrepancies between measures of verbal and non-verbal cognitive function. Individuals in the preclinical stage of AD have shown substantially different scores on tests of verbal and visual-spatial ability (Jacobson, Delis, Bondi, & Salmon, 2002).

Behavioral abnormalities can also be seen in individuals with preclinical AD. Individuals who eventually develop AD and related dementias appear to exhibit changes in their daily living activities such as shopping, taking care of finances, and using the telephone well before a diagnosis of dementia can be reached and before standardized tests could detect any cognitive or behavioral changes (Nygard, 2003). Emotional and personality abnormalities may also act as an indicator of the eventual development of AD. Individuals in the preclinical stages of AD appear to exhibit more depressive symptoms than others up to 3 years before diagnosis, especially symptoms that are related to motivational disturbances, such as anhedonia, and decreases in energy and concentration (Berger, Fratiglioni, Forsell, Winblad, & Backman, 1999). Furthermore, individuals with preclinical AD may also exhibit anxiety, social withdrawal, introversion, self-centeredness, agitation, and apathy in very mild forms of AD when cognitive decline is difficult to detect (for a review, see Cummings, 2003).

Scores on the MMSE seem to be slightly decreased in individuals with preclinical AD as compared to those who do not go on to develop AD (Berger et al., 1999). One study

has shown that differences in the MMSE can be observed up to 6 years before the diagnosis of AD (Small, Fratiglioni, Viitanen, Winblad, & Backman, 2000).

Furthermore, if individuals in the preclinical stages of AD report memory loss, perform poorly on tests of cognitive functioning (such as the MMSE), and perform poorly on neuropsychological tests there is an 85 percent change that these individuals will develop AD within 3 years (Palmer, Backman, Winblad, & Fratiglioni, 2003). However, there does appear to be a great deal of variability among individuals with preclinical AD regarding both rate and pattern of decline (Backman et al., 2005).

Mild Cognitive Impairment

Recent research has also focused on Mild Cognitive Impairment (MCI). MCI has been thought of as a possible precursor to the development of AD and a possible beginning point for the treatment of AD (Desai & Grossberg, 2005). MCI has been conceptualized and called many different things, including incipient dementia, prodromal AD, and isolated memory impairment (Petersen & Morris, 2003). MCI differs from preclinical AD in that preclinical AD does not necessarily encompass a noticeable cognitive impairment whereas MCI does involve a noticeable cognitive impairment. MCI is diagnosed if individuals have no loss in function, do not meet the criteria for dementia, but have scores on tests of memory that are more than one standard deviation lower than the norm (Desai & Grossberg, 2005).

There appear to be three types of MCI: amnesic MCI, which includes a subjective memory problem and typically progresses to AD; multiple-domain MCI, which involves slight deficiencies in memory as well as non-memory domains (e.g. language, executive

function, activities of daily living, etc.); and single non-memory domain MCI, that manifests as a single non-memory related cognitive dysfunction (Petersen, 2003). The DSM-IV-TR (APA, 2000) refers to “age-related cognitive decline” (780.9), a condition similar to MCI that is a cognitive impairment not due to another condition that is objectively tested and typically includes subjective memory complaints. An objective, universal definition of MCI has not yet been established, although it often includes subjective memory complaints, normal global cognitive functioning relative to age, maintenance of ability to perform tasks of daily living, and absence of dementia (Petersen, 2003; Petersen & Morris, 2003).

AD is sometimes conceptualized as representing the end point on a continuum of aging, whereas other times it is thought of as being a separate disease that is not related to normal aging (Gomez-Isla & Hyman, 2003). MCI is often conceptualized on this continuum as a transitional phase between normal aging and AD (Gomez-Isla & Hyman, 2003; Petersen & Morris, 2003; Petersen, 2003). A large proportion of individuals with MCI eventually are diagnosed with AD. Approximately ten percent of individuals with MCI are diagnosed with AD every year compared to one to two percent of non-MCI individuals (Petersen et al., 1999). Within 6 years, approximately 80 percent of individuals with MCI meet the clinical criteria for a diagnosis of dementia (Petersen et al., 2001).

Neurological abnormalities can be observed in individuals with MCI. Individuals with MCI exhibit a substantial (32 percent) loss of neurons in the entorhinal cortex, a structure that is very often compromised early in AD and throughout the progression of the disease (Gomez-Isla & Hyman, 2003). Individuals with MCI also have a tendency to

exhibit neurofibrillary tangles and amyloid plaques (Gomez-Isla & Hyman, 2003). Individuals with MCI show increased hippocampal activation during memory tests, whereas individuals with AD show decreased activation (Dickerson et al., 2005). This increased activation may represent the need to employ more coping strategies in order to execute successful memory (Dickerson et al., 2005).

Still, it is often very difficult to distinguish between individuals in the very early stages of AD (i.e., preclinical AD and MCI) and normal adults (Morris & Becker, 2004b). Aside from obvious diagnostic and treatment issues that this raises, another implication is that it hinders effective research of AD. Many studies of AD involve comparing a group of AD patients to a control group of “normal” adults on some objective measure and comparing the differences between the two groups. However, it is estimated that up to 20 percent of older individuals in the “normal” adult control groups may be in the early stages of AD (Fleischman & Gabrieli, 1998). This obviously has major implications for the effective study of AD.

Diagnosis of Alzheimer's Disease

As treatments are being developed, interest in diagnosing AD in its earliest stages has increased (Frodl et al., 2002). Recognizing AD in its earliest possible stages has become more important in recent years due to the development of interventions, especially pharmacological interventions, that are best utilized in the earliest stages of the disease (Wetter et al., 2005; Desai & Grossberg, 2005; Gomez-Isla & Hyman, 2003; Petersen & Morris, 2003; Cummings, 2003; Mohr, Dastoor, & Claus, 1999; Frodl et al., 2002; Morris & Becker, 2004b; Parasuraman, 2004; Leifer, 2003). Effective early diagnosis and

discovery of the cause of AD may allow for reversal of the disease and limit emotional distress of individuals with AD and their loved ones (Cohen & Eisdorfer, 1986; Leifer, 2003). For example, loved ones of individuals with AD often sense that something is wrong but are not aware why their spouses, parents, and siblings with AD are prone to emotional outbursts, intellectual confusion, and dangerous behavior (Cohen & Eisdorfer, 1986). Also, early and accurate detection allows for a more accurate prognosis, more timely education of patients and their loved ones and care givers, and appropriate planning for future care (Ikeda, 2004; Leifer, 2003).

Although the ability to make a successful diagnosis has improved in recent decades, effective early diagnosis is still difficult (Lopez et al., 2000; Cummings & Khachaturian, 1999; Miller, 2004). AD cannot be officially diagnosed until autopsy because the presence of neurofibrillary tangles and amyloid plaques must be confirmed before the nature of the individual's dementia can be known for certain (The Dementia Study Group of the Italian Neurological Society, 2000), but preliminary diagnoses can be made. Still, there are no objectively defined cut-off scores for AD in contemporary diagnostic systems (Petersen & Morris, 2003), there is no assessment tool that can provide a definitive diagnosis of AD (Sabat, 2001; Hannesdottir & Snaedel, 2002; Miller, 2004), and the criteria for an inclusion diagnosis of AD have never been operationalized (Lopez et al., 2000). Furthermore, there are no biological markers that allow for a definitive diagnosis of AD (The Dementia Study Group of the Italian Neurological Society, 2000). This is the biggest hurdle to accurate diagnosis (Gray & Della Sala, 2004). The subtle early symptoms and insidious onset that characterizes the early progress of AD also makes early diagnosis difficult (Leifer, 2003).

Another issue in the early detection of AD is that the course and presentation of AD is highly variable both within and among individuals and is often unpredictable (Haxby et al., 1992). In general, the presentation and course of AD is highly heterogeneous (Bouchard & Rosser, 1999; Lopez et al., 2000). For example, different people will exhibit different symptomatology in the early stages of the disease and this symptomatology will progress and change in different ways and at different rates (Bouchard & Rosser, 1999). Furthermore, the neurological abnormalities associated with individuals with AD can be highly variable (Lopez, 2000). Functioning can change noticeably even on an hourly basis (Sabat, 2001).

People in the early stages of AD often show little or no decline after an initial small decline, making AD hard to detect well after a slight decline is in place. Often the disease may have to progress to the intermediate stages before deterioration is obvious (Bouchard & Rosser, 1999). Individuals in these early stages of AD often perform relatively normally on tests of general cognitive function for up to 35 months after disease symptomatology has begun (Haxby et al., 1992). This plateau stage includes scores on the WAIS, which suggests that in the early stages of AD non-memory cognitive function associated with IQ remains constant during an initial decrease in memory ability (Haxby et al., 1992). This makes AD especially difficult to detect in its early stages.

It is also possible that individuals can hide this initial decline by utilizing coping skills that have the potential to mask the effects of AD for some time after the initial cognitive symptoms appear (Cohen & Eisdorfer, 1986). Hence, although an individual with AD may experience many of the initial cognitive declines associated with the disease, the use of coping mechanisms makes it difficult for others, whether family

members, loved ones, or clinicians, to detect. Many individuals with AD report that they were effectively able to disguise their cognitive decline well after they knew there was a decline (Cohen & Eisdorfer, 1986). Individuals with AD report using strategies such as talking less, writing reminders, and limiting activities to those that were easily performed (Cohen & Eisdorfer, 1986). External cues such as notes and reminders appear to be the most effective compensatory techniques used by individuals with AD (Wilson & Hughes, 2001). As AD progresses, individuals often rely increasingly on others as coping mechanisms to provide memory cues (Dixon, Hopp, Cohen, de Frias, & Backman, 2003).

A number of other factors can make diagnosis difficult and inaccurate. For example, symptoms of psychosis, aphasia, mental retardation, low education level, and language differences between the assessor and the individual with AD can all lead to a false positive diagnosis of AD (Canadian Consensus Conference, 1991). AD affects elderly individuals almost exclusively and because older individuals are at high risk for a number of other physical, psychological, and sensory problems and also often experience side effects of medication, it is frequently difficult to gain an accurate psychological assessment of elderly individuals, especially if pre-morbid functioning cannot be accurately assessed (Miller, 2004). Assessment instruments also present a problem in diagnosing AD as many standard cognitive assessments are not satisfactorily normed on extremely old populations (Miller, 2004). Unfortunately, cognitive assessment tools have not been developed that are specifically designed for use in an elderly population (Miller, 2004). Due to all of these difficulties, the diagnosis of AD must rely heavily on clinical judgment (Petersen & Morris, 2003).

Recent studies have suggested clinical diagnostic accuracy rates of up to approximately 90 percent (Salmon et al., 2002; Graff-Radford, 2003; Cummings & Khachaturian, 1999). Nevertheless, AD still often goes undetected until the moderate or late stages of the disease. Between 24 and 72 percent of primary care physicians fail to diagnose AD when it is present (Leifer, 2003). Many times mild or moderate cases will not be recognized upon admission to general medical hospitals (Cairns, Evans, & Prince, 2004). Still, a wave of recent research in AD has led to a substantial increase in the reliability of diagnostic criteria of AD as well as increased diagnostic accuracy (Desai & Grossberg, 2005).

Accurate diagnosis of AD typically involves many steps. First, it is important that the individual's pre-dementia intellectual functioning is established before assessment takes place (Morris, 2004). The best tool to achieve this is the New Adult Reading Test (NART) (Morris, 2004) developed by Nelson and O'Connell (1978). This test requires individuals to read familiar words, a task that is considered to be unaffected in individuals with AD (Nelson & O'Connell, 1978) and therefore useful for establishing some level of pre-dementia intellectual functioning. A clinical interview and a thorough history are typically the next steps in the diagnosis of AD (Weiner, 1991; Leifer, 2003). Assessing onset of symptomatology, duration of symptoms, progress of symptoms, current medications during the clinical interview as well as performing a neurological evaluation are very important in accurately diagnosing AD as well (Duncan & Siegal, 1998). After the interview, the assessment process typically includes tests of at least memory, language, and one other area of cognitive function (Miller, 2004). If an assessment battery tests memory, language, and another area of cognitive function and no

signs of dementia are revealed, then further testing typically does not add any useful information (Miller, 2004). Because AD affects cognitive functioning in such a global way, a test of almost any domain of cognitive function can add to the diagnosis of AD (Miller, 2004). Tests of memory are often the most useful in diagnosing AD, especially in the early stages of the disease, although accurate diagnosis of AD requires a comprehensive assessment (Miller, 2004). Because language difficulties are also common in AD in early stages of the disease, tests of language function can be used to aid in the diagnosis of AD (Weiner, 1991; Miller, 2004). A number of other areas may be assessed, including reading, writing, abstract thinking, judgment, and motor coordination (Weiner, 1991). Office-based assessments ideally have been normed on extremely elderly populations (although many have not been) and typically consist of 20 to 30 questions that focus on basic cognitive functioning (Miller, 2004). Finally, basic cognitive functioning is explored using the most basic questions about one's self, common knowledge, and simple tests of memory (Miller, 2004).

A number of tests exist that attempt to quantify dementia. The most commonly used include the MMSE, Global Deterioration Scale, Blessed Dementia Scale, Washington University Clinical Dementia Rating, Brief Psychiatric Rating Scale, Sandoz Clinical Assessment-Geriatric Scale, and Alzheimer's Disease Assessment Scale (Weiner, 1991). The Wechsler Memory Scale is the most commonly used assessment for evaluating memory function in AD (Miller, 2004).

The most used screening test (and "gold standard" for other screening tests) for AD is the MMSE (Miller, 2004; Leifer, 2003), developed by Folstein, Folstein, and McHugh (1975). Although the MMSE is the most widely used instrument for screening for early

AD, it is not very sensitive when used by itself in diagnosing mild cases of AD (Leifer, 2003) and it has a tendency to produce false positives and cannot be used alone to diagnose AD reliably (Miller, 2004). False-positive diagnoses are the most common error made in assessing dementia in general (Miller, 2004). Scores below 23 out of 30 for individuals with a high school education on the MMSE are often indicative of the presence of dementia, while the same is true of individuals with a score of 18 or below who have an eighth grade education (Weiner, 1991).

The Global Deterioration Scale (GDS) may also be used to diagnose AD and track its severity (Reisberg, Ferris, De Leon, & Crook, 1982). The GDS rates individuals on seven levels of cognitive decline: none, very mild, mild, moderate, moderately severe, severe, and very severe (Reisberg et al., 1982). Therefore, the GDS is not only useful for the diagnosis of AD, but also useful for tracking its progress (Reisberg et al., 1982). This scale utilizes a clinical interview, the WAIS, and the MMSE in order to give patients the appropriate rating of cognitive decline (Reisberg et al., 1982). A score of 3 (mild) often indicates preclinical AD or the presence of MCI (Petersen, 2003). The Blessed Dementia Scale (BDS; Blessed, Tomlinson, & Roth, 1968) assesses general knowledge, concentration, and memory. The BDS also contains questions relating to activities of daily living, changes in affect and habits, and personality. The items consist of various difficulties that individuals with dementia might have, such as inability to remember a short list of items. Patients or their caregivers either rate if this difficulty occurs never, occasionally, or daily or mark if the difficulty is present or absent. The Washington University Clinical Dementia Rating Scale (CDR) quantifies AD severity via interview (Hughes, Berg, Danziger, Coben, & Martin, 1982). This instrument measures

functioning in six domains: memory, orientation, judgment and problem solving, home and hobbies, community affairs, and personal care (Hughes et al., 1982). Each domain receives a rating of either none, questionable, mild, moderate, and severe regarding the presence of dementia (Hughes et al., 1982). The CDR also yields a general score to reflect overall dementia (Hughes et al., 1982). Scores of questionable dementia may reflect the presence of a preclinical form of dementia (Petersen, 2003). The Brief Psychiatric Rating Scale (Overall & Gorham, 1962) is one of the most widely used instruments in psychiatric research. It was originally 16 items, but was expanded to 18 shortly after its development (Burger et al., 1997). This scale assesses five major areas: thinking disorder, withdrawal, anxiety-depression, hostility-suspicion, and activity (Burger et al., 1997). The Sandoz Clinical Assessment-Geriatric Scale is a rating scale that consists of 18 items (Patin, Hamot, & Singer, 1984). Each item falls into one of four categories: cognitive impairment, behavioral impairment, somatic complaints, and negative mood (Patin et al., 1984). The items are rated on a 7-point Likert scale with one representing no dysfunction and seven representing severe dysfunction (Patin et al., 1984). The Alzheimer's Disease Assessment Scale (Rosen, Mohs, & Davis, 1984) evaluates dementia severity in both cognitive and non-cognitive realms. The cognitive portion of the test is assessed using traditional testing procedures while the non-cognitive items are assessed via behavioral observation (Rosen et al., 1984). It consists of 21 items that are rated on a 0 to 5 scale, 0 indicating absence of dysfunction and 5 indicating severe dysfunction (Rosen et al., 1984). Some researchers support the use of the WAIS as a complementary tool to the diagnosis of AD (Larue & Jarvick, 1980; Reisberg et al.,

1982), although some feel that it lacks sensitivity in detecting AD (Miller, 2004; Haxby et al., 1992).

It is important that not only cognitive tests of AD are used and investigated; biological, neurophysiological, and neuroimaging techniques are investigated and should be used in the diagnosis of AD as well (Frodl et al., 2002). New techniques include MRI-volumetric measurement, biological correlates to AD found in cerebrospinal fluid, genetic testing for the APOE allele, and a variety of cognitive measurements (Frodl et al., 2002). Furthermore, the finding that certain characteristics of specific event-related potentials are different in those with AD and those who eventually develop AD compared to others (i.e., controls and those with MCI) has opened this area as a potential diagnostic avenue (Frodl et al., 2002). Positron emission tomography (PET) is a relatively noninvasive procedure that could potentially aid in the diagnosis of AD. PET measures the metabolic rate of cerebral glucose. Individuals with AD sometimes have reduced metabolism of cerebral glucose in parts of the parietal and temporal and this pattern is sometimes observable well before AD can be diagnosed (Leifer, 2003).

Differential diagnosis between AD and other dementias is often problematic as well. Vascular Dementia (VaD) is the second leading cause of dementia and is difficult to distinguish from AD due to general cognitive similarities between the two diseases (Misciagna et al., 2005). While there may be some differences in the presentation of different types of dementia, differential diagnosis among these dementias remains very unreliable due to the overall similarity in dementia presentation and the heterogeneity of presentation among individuals with all forms of dementia (Miller, 2004).

Psychopharmacological Interventions

As the incidence of AD increases, so too does the effort to develop effective pharmacological treatments for AD (Lopez & Bell, 2004). Although there are no cures for AD, there are a number of psychopharmacological treatments for the disorder. These treatments have a number of potential benefits, including delaying the onset of AD, reducing the symptoms of AD, and aiding in helping in the biological difficulties associated with AD (Allen & Burns, 1995). Specifically, acetylcholinesterase inhibitors (AChEIs) appear not only to have beneficial effects in the cognitive realm for people with AD, but also can elicit improvements and/or stabilization in activities of daily living, behavioral disturbances, and delay in placement in nursing homes (Standridge, 2004). For example, Lopez et al. (2002) found that AChEIs may delay the deterioration of the ability to live independently. In their study, 40 percent of people with AD who were untreated had been admitted to a nursing home after their study had begun whereas only six percent of patients treated with AChEIs had entered a nursing home during the same three year period (Lopez et al., 2002).

Deficits and abnormalities in AChE neurons is a hallmark of AD and continue to worsen throughout the progress of the disease (Geula, 1998). Individuals with AD can experience a 50 percent reduction of AChE (Carlsson, 1983). These deficits are expected in AD as AChE is linked to memory function and memory function is severely impaired in individuals with AD. AChE deficits are especially dramatic in the hippocampus and neocortex, key areas that influence memory, executive functioning, and various behavioral and emotional responses. (Ballard, 2002). Abnormalities in AChE are associated with both the formation of amyloid plaques and neurofibrillary tangles, the

neurological hallmarks of AD (Hogan & Patterson, 2002; Wright, Geula, & Mesulam, 1993). Hence, medications that increase the presence of the AChE in the brains of individuals with AD can help aid in many of the cognitive deficits associated with the disease (Hogan & Patterson, 2002).

Currently, AChEIs are the most effective pharmacological treatment for AD and work by increasing the presence of AChE in the individuals with AD (Hogan & Patterson, 2002; Ballard, 2002; Whitehouse, 1997; Allen & Burns, 1995). AChEIs effectively increase the amount of AChE in the synapses of those with AD (Hogan & Patterson, 2002; Leifer, 2003) by decreasing the rate that AChE is broken down in the synapse (Johanssen, 2004) by acetylcholinesterase (Hogan & Patterson, 2002). AChEIs were the first medications approved for the psychopharmacological treatment of AD by the United States Food and Drug Administration (Lopez et al., 2002; Leifer, 2003). These medications are typically used as the first line of treatment for AD (Lopez et al., 2002).

Currently there are three different types of AChEIs that are used for treatment of AD, rivastigmine, donepezil, and galantamine (Johanssen, 2004; Rosenberg, 2005). These medications have similar global effectiveness and side effect profiles (Hogan & Patterson, 2002; Ballard, 2002). These drugs have been shown to slow the degradation of global functioning, cognitive functioning, activities of daily living, and behavioral problems associated with AD (Johanssen, 2004). The side effects include nausea, vomiting, diarrhea, muscle cramps, abdominal pain, dizziness, insomnia, and weight loss (Hogan & Patterson, 2002). While these drugs do not reverse the progress of AD they can elicit some improvement in the early stages of treatment (Johanssen, 2004; Desai & Grossberg, 2005). Unfortunately, not everyone with AD experiences benefits from these

medications, and those who do not respond cannot be reliably identified (Hogan & Patterson, 2002).

Typically, these medications are most effective for individuals with mild to moderate AD and are typically prescribed for individuals only in these stages (Johannsen, 2004; Ballard, 2002) although they may have longer lasting effects that could benefit individuals in the more severe stages of AD (Lopez et al., 2002; Johannsen, 2004). The beneficial effects of these drugs appear to sustain themselves for more than 5 years (Johannsen, 2004). It is recommended that AChEIs be continued in patients with AD for at least 1 to 2 years before there is consideration of discontinuing the medications in order to ensure that the medications are not having a beneficial effect (Johannsen, 2004).

Although monitoring the effectiveness of AChEIs is important to decisions regarding the continuation of pharmacotherapy it is difficult to track these drugs' effects. The MMSE is typically used to assess the effectiveness of pharmacotherapy slowing these declines (Johannsen, 2004). However, the MMSE does not assess a number of areas that may receive benefits from medication, such as affect and activities of daily living (Johannsen, 2004). Because AChEIs seem to produce benefits in a number of realms, a cognitive assessment such as the MMSE should not be used alone in the assessment of these drugs' effectiveness. Measures of everyday function and behavior should be used in conjunction with cognitive tests to monitor drug effectiveness in AD as AChEIs aid in slowing decline in these areas as well (Hogan & Patterson, 2002). Also, the MMSE may not be able to detect subtle improvements that may be occurring due to the therapy (Hogan & Patterson, 2002). However, because there is typically a 3.3 point decline annually on the MMSE, although this rate of decline is variable both within and among

individuals with AD that are untreated (Haxby et al., 1992), a lesser decline or no decline at all in individuals receiving pharmacotherapy would suggest effectiveness of the medication (APA, 2000; Lopez et al., 2002; Hogan & Patterson, 2002). AChEIs have been shown to decrease the rate of decline on the MMSE. Lopez et al. (2002) found an average decline of 2.5 points per year in those who were taking AChEIs as compared to the typical 3.3 point decline. Therefore, although the subtle effects of these drugs on the course of AD may be difficult to track, the global effectiveness of these drugs can be consistently monitored.

AChEIs are not the only form of pharmacotherapy available to individuals with AD. AChEIs may also be used in combination with drugs such as memantine, an N-methyl-d-aspartate stimulator. Memantine by itself has been shown to slow the deterioration of both cognitive and behavioral functions (Desai & Grossberg, 2005) and when used in combination with AChEIs may be more beneficial than AChEIs alone (Standridge, 2004). Another line of pharmacotherapy is the non-steroidal anti-inflammatory drugs (NSAIDs). These drugs are anti-inflammatory drugs (such as aspirin) that appear to provide some protection against the development of AD (McGeer & McGeer, 2001; Rosenberg, 2005) as inflammatory processes in the central nervous system are associated with AD and neuronal death (Rosenberg, 2005). However, the effectiveness of these drugs has not been confirmed by prospective studies (Desai & Grossberg, 2005). It has also been suggested that inhibiting the production of butyrylcholinesterase (BuChE) as it is a substrate for AChE and increases over the course of AD may be worthwhile as a focus of pharmacotherapy (Ballard, 2002). Medications that inhibit BuChE include cymserine, bisnorcymserine, and phenethylcymserine (Ballard, 2002). Rivastigmine

inhibits both acetylcholinesterase and BuChE and may therefore be more effective than medications that inhibit either acetylcholinesterase or BuChE alone, although this claim has not yet been substantiated (Ballard, 2002).

Other medications used to treat AD include neuroleptic and non-neuroleptic drugs for abnormal behavior associated with AD, antipsychotic medication for cognitive deficiencies, and benzodiazepines (Lopez & Becker, 2004). MAOI's and SSRI's also have been used in the treatment of AD (Allen & Burns, 1995). Vitamin E has been investigated as a possible treatment for AD due to its antioxidant properties. Results on the efficacy of this treatment have been mixed, although vitamin E does have the advantage of being a safe and low cost treatment (see Leifer, 2003 for a review). The American Psychiatric Association recommends pharmacological treatment for AD that is both individualized and multimodal (American Psychiatric Association, 2002).

Non-pharmacological Interventions

Although psychopharmacological treatments for AD are the first line of treatment for the disease, psychological and behavioral interventions are important as well (Desai & Grossberg, 2005). Psychotherapy of individuals with AD is a relatively recent phenomenon as researchers and clinicians have been very pessimistic regarding the ability of individuals with AD to retain information needed to benefit from psychotherapy (Davis, 2005). In 1989, Riley noted that caregivers were typically the identified patient in cases of AD rather than the individuals with AD. By focusing only on behavioral management, as psychosocial interventions for individuals with AD typically do, there is the danger of ignoring phenomenological aspects of the disease (Riley, 1989).

Psychotherapy itself is controversial in the context of dementia due largely to clients' inability to remember information from session to session (Frazer, 2000), although it may be dangerous to presume that gains cannot be made in psychotherapy for this reason (Riley, 1989).

One difficulty with using non-pharmacological interventions is that, due to difficulties in executive functioning, individuals with AD have difficulty implementing strategies that are designed to help them (Rusted & Clare, 2004). Furthermore, the existence of anosognosia can greatly hinder the effectiveness of non-pharmacological treatments in AD (Cotrell, 1997). Still, because there is often a "disability gap" (individuals with AD often exhibit greater dysfunction than is warranted by their neurobiological abnormalities), environmental factors are important to the functioning of individuals with AD (Bowlby Sifton, 2000). A major goal of non-pharmacological interventions in AD is to reduce this gap (Bowlby Sifton, 2000).

Unfortunately, few non-pharmacological treatments for AD have undergone randomized clinical trials to establish the efficacy of these treatments (Rabins, 2000). The efficacy of non-pharmacological treatments is based on case studies, naturalistic observation, and single-blind studies rather than randomized clinical trials (Rabins, 2000). A review by the American Psychiatric Association found no evidence for improvement in cognitive functioning via non-pharmacological therapies (Rabins, 2000). The same review suggested that some non-pharmacological therapies may be somewhat efficacious in treating non-cognitive, behavioral symptoms. These therapies include music therapy, pet therapy, activity therapy, and regularly scheduled activity (Rabins, 2000). This review also suggested that a supportive, structured environment that engages

individuals with dementia in frequent physical and mental activities is more helpful than classic talk therapy.

Everyday intervention with AD is largely environmental in nature. Focus on activities of daily living, safety, caregiver issues, access to appropriate community resources, and psychoeducation are all key components of any intervention strategy designed to treat AD (Whitehouse, Mayeux, & Growden, 1989). Simple reminders are a key component of memory loss intervention (Frazer, 2000). Also, removing potentially dangerous objects and replacing them with safer things is also important. For example, instead of having a stove, the individual with AD may have a microwave or a toaster oven (Frazer, 2000). Environments of individuals with AD should match the severity of the dementia and provide relatively easy functioning within that environment (Chafetz, 1991). A number of principles of environmental construction can be used to aid individuals with AD and dementia (for a review, see Chafetz, 1991). These are simplification of the environment (e.g. removing things that are unnecessary, making simple floor plans that are preferably only one level, etc.) while maintaining an appropriately stimulating environment, easy access to things needed for everyday living, protection from potentially dangerous objects and situations, providing access to safe outdoor environments, safe and easy to use furniture, limiting excess noise and light, and making locations within the environment as easy to identify as possible. Pynoos and Regnier (1991) presented 12 guidelines for setting up the physical environments of individuals with AD to aid in their functioning including having written schedules, providing specific steps for everyday activities, using pictures to remind of the functions of different everyday objects, controlling the individual's level of stimulation, adhering to

a routine schedule, limiting challenging activities to appropriate levels with regard to the individuals abilities and frustration tolerance, limiting novel experiences, and using medication reminders.

Treatment of AD often focuses on treating memory problems rather than emotional problems surrounding the disease. There are many simple things that caregivers can do to aid memory of individuals with AD. These include maintaining a consistent schedule for the individual with AD, providing visual reminders of activities for the day, using notes, labeling objects either with words or pictures depending on the individual's abilities, and using short sentences when communicating (Mace & Rabins, 1991). Camp, Foss, O'Hanlon, and Stevens (1996) utilized spaced retrieval to aid individuals with AD reduce difficulties with memory and time orientation by involving implicit memory functions that are relatively maintained in AD. Spaced-retrieval involves teaching an individual a piece of information, then repeatedly questioning them about that information. Each time the individual is successful remembering the information upon inquiry, the time between inquiries increases (Camp et al., 1996).

Arkin (2001) helped individuals with AD improve biographical memory by having them repeatedly listen to audiotapes the stated facts about their life history. Other treatments may involve memory exercises such as practicing digit span and reviewing biographical and geographical information (Fernandez, Manoilloff, & Monti, 2006). Because difficulties in encoding seem to be at the heart of the memory difficulties associated with AD, interventions that help individuals with AD encode information should be especially useful (Rusted & Clare, 2004). Recently, interventions have focused

on multi-modal encoding that can be used in the individual's everyday life (Rusted & Clare, 2004).

Camp and colleagues (Camp et al., 1993) have developed a model of memory intervention that utilizes principles of classical conditioning. This model is based on the assumption that individuals with AD are not significantly impaired in the use of external aids for memory and are not significantly impaired in their implicit memory. The model uses classical conditioning to change problematic behaviors of individuals with AD. For example, a stimulus that typically elicits a negative or inappropriate response from an individual with AD is repeatedly paired with a stimulus that elicits a positive or appropriate response. In theory this works because individuals with AD can rely on external aids to learn and because they can learn the association via the relatively preserved implicit memory system as opposed to the severely compromised explicit memory system. Individuals can also be conditioned to utilize external aids such as calendars and reminder notes early in the course of AD so that they will continue to use these external aids throughout the disease.

Often psychosocial interventions are maintenance interventions rather than methods to improve or reverse the disease due to difficulty learning new information. It is difficult for individuals with AD to improve if they have difficulty learning new skills and behaviors (Weiner, 1991). However, some evidence suggests that individuals with AD can improve. For example, studies have suggested that simple environmental interventions could provide great assistance to those with AD. For example, Dawson, Kline, and Wiancko (1986) showed that simply engaging individuals with AD in planned weekly interactions can elicit improvement on cognitive tests. Furthermore, studies have

suggested that individuals with AD who were given small amounts of control over their environment helped increase health and mood. Langer and Rodin (1976) performed a study in which one group of individuals with AD were able to choose how they arranged furniture in their rooms, what kind of plant they had in their rooms, and which of two nights they would see a movie. The other group had no control over any of these decisions. Those in the first group were not only happier, healthier, and more active, but experienced half as many deaths in the 18-month span of the study. Unfortunately, the effectiveness of current environmental interventions is largely under question and have not surpassed the effectiveness of pharmacological interventions (Rusted & Clare, 2004; American Psychiatric Association, 2002; Weiner, 1991).

An important aspect of AD treatment to some researchers is simply that the person with AD is not forgotten or ignored. Kitwood (1990; 1997) stressed the importance of avoiding placing people with AD in an inferior position, a common occurrence in the treatment of AD that is part of what he refers to as “malignant social psychology.” According to Kitwood, this causes individuals to exhibit more cognitive and behavioral disability than can be accounted for by neurological dysfunction alone (the “disability gap” mentioned above). Malignant social psychology occurs largely because caregivers often unintentionally focus on the shortcomings of the individual with AD and thus “position” them socially in a manner that is depersonalizing, unsupportive, and counter therapeutic (Kitwood, 1990). Sabat (1994b) provided evidence for this phenomenon in a case study that showed a woman whose symptoms were reduced in the therapeutic environment of a day care center but greatly worsened in the less therapeutic environment of her home.

Kitwood (1997) espoused a person-centered approach to the treatment of AD and focused on facilitating positive interactions with individuals with AD as a primary means of treatment. These positive interactions include validating the individual, their reality, their feelings, recognizing the individual as a sentient being with real needs and desires and communicating this to them, consulting with the individual regarding their needs and preferences, working collaboratively on treatment and tasks, and helping individuals with AD in areas they need assistance by filling in the function that they can no longer perform.

Another important intervention is helping individuals with AD function in meaningful ways, such as helping individuals with AD find ways to continue to engage in hobbies, activities of daily living, social activities, and household chores that are enjoyable (Bowlby Sifton, 2000). Supporting positive behaviors that are maintained in individuals with AD in general can be an effective intervention (Bowlby Sifton, 2000). Bowlby Sifton (2000) identified a number of functions that are commonly maintained in individuals with AD and identified ways to support these functions. For example, procedural memory is often somewhat maintained in AD and can be especially aided by familiar, typically non-verbal cues as recognition is typically not as damaged as recall. Because humor is often maintained throughout AD and can aid in emotional well-being, it is important to support and encourage the use of humor by individuals with AD. It is important to encourage the experience of positive emotions and the experience of positive emotional memories as these abilities are typically maintained in AD. Because many social skills are over-learned, such as hand shaking, encouraging the use of these skills can facilitate social involvement, self-esteem, and dignity. Providing appropriate sensory

stimulation is important to maintain contact with the external environment, promote brain activity, and provide sensory pleasure through things such as pleasant odors and textures. Exercise and movement are beneficial to many with AD as substantial motor functioning abilities are typically maintained in AD. The ability to process and enjoy music is typically maintained in AD and can help support an individual's connection with the external environment and provide a positive emotional experience. Because long-term memory is largely preserved, positive memories can be aroused by encouraging individuals with AD to reminisce about positive things from their past (Bowlby Sifton, 2000).

Some interventions used with AD focus on the interaction between the individual with AD and their caregiver. The manner in which caregivers interact with individuals with AD can either exacerbate or ameliorate some of the symptoms associated with AD and is thus a very important area of AD management (Weiner, 1991). It is important that caregivers create a physical and interpersonal environment that allows individuals with AD to function at the highest level possible (Weiner, 1991). It is also useful for the caregiver to accept an individual's level of functioning rather than attempting to challenge or improve them (Weiner, 1991). It is also suggested that caregivers aid individuals with AD by performing some of the day-to-day functions that the individual can no longer perform (Weiner, 1991; Kitwood, 1997).

Weiner (1991) outlined a number of principles that are important in the management of AD, including correcting sensory impairment when needed, not confronting the individual with AD, simplifying communications and activities, structuring activities, using multiple cues when communicating, repetition of communication, demonstrating

appropriate behaviors, using both positive and negative reinforcement, reducing the individual's choices, providing an appropriate amount of stimulation, avoiding behaviors that require learning new things, identifying and encouraging the use of skills that are still intact, expressing emotion clearly, minimizing anxiety, and using methods of distraction when problematic situations arise. Bowlby Sifton (2000) also outlined a number of important things caregivers can do, such as helping individuals with AD begin an activity, provide appropriate cues, break jobs down into smaller steps, allow for choice that is not overwhelming, set up the individual to succeed, limit distraction, allow privacy, allow extra time to complete tasks, and provide a consistent routine.

A number of classic "talk" therapies have been utilized with individuals with AD and dementia (Watkins, Cheston, Jones, & Gilliard, 2006; Riley, 1989; Frazer, 2000). Although many of these are individual therapies, group and family therapy may also be effective (Riley, 1989). Different forms of psychodynamic therapy and different psychodynamic conceptualizations of AD have been used to treat AD ranging from focusing on providing attachment to a parental figure, facilitating emotional catharsis, facilitating psychological growth by utilizing weakened defenses caused by AD, and utilizing interpersonally focused therapy (for a review, see Frazer, 2000). Rationale for psychodynamic therapy includes the maintained affect in individuals with dementia and the rapid development of transference (Frazer, 2000). Furthermore, because defenses are weakened due to cognitive impairment, progress can be made quickly as unconscious material can be brought into awareness quickly (Frazer, 2000). Psychodynamic therapies have been used with individuals with mild to moderate cognitive impairment due to dementia but not severe dementia (for a review, see Frazer, 2000).

Validation therapy, developed by Feil (2002), is also a therapy for AD that focuses on interacting and communicating with individuals with AD. It uses a psychodynamic perspective to attempt to make sense of the seemingly random verbalizations and behaviors of individuals with AD (Frazer, 2000). Although validation therapy has not been empirically validated, it is used by many therapists (Frazer, 2000). It can be used by a number of people, and although it requires training, it does not require a college degree. The central tenet of validation therapy is to provide empathic listening and to maintain a respectful attitude toward individuals with AD (Feil, 2002). Specific techniques of validation therapy are used for individuals at different stages of AD (Feil, 2002). Unfortunately, validation therapy has little scientific support (American Psychiatric Association, 2002).

Although cognitive-behavioral therapy is often used to treat comorbid depression in individuals in the early stages of AD and dementia, it may be used to treat individuals with MCI independent of depression (for a review, see Frazer, 2000). Cognitive-behavioral therapy with individuals with cognitive impairment is similar to any other population where the focus is on psychoeducation regarding the relationship between behavior, cognition, and affect, recognizing and changing cognitive distortions and the settings in which they occur, recording behaviors and cognitions, analyzing the relationship between cognition and mood, and encouraging more adaptive behaviors and cognitions. Sometimes additional structure is required both within and between sessions for individuals with cognitive impairment in order to make change more salient. Caregivers may also be involved in implementing behavioral interventions.

Person-centered therapy for AD has been increasing in recent years as researchers and clinicians are more thoroughly recognizing and attending to the emotional needs of individuals with AD (Kitwood, 1997). Person-centered therapy attempts to focus on the person with AD rather than their short-comings and attempts to utilize their strengths (Innes & Hatfield, 2001). Person-centered therapy is sometimes used in conjunction with visual art therapy, dance/movement therapy, and music therapy (Innes & Hatfield, 2001).

Many other therapies are specifically designed for individuals with AD. Reminiscence, life-review therapy, and sensory stimulation therapy have shown some benefit to individuals with AD (Bowlby Sifton, 2000). Reminiscence therapy encourages individuals with dementia to retrieve autobiographical memories in order to gain a better understanding of self, gain personal meaning, and aid in accepting the final stage of life (Kasl-Godley & Gatz, 2000). This intervention is usually conducted in groups with individuals with dementia and is often used to aid socialization (Kasl-Godley & Gatz, 2000). Life-review therapy has similar goals but uses a number of techniques such as writing autobiographies, taking trips to important places from one's past, creating scrapbooks, and visiting or writing important people from one's past (Butler, 1974). Stimulation therapy involves increasing the social and physical activity of individuals with AD (American Psychiatric Association, 2002; Rusted & Clare, 2004). Reality orientation, where individuals with AD are routinely oriented to place, time, and other important aspects of their environment, is sometimes used to aid memory problems, but its effectiveness is questionable (Rusted & Clare, 2004; Zarit, Orr, & Zarit, 1985).

Activity therapies involve focusing individuals with AD on external activities that are pleasurable and taking the focus away from themselves and their decreased cognitive,

behavioral, and emotional abilities (Weiner, 1997). Activity therapies can demonstrate short-term benefit by distracting individuals with AD from their predicament (Weiner, 1997). Group therapies are also sometimes used with individuals with AD and are often successful (for a review, see Frazer, 2000). Group therapy is the most common form of non-pharmacological therapy used to treat AD (Watkins et al., 2006).

Although many individual “talk” therapies are available for individuals with dementia, some themes provide common foci across therapies with this population. These issues are loss, adaptation, and interpersonal conflict (Frazer, 2000). Elderly individuals frequently experience the loss of close friends and family members through death and may also experience the loss of their own cognitive abilities. In situations in which individuals are concerned about loss, it is important for the therapist to communicate to the individual that they are not alone (Frazer, 2000). Furthermore, not only must individuals with AD adapt to the limitations of their own cognitive impairment, but they also commonly have to adapt to changes in residency and caregivers and their own role within the family (Frazer, 2000). Therapists and caregivers may deal with the problem of adaptation by substituting their own cognitive abilities for those of the individual (Kitwood, 1997; Frazer, 2000) with AD and by identifying care giving staff that the individual is most comfortable with and allowing them to maximize the time they work together (Frazer, 2000). Finally, due to cognitive impairment and lack of behavioral and affective inhibition, among numerous other difficulties, individuals with AD commonly experience a variety of interpersonal difficulties (Frazer, 2000). Successful interventions within the realm of interpersonal difficulties typically involve behavioral interventions that prevent situations in which problematic interpersonal

interactions occur, whether this be avoiding certain people or certain environmental settings (Frazer, 2000).

Tracking Alzheimer's Disease

Monitoring the progress and course of AD is important to determine individuals' cognitive and behavioral abilities and to understand the course of AD. Also, treatment effectiveness is important to monitor so adjustments can be made in treatment and the effectiveness of various treatments can be documented. However, monitoring the effectiveness of treatment in AD is especially difficult due to its highly variable and unpredictable presentation and progress (Haxby et al., 1992; Bouchard & Rosser, 1999; Lopez et al., 2000). Progress of AD is typically monitored using either screening instruments that are used in the diagnosis of AD, those that provide a broad picture of cognitive functioning (such as the MMSE), or extensive test batteries that allow for a more nuanced look at how AD is progressing (Gray & Della Sala, 2004). It has been suggested that the progression of language deficiencies could be used to track the progress of AD as different language disturbances develop through the course of AD (Kertesz, 2004). The tracking of motor disturbance has also been suggested as a possible method of tracking the development of AD (Kidron & Freedman, 2004).

Some researchers pay close attention to the discourse of individuals with AD in order to determine the effectiveness of treatment. For example, Watkins et al. (2006) observed signs in individuals' narratives that signaled the assimilation of and acceptance of their disease and the accompanying symptoms of the disease. These researchers suggested that a key part in treatment is promoting the conscious acceptance of the disease and its

consequences, and therefore statements that reflect this, such as commenting on the disease and its symptoms and communicating fear that one is losing one's mind are seen as markers of improvement over the course of therapy. Their findings have suggested that different therapeutic foci are most beneficial at different stages of the disease. For example, if individuals have assimilated their memory difficulties, it may be most beneficial to aid them in gaining some control over their situation through planning. If an individual has not assimilated their disease, a less directive focus on affect may be more beneficial.

Inner Experience in Alzheimer's Disease

There is very little understanding of the subjective experience of individuals with AD (Lawton, Van Haitsma, & Perkinson, 2000). Although it is difficult for individuals with dementia to communicate what is occurring in their inner experience, it can still be understood to a limited degree (Lawton et al., 2000). Understanding of this experience is important for a number of reasons, one of which is to help caregivers can respond more effectively to their emotional needs and desires (Lawton et al., 2000).

Good care for people with dementia requires a continuing search for means by which caregivers may comprehend the needs of such people and build this understanding into the way they give care. The emotional states of dementia patients are a neglected source of such cues. (Lawton et al., 2000, p.117).

Although there has been substantial interest in the study of the inner experience of individuals with AD in recent years, many researchers, caregivers, and individuals with AD are left to speculate on the nature of the inner experience of individuals with AD.

For example, support groups for caregivers of those with AD are often populated with questions such as “what’s going on in that head of his?” (Gubrium, 2000, p. 185).

There were caregivers who anxiously sought answers and seemingly grasped at any understanding that became available. Other caregivers came to support group with ready-made answers of their own, contributing to the local culture of knowledge about the inner world of the demented. Some support groups touted rather definitive views of the demented and participants were continuously held accountable to these views. (Gubrium, 2000, p. 186).

Furthermore, support groups often seem to develop and maintain group myths about what the experience of AD is like. Sometimes caregivers develop romanticized views of the inner experience of AD. For example, some group myths have included views that individuals with AD experience more with feelings than with words, that as the disease progresses individuals with AD are more sensitive to touch, that they respond more to the tone of a loved one’s voice, that the individual just needs physical affection to “wake up,” and that they can communicate with their eyes and expressions (Gubrium, 2000). Not all views are necessarily romanticized however. Other speculations that individuals who care for individuals with AD sometimes make are that AD is basically “brain failure” (Gubrium, 2000, p. 185), that there is no mind left in AD, and the individual with AD is “just a piece of meat”, that there may be no thoughts left, that the person still “has it up there” (Gubrium, 2000, p. 187) but is simply more prone to confusion, that feelings are present but processing is decreased, that the person is an “empty-shell” bereft of thought, that the person is not really there anymore, and that their inner experience is confused but not meaningless (Gubrium, 2000).

Unfortunately, individuals with AD are also left to speculate the nature of their own condition. For example, one individual with AD lamented,

No theory of medicine can explain what is happening to me. Every few months I sense that another piece of me is missing. My life...my self...are falling apart. I can only think half thoughts now. Someday I may wake up and not think at all...not know who I am. Most people expect to die someday, but who ever expected to lose their self first? (Cohen & Eiserdorfer, 1986, p. 22).

Unfortunately, not only must individuals endure the unspeakable hardships of AD but they must do so without a thorough explanation of what to expect experientially as the disease progresses.

Even researchers often seem in the dark and left to speculations regarding the inner experience of AD and dementia. Sabat (2001) asked,

How, then, can we come to a more detailed, richer understanding of the experience of persons afflicted with AD as they go about the task of living with and among others? That is, how can we see the afflicted as persons who have their own desires, hopes, fears, loves, identify the nature of those aspects of their lives, and thereby see them as being defined and understandable in terms of characteristics beyond their ‘presenting symptoms’? (p. 13).

The reason that caregivers, loved ones, researchers, and even those with AD and dementia must resort to unfounded speculations about the inner experience of AD is that very little is known about the inner experience of AD and dementia.

What is the experience of AD like?...But what does it mean to lose one’s mind (as opposed to a brain)? How can one tell when the mind is gone? How is one to

conceptualize its subjectivity? These are urgent questions because their answers organize thoughts, sentiments, and courses of action in relation to the individual question. (Gubrium, 2000, p. 185).

Although there is very little known definitively about the inner experience of individuals with AD and other dementias (as evidenced by the need for the speculations above), the inner experience of dementia has been a topic of interest for well over 100 years. Esquirol (1838/1845, cited by Sabat, 2001, p. 313) hypothesized about the inner experience of dementia, stating that individuals with dementia have “few or no ideas.” Contemporary researchers continue to form hypotheses and make speculations regarding the inner experience of AD and dementia. The notion that individuals with AD experience a general loss of self is perhaps the most pervasive speculation regarding the inner experience of individuals with AD (Ballenger, 2006). However, this speculation has been changing recently as many researchers believe that selfhood is maintained well into the progression of the disease and perhaps throughout the disease (Shenk, 2005; Ryan, Byrne, Spykerman, & Orange, 2005). Although there are clearly a number of losses of important aspects of the self associated with AD, there is also potential for growth in major aspects of the self, including the use of coping skills, creativity, and spirituality (Ryan et al., 2005; Kitwood, 1997).

Nevertheless, the extent to which individuals with AD maintain their sense of self remains a topic of debate in contemporary Alzheimer’s research and is often the focus of questions surrounding the inner experience of individuals with AD. Dementia has come to be thought of by many researchers as a loss of selfhood, although there is very little understood about self-awareness in dementia and there is likely to be high variability

among individuals with dementia regarding perceptions of selfhood and self-awareness (Lawton et al., 2000). Because Western culture often equates selfhood with memory and language while ignoring non-cognitive aspects of expression, AD is often viewed as a loss of selfhood in this culture (Ballenger, 2006). This notion may also be partially present due to campaigns that used the idea to win support for AD (Ballenger, 2006). Cohen and Eisdorfer (1986) used the reports of individuals with AD and dementia to hypothesize that a key component of AD and dementia is the progressive “loss of self.”

Some researchers, however, have rejected the idea that dementia leads to a loss of self-hood (Ballenger, 2006). Some caregivers reject the notion that their loved ones have lost their selfhood, believing that the self is still there, simply hidden behind the mask of dementia, and that sometimes dementia helps to reveal an individual’s true self (Ballenger, 2006). The extent to which individuals with AD maintain a sense of self depends largely on the observer’s definition of self. Although individuals with AD may lose key components of their selfhood, such as memory and communication, they may maintain other important parts of their selfhood, including their social selves (Sabat & Harre’, 1992; Kitwood, 1990). Harris and Sterin (1999) stated that the nature of the self in AD is difficult to pinpoint as it is in a constant state of change due to ever changing needs and shifting roles that are part of the progression of AD.

The primary method of drawing inferences about the nature of self in individuals with AD is closely examining the communication of these individuals in their natural environment, especially communication that seems to indicate the existence of a sense of self such as using personal pronouns and the communication of values, memories, experiences, and topics that are otherwise important to them (see Sabat, 2002; Sabat &

Harre', 1992; Shenk, 2005). The idea that an individual is still a person or has a self has been suggested as the central tenet of AD care (Ryan et al., 2005).

Perhaps the leading researcher in the area of the inner experience of AD is Kitwood, who developed the Dementia Care Mapping (DCM) technique to evaluate the care given to individuals with dementia (Kitwood & Bredin, 1994). DCM requires researchers to shadow an individual with dementia who lives in a residential care facility for at least 6 hours in order to understand the quality of care the individual is receiving and to gain an understanding of their daily experience. This technique has led Kitwood to hypothesize that a key component of the experience of dementia is the loss of personhood, and a key component of care is aiding individuals with dementia to maintain their personhood (Kitwood, 1993; Kitwood & Bredin, 1992). Kitwood and Bredin (1992) have identified three phenomena in dementia that are evidence for the maintenance of personhood. First, there is sometimes a reversal of symptoms, even in the severely demented. Individuals who have experienced a progressive deterioration of cognitive and behavioral functioning sometimes recover some of their lost skills. Second, after progressive cognitive and behavioral deterioration, there is sometimes stabilization and a lack of further cognitive and behavioral deterioration. And finally, research with geriatric rats show that, at times, changing the rats' environmental conditions can reverse their neurological deterioration. Although the authors admitted that these observations are not adequate for a sound scientific theory regarding the maintenance of personhood in dementia, they did maintain that they are sufficient to show hope for the maintenance of personhood in dementia (Kitwood & Bredin, 2002).

Furthermore, Kitwood and Bredin (1992) hypothesized four “global sentient states” related to the inner experience of individuals with AD that are derived from various behavioral observations of people with dementia. These states are:

1. Sense of personal worth – Ageing involves losses and this attacks personal worth. Maintenance of personal worth after losses is associated with general well-being.

2. Sense of agency – This involves control of one’s environment. This is lost as dementia progresses and as the ability to control one’s self and one’s environment diminishes.

3. Social confidence – This is being comfortable with others and feeling as if you have something to offer socially.

4. Hope – Maintaining a state of hope is often very difficult in dementia.

There are behavioral observations that are empirically measurable and are indicative of these states (Kitwood & Bredin, 1992). These behaviors are divided into 12 categories as follows: the assertion of desire or will, the ability to experience and express a range of emotions (both positive and negative), initiation of social contact, affectional warmth, social sensitivity, self-respect, acceptance of other dementia sufferers, humor, creativity and self-expression, showing evident pleasure, helpfulness, and relaxation.

The study of inner experience in general is thought to be difficult empirically, especially in individuals with multiple cognitive deficits such as those that occur in AD. Kitwood (1997) suggested that empirical methods are not suitable to gain valid insight into the inner experience of individuals with dementia. Instead, Kitwood (1997) recommended using more imaginative techniques to study the inner experience of

individuals with dementia. Kitwood (1997) suggested six access routes that may be used to investigate the inner experience of individuals with dementia:

1. Examining written accounts of individuals with dementia – There are many publications written by individuals with dementia that are designed to describe the experience of their dementia. This can help researchers understand the difficulties that individuals with dementia face, not the least of which is the “struggle to remain a person” (Kitwood, 1997, Six Access Routes, para. 2). The written accounts of individuals with AD regarding their inner experience will be presented later in this paper.

2. Interviewing individuals with dementia – This may be helpful for gaining insight into the inner experience of dementia, but the researcher must pay close attention to nonverbal communication. Researchers should also pay close attention to metaphor rather than focusing on the literal meaning of the content of the interview. Interviews of people with dementia have uncovered insights into the inner experience of dementia, including the fear of losing control and meaning in one’s life and the need for reassurance.

3. Paying careful attention to the day-to-day behavior of individuals with dementia – Again, Kitwood suggested that researchers go beyond the literal meaning of everyday behavior and speech and interpret the metaphorical meaning of verbal and non-verbal behavior.

4. Interviewing people who have experienced dementia due to illness and have recovered – Typically these reports come from individuals who have experienced the dementing effects of depression or meningitis. One individual described the conscience experience of her meningitis-induced dementia as having a sense of “strangeness” and

“weirdness,” at the same time experiencing that “she both is, and is not, herself” (Kitwood, 1997, Six Access Routes, para. 14).

5. Using poetic imagination – Kitwood suggested that the researcher use his own poetic imagination in order to hypothesize about the experience of individuals with dementia. This may be necessary because typical forms of verbal description may not capture the strange experience of dementia. Kitwood provided his own example of using poetic imagination as an attempt to gain insight into the experience of individuals with dementia. This is an excerpt from that example:

You are in a swirling fog, and in half-darkness. You are wandering around in a place that seems vaguely familiar; and yet you do not know where you are; you cannot make out whether it is summer or winter, day or night. At times the fog clears a little, and you can see a few objects really clearly; but as you try to make sense of where you are you are overpowered by a kind of dullness and stupidity; your knowledge slips away, and again you are utterly confused. (Kitwood, 1990, p. 40).

6. Using role-play – Kitwood suggested that researchers role-play what it is like to have dementia in order to gain a better understanding of the inner experience of individuals with dementia. The role-play will allow researchers to use their own dementia-like experiences from the past in order to create an “inner narrative” that is similar to the inner narrative of individuals with dementia.

Using his own research and the research of others, Kitwood (1997) conceptualized the progressive experience of individuals with dementia as having three stages. The first involves feelings typically of negative content that are associated with the perils of living with dementia. The second Kitwood described as involving “global states.” These

global states consist largely of “raw emotions” and confusion. The third stage involves “burnt-out” states that may resemble a vegetative existence. Individuals with dementia can pass in and out of these stages, back and forth, or may experience these stages simultaneously. Kitwood also claimed that individuals with dementia tend to have extremely intense and “vivid” emotional experiences.

Another analogy that Kitwood and Bredin (1992) drew regarding the experience of individuals with AD is that of a fluid, frozen, and shattered self. These researchers suggested that the self remains fluid in childhood and moves into a frozen state in adulthood. In individuals with dementia, their self becomes shattered and their subjectivity is fragmented. In this state the individual needs others to help shape their reality as well as their sense of personhood.

Sabat (2001) also investigated the inner experience of individuals with AD and dementia. Sabat and colleagues’ primary method of inquiry was to interact with individuals with AD (Sabat, 2001; Sabat & Cagigas, 1997) while paying close attention to metaphor, individuals’ idiosyncratic use of language (Sabat, 2001), and non-verbal communication (Sabat & Cagigas, 1997) in order to draw conclusions about inner experience (Sabat, 2001). This method can help increase understanding of AD and complement standard quantitative methods and can aid in treating AD by identifying and stressing abilities still present in individuals with AD (Sabat, 2000).

Sabat and colleagues held that individuals define their reality through language and that autobiography is a public manifestation of the self (Sabat & Harre’, 1992). They define three different aspects of the self: a singular point of view or consciousness (Self 1), the attributes that an individual possesses and the beliefs the individual has about

those attributes (Self 2), and the manner in which an individual presents himself to the rest of the world (Self 3) (Sabat, Fath, Moghaddam, & Harre', 1999). According to these researchers, the use of personal pronouns is indicative of the existence of Self 1 (Sabat et al., 1999) and is therefore examined in individuals with AD to infer the maintained existence of Self 1 (Sabat & Harre', 1992). Through this method, Sabat and colleagues concluded that individuals with AD typically maintain Self 1 until the very final stages of AD (Sabat & Harre', 1992; Sabat, 2000). Individuals with AD often maintain their Self 2 deep into the progress of the disease as individuals are aware of many of the attributes they have as well as many of the attributes they have lost due to the progress of the disease (Sabat et al., 1999). A person to interact with is required in order for the existence of Self 3 to be manifested and therefore this aspect of the self is affected differently in AD depending on how those around them interact with them (Sabat et al., 1999).

Sabat (2001) drew further conclusions regarding the inner experience of individuals with AD. He stated that individuals with AD, even in very severe stages, maintain a sense of self-worth and behave in ways that attempt to maintain this sense of self-worth even though there is typically a loss of the sense of self (Sabat 2001; Sabat & Harre', 1992; Sabat et al., 1999). However, although there is some loss of the sense of self in the severe stages of AD, sense of self is rarely totally depleted evidenced by the continued use of first person pronouns (Sabat & Harre', 1992). He also stated that individuals with AD engage in dialectical reasoning where they think of their past positive attributes, realize they no longer possess many of these positive attributes, and wonder what their life would be like if they did not develop AD. This leads to tension and negative affect.

Sabat's observations have further allowed him to hypothesize that the inner experience of individuals with AD typically includes great pride in positive attributes, embarrassment about the symptoms of AD, frustration when others focus on the symptoms of AD over positive attributes, and delight upon presenting themselves in a positive way (Sabat, 2001).

Watkins et al. (2006) also focused on the discourse of individuals with AD in drawing inferences about their inner experience. These researchers suggested that individuals have many different internal voices and that some are stronger than others. Individuals in the early stages of AD may deny the existence of their disease by drowning out the voice or voices that tell them that something is wrong. Therefore, a major therapeutic goal in treating AD is to help these voices become louder so that individuals can process the meaning of their disease.

Asp, Song, and Rockwood (2005) similarly paid close attention to the verbal communications of individuals with AD. They showed that individuals with AD often ask for certainty after making statements, such as, "My daughter will be 65 next week, *won't she?*" These researchers suggested that when individuals follow statements with questions such as these that this indicates that they are aware of memory difficulties they are having associated with AD. Therefore, these questions are positive signals that at least the individual that uses these words is not experiencing anosognosia and is aware that they are having memory difficulties.

Gubrium (2000) suggested that we pay particular attention to the narratives created by caregivers and loved ones of individuals with AD and dementia in order to construct a hypothesis of their inner experience. He stated that story-telling is one major way in

which we can understand the inner experience of others. Narratives of older individuals are becoming a more common method to obtain subjective data of the reality of aging (Kenyon, Ruth, & Mader, 1999). Although Gubrium (2000) was aware of the speculative nature and the potential dangers and inaccuracies that can come with relying on one's theoretical account of another's inner experience, he believed that these narratives and stories can provide important insight into the inner experience of individuals with AD and dementia.

Cheston (2004) also relied on narratives created by individuals with dementia in order to gain an understanding of their experience. Cheston (2004) asserted that in the early stages of AD individuals use narratives/stories to first distance themselves from their plight and then to relate experiences that are not entirely in their awareness. Eventually, patients with AD use narratives/stories to integrate information regarding their disease into their awareness. From examining narratives/stories in this manner, Cheston (2004) arrived at the following conclusion regarding the inner experience of those with AD and how these individuals come to be aware of their disease:

The gradual emergence of awareness is a process that is analogous to entering a brightly lit room from a dark corridor: first people blink and look away, perhaps defending themselves from the harsh new light by placing their hand over their face. It is only over time that we can open our eyes fully (p. 108).

Stiles et al. (1990) developed a systematic method to evaluate the experience of individuals with AD using narratives. This method is called the Assimilation of Problematic Experiences Scale (APES), which uses the narratives of individuals with AD to gauge how aware individuals are of their disease. Stiles et al. (1990) used this scale to

hypothesize five levels of awareness. At first, narratives/stories are at Level 0 and are used to “ward off” awareness of dementia. At Level 1, narratives/stories express “unwanted thoughts” about dementia. That is, these narratives/stories act as a method to remove problems related to dementia from awareness. Level 2 narratives/stories are used to express a “vague awareness” about the disease. Level 3 narratives/stories are used more specifically to identify the problem of dementia and problems the individual has that are associated with dementia. Here, individuals are trying to define the disease for the first time. Finally, at Level 4, narratives/stories express “understanding/insight” and are typically coupled with more positive emotion and a more in depth examination of their disease and its related problems.

Lawton, Van Haitsma, and Klapper (1996) developed the Apparent Affect Rating Scale (AARS) to assess the affective component of experience of individuals with dementia. The AARS trains caregivers to observe individuals with dementia for a 5 minute period and record the amount of times the individuals display different emotions. The caregivers are given a list of specific behaviors that indicate certain emotions. For example, depression is indicated by crying, tearing, wiping of the eyes, moaning, sighing, frowning, and putting the head down while having no expression on the face. If an individual is displaying these behaviors the caregiver records depression for the appropriate amount of time. Although the researchers believe the AARS is valid and reliable, they admit that using behavioral observations to infer emotion is limited at times due to a lack of precise understanding about how behaviors reflect affective states (Lawton et al., 1996).

Gil et al. (2001) focused on self-consciousness or self-awareness in trying to understand the inner experience of individuals with AD. These researchers used 14 questions designed to evaluate various aspects of self-consciousness of individuals with AD (identity, knowledge of cognitive disturbances, self-knowledge of affective state, bodily awareness, awareness of future plans, capacity to introspect, and moral awareness). They concluded that although AD does not destroy self-consciousness, it does cause alterations in self-consciousness. Knowledge of cognitive disturbance and moral awareness were correlated with dementia severity, suggesting deficiency in these aspects of self-consciousness. Gil et al. (2001) suggested that it is possible that alterations in self-consciousness may be the central difficulty faced by individuals with AD.

Perrin (1997) hypothesized that individuals with severe dementia experience the world as if they were in a plastic bubble of approximately three feet diameter.

...from inside the bubble, the physical conditions of the general environment, along with the conversations and interactions of everyday social intercourse, are perceived in a distorted and muffled fashion and therefore fail to impinge appropriately upon the individual within. (p. 940).

Perrin suggested that individuals who care for people with dementia must physically remain within the bubble's three-foot diameter and remain there in order to be effective caregivers.

Some psychotherapeutic interventions designed specifically for individuals with AD have been designed based on assumptions regarding the inner experience of individuals.

Validation therapy (Feil, 2002) is based on eight assumptions that are related to the inner experience of individuals with AD:

1. Expressing painful feelings diminishes the experience of painful feelings.
2. Painful feelings that are ignored will become more prevalent in experience.
3. Memories with strong emotions are maintained in individuals with AD.
4. Recalling early memories that are affect-laden is used as a coping mechanism when more recent memories begin to fail.
5. When vision becomes poor, individuals with AD are able to use their “mind’s eye.” When hearing becomes poor, individuals with AD focus on auditory stimulation that occurred in the past.
6. All people, including individuals with AD, have multiple levels of awareness.
7. Old memories are used when individuals with AD experience intense negative emotion.
8. Affect that is experienced in the present will cause affect from the past to come into awareness.

Thus, assumptions about the inner experience of individuals with AD currently inform intervention strategies.

Data from cognitive and neuropsychological tests have been used to inform speculations regarding the inner experience of AD. Overman and Becker (2004) suggested that because individuals with AD have impairment in episodic and autobiographical memory, their experience loses personal relevance. Specifically, although individuals with AD might know that events in their lives and events in the history of their family have occurred, they lose access to the memory of actual

experiences and therefore lose touch with their past (Overman & Becker, 2004). Their experience of the past is like facts read from a history book rather than like the remembrance of experience from their own lives.

Much of the research of experience in individuals with AD and dementia has focused on the individual's experience of care in residential facilities (see Cheston, Bender, & Byatt, 2000; Kitwood & Bredin, 1994). A number of methods have been devised to assess the experience that individuals with dementia have regarding their care, including DCM, questionnaires, and structured and semi-structured interviews (Cheston et al., 2000). Nevertheless, due to severe deficits in cognitive and communicative skills in many individuals with AD and dementia, their experience and viewpoints concerning the caregiving process are often difficult to discern and are often ignored (Cheston et al., 2000).

Unfortunately, in spite of the research efforts above, caregivers, loved ones, and researchers do not have any definitive answers as to what the inner experience of those with AD and dementia is really like. Most individuals must resort to speculations and/or use subjective interpretations to imagine what the inner experience of AD and dementia is like because science has to this point failed at accurately describing the inner experience of those with AD. This is due at least partially to the difficulty that individuals with AD and dementia have communicating their inner experiences with others or perhaps because there are few methodologies that systematically attempt to study the inner experience of people in a careful way.

It should be noted that there may be some discrepancy between the above researchers' definitions of inner experience and definition of inner experience used in this

study. The researchers above seem to define inner experience in a number of ways, but largely as the experience of difficulties associated with depleting skills and their accompanying mood states. They also seem to use the phrase inner experience to refer to general emotional experiences, such as anger, depression, confusion, etc. The definition of “inner experience” in this study is literally the form and content of conscious experience. Although anger, depression, or confusion may be a part of an individual’s experience at a given time, these words are far too broad given the author’s definition of inner experience. In this study when the term “inner experience” is used it is referring to the literal and highly specific contents of consciousness that occur at any given moment in time. For example, this may involve a phrase being spoken in the individual’s voice, in another’s voice, an inner seeing of something the individual may have seen in the past, an inner seeing of something the individual may have never seen, a physical feeling (e.g. a sense of heat in the chest, a tingling sensation in the back of the head, etc.), or myriad other things, or a combination of these things. Nevertheless, the purpose of previous research and the present study is ultimately the same: to gain an in depth understanding of the inner experience, however defined, of older individuals with and without cognitive impairment, including AD, in order to facilitate early diagnosis, early intervention, effective treatment, and a public understanding of AD and dementia in order to increase the life satisfaction of those with AD and dementia and their loved ones and caregivers.

The Inner Experience of Alzheimer’s Disease – The First-Person Perspective

As discussed above, studying the first-person accounts of individuals with AD is an important tool in the investigation of the experience of those with AD (Kitwood, 1997).

A number of individuals with AD have written accounts of their experience with the disease. Although the majority of these writings do not focus upon the inner experience of AD the way that the present study does, these writings are still potentially useful in gaining some insight into the inner experience of these individuals. This section will discuss a few of the major works of individuals with AD focusing on how these writings relate to the inner experience of AD.

Cary Smith Henderson held a Ph.D. in modern American history when he was diagnosed with AD. Henderson received a diagnosis of AD very early in its course and used a tape recorder to document his experiences through the moderate stages of the disease. These experiences were recorded in his book, *Partial View: An Alzheimer's Journal* (1998). Henderson's wife Ruth (who helped edit the book) stated that his recordings were surprising in that he revealed much more insight into his disease than he expressed in day to day life.

Henderson described his experience with AD in a variety of ways. He called it "somebody's version of hell" (p. 4). At one point he had difficulty calling himself a human being, difficulty considering himself alive, and stated that he was not a normal person. His struggles with memory were apparent and poignant: "I just had a brilliant idea, but before I could push down the little recording mechanism, it was absolutely totally gone" (p. 7). He struggled to remember how old he was on his 62nd birthday, stating he should have been a year younger, and had trouble remembering where his long time home was located. He stated that he had no ability to comprehend time and that every minute and every moment are "separate" (p. 41). He expressed anxiety about his compromised ability to communicate: "It's kinda nice to talk to a dog that you know is

not going to talk back. And you can't make a mistake that way" (p. 13). He said that his words became "tangled" easily and that they were forgotten easily (p. 18). Eventually he could no longer read nor write. He stated that his difficulty reading was at least partially due to the experience that words move or waver and he "can't catch them" (p. 23).

Henderson described severe mood swings as well: "Sometimes I feel on top of the world, a couple of days ago I did and today I just feel absolutely devastated" (p. 32). He stated that although he does not think very much, everything he does is "full of feelings" (p. 56). Paranoia is so prevalent in Henderson's experience that he stated that it must be "basic to Alzheimer's people" (p. 81).

The variability of the disease in general was expressed when Henderson called AD a "come and go disease" (p. 36). He explained that his ability to think is easily compromised by the presence of others, even one other person. He explained that taking social cues from others is very important when one is confused about how to behave in social situations. He stressed the importance of humor, calling it the most valuable tool one can have to deal with AD. He called music "the only real constant friend I've got" and music repeatedly gave him comfort throughout his musings (p. 17).

In direct relationship to his inner experience, he stated that he could not "visualize things" (p. 8). He stated that he had numerous problems surrounding bodily awareness, most commonly regarding the positioning and movement of his feet and the feeling that he was unbalanced. He stated repeatedly that he felt severely restricted and that he was "half a person" (p. 19). Henderson made a plea specifically to understand the common inner experience of others who have AD:

It would be very interesting for Alzheimer's patients to correspond with one another, not necessarily to learn very much, but to, just to see what other people are thinking. Well, if you're like me, I'm not sure you're thinking a whole lot, but you have a lot of feelings. I must say a heck of a lot of feelings. Everything we do is just full of feelings...But I would sincerely like to share my—our—experiences and our feelings, and what I'm trying to do in this series of talks, if that's what you want to call it, these are straight from the victim's own words and whatever I say is sincere...I think we do have experiences which might be worthwhile, especially to anybody who had any reason at all in this world to want to know a little bit about Alzheimer's. I do suspect we do know more than we seem to know because it gets so hard to express what we know. I'd just like to know from anecdotal experiences what people with Alzheimer's had, to what degree are they clumsy, to what degree do they very quickly forget things, and to what degree can they make themselves useful...I've got lots of questions. And I have very few answers...I really want to find out from other people what they have experienced. (pp. 56-57).

Larry Rose was diagnosed with early onset AD at the age of 54 (Rose, 1996). His symptoms seemed to come on without warning. He was driving to his cabin in the mountains, something he had done countless times, when he became lost. He did not recognize where he was, could not remember the trip he had taken, and after several hours, had to stop at a hotel. The next day when he made it to his cabin, he forgot for hours about a pizza he was cooking. He had not noticed any forgetfulness prior to these two incidences. Within the ensuing weeks, Larry was

at times not able to remember what year it was, how old he was, or what he had for breakfast.

Within a year Rose began to feel anxiety, depression, and anger. He also experienced isolation, repeatedly expressing wonderment at the fact that there could be so many people with AD in the world but that he never met one. When he did finally meet people with AD he stated that he felt much less alone and much less empty.

Rose described his thoughts as being tangled and out of order. He began to have tremendous difficulty making the smallest decisions, such as whether to wear boots or sneakers. Eventually he began to experience anger, uncertainty, and fear that he described as a physical sensation in his stomach. Rose also described many instances of joy, and especially humor, throughout his experience with AD. He also stated that AD caused him to become more compassionate. Like Henderson, Rose found solace in a pet. A little over a year after diagnosis, he bought a pig that he became very close to and enjoyed very much.

The variability of Rose's experience of AD was present throughout his account. At times he could travel long distances and arrive easily at his destination. Other times he would get lost on his own street, forget what car he drove to get to his destination, or forget his phone number. At other times he heard the phone ring, but could not identify what the sound meant although he knew he had heard the sound before. He stated that at times he felt perfectly fine cognitively, but at other times he would become extremely disoriented.

Diana Friel McGowin also suffered from early onset AD (McGowin, 1993). It started when she began to notice problems with memory, make mistakes at work as a legal

secretary, and have difficulties with everyday activities such as cooking. She initially attributed these problems to tension. She sometimes became lost driving traveling roads she had traveled hundreds of times. She told a doctor that she had to relearn directions, forgetting the meaning of left, right, up, and down. She also had distortions in visual perception that caused her to lose her balance and began slurring her words when she spoke. She quickly had periodic difficulty remembering the name of the street that she lived on. One day she lost consciousness at work and this eventually led to her diagnosis of AD, although her primary care physician and neurologist did not initially diagnose AD or any other neurodegenerative impairment.

Diana's initial symptoms caused her significant anxiety. She often tried to hide her symptoms from others. When she did not recognize a co-worker she stated that she had a very bad headache. When she did not recognize her cousin she again covered for her memory problems. She pretended that she was a tourist and asked directions to places she had been many times. Sometimes she had to ask for directions three or four times on one trip. She visited a childhood friend whom she revered for his intelligence partly to see if she could successfully hide her AD-related problems from someone with high intellect. Eventually she had to resign from her job and take a temporary job stating "I figured that no one would expect a temporary assistant to know her way around a building or office, nor recognize the employees on sight. If I erred, it would seem natural, nothing amiss" (p. 30). She also stated "I was playing a game of 'I've got a secret' with everyone, even with myself" (p. 48).

The course of McGowin's AD was highly variable. At times she was able to perform complex tasks with relative ease while at other times the simplest tasks could not be

performed effectively. “One minute I was coping fine with my work. The next, I had lost complete recall of whom I was speaking to on the telephone, and why” (p. 39). Emotionally, Diana experienced anxiety, anger, increased desire for sex, a loss of patience with others, guilt for no longer being able to work and hiding her diagnosis from some loved ones, depression, and paranoia. She developed insomnia, lost a great deal of weight, and developed compulsive checking behaviors. The desire for affection grew as the disease progressed and her sense of smell improved. Eventually she felt worthless, especially in large groups of people. Her love of music remained unblemished, however. She stated that counseling helped her cope with AD, but did not explain specific therapeutic techniques. She started a support group for early onset AD, which was invaluable to her. She repeatedly stated how helpful it was to have understanding of the experience of AD and the only people who can truly understand are others with AD. At times she felt as if she was losing a grip on her existence. This was partially due to the way others treated her, but also had internal sources: “I am painfully aware that less of me exists than the day before, for now, I can say, I am still here! Diana McGowin exists!” (p. 116).

Solace often came to McGowin through remembrance of joyful events from her past. She explained that memories from her past seemed especially vibrant and comforting:

I can actually smell the aroma of the small town library where I spent so many childhood hours...Although I have not seen snowflakes for decades I can taste them on my tongue...I can experience the total, absolute quiet of a snowbound world. Even the bitter pain endured when warming my frozen fingers after walking to my piano teacher’s home becomes a bittersweet memory...Visions of first daffodils of an

Ohio spring float through my memory...My own voice echoes in my ears as I remember laughing with great glee while chasing fireflies. (pp. 109-110).

McGowin eventually renewed two lost friendships from childhood, and these became, in some ways, the most important relationships in her life after being diagnosed with AD. She intensely pursued a number of other past relationships as well. She hoped that these people would see her as she was before she developed AD and allow her to see herself in that was as well.

McGowin's family was not emotionally supportive when she revealed her diagnosis. Many of them did not believe or comprehend the seriousness of it. Others simply chose to ignore it. Her own husband chided her to "rise above" the disease (p. 67). Eventually, McGowin explained that the reason for their reactions was because of their differing understanding of the experience of the disease. "It was as though I was standing at one end of a telescope and my family at the other, each peering intently into the instrument, each with a quite opposite perspective" (p. 97). She did find solace in pets however, most notably her pet terrier.

Surprisingly, McGowin stated that the medical and research community do not want individuals with AD to attempt to fight the disease or to communicate insights they have about the disease. She stated that when individuals with AD are able to express their insight regarding the disease, that this challenges the scientific community. By not giving up and slowly deteriorating into a vegetative state, McGowin stated that she and those like her are breaking the "mold" created by researchers of AD, and that this causes resentment in the scientific community.

Thomas Debaggio was diagnosed with AD at the age of 57 (Debaggio, 2002). Debaggio described his experience with AD in a variety of ways. “I start thinking about something intently and then my thoughts wander through fields of memory and I bob to the surface suddenly and wonder for a moment who I am, and whether I have truly lost my mind” (p. 13). He said that his mind cannot stay focused on one thing, that it “skitters from place to place” (p. 96). “Clouded memories flit through my brain, wandering moments in a jumble of events only half-remembered. Faces smiling and sullen rise through a mist of years” (p. 113). He described images coming and going very quickly in his awareness. At times he would have surreal experiences and feel as if he was in a different world that was foreign to him. “My mind is becoming one-dimensional. I have almost lost my ability to hold two thoughts simultaneously. Along with this is the long, frustrating wait for the word I need in conversation” (p. 142). He said that he became more aware of subtleties in his environment as his disease progressed.

Debaggio stated that he was “ready to leap from one stone to the next in the crowded stream of consciousness.” (p. 46). He hinted at the possibility that AD and its symptoms are often not directly in his awareness or at least not central to his awareness. “This evil disease sleeps on the edge of my consciousness, always there to remind me of its wicked strength over me” (p. 46).

Debaggio described a number of unusual sensory experiences that he had only after AD was diagnosed. A number of these occurred before he went to sleep. He saw ...bouncy colored lights, mountains in fantastic colors, pictures that resemble the landscape of the moon seen from a slow-moving vehicle...Some nights the visual

pyrotechnics are so strong it is difficult to get to sleep, something that never happened to me before (p. 24).

As I lay awake this morning in 4A.M. darkness, I was treated to a light show. A series of yellow images with edges torn in irregular patterns began to flash slowly before me as I stared at the wall opposite me. They danced before my eyes as if they were projected on the wall but there was no source of light for them. They could only be generated in my mind but they were as real as if Picasso was squirting the wall with random objects painted in yellow. I lay there alone and insignificant and for several minutes the yellow-lit objects snapped on and off in different places on the wall (p. 184).

Debaggio described similar visualizations, almost always late at night or early in the morning, throughout his account. Eventually these images went away and were replaced by “a raw sheet-metal color that reminds me of a trashcan” (p. 99) but stated that sometimes he saw yellow before going to sleep. Debaggio also had sensory experiences of the sidewalk moving as he walked. He experienced other bizarre sensory experiences:

Often when I awaken in the dusty morning light, the new day I see around me is patterned in tiny square checks through which I see the world. I blink my eyes but the images before me remain. It is as if I am looking close-up through an old screen door. The precision of the tiny checks makes me think I am awakening in some kind of cell, a prisoner behind minute, rigid crisscross bars. Before long the apparition disappears and the world becomes clear and normal as the sun comes up. Is this another signal from the war in my brain where I am on the losing side in a battle with Alzheimer's? (p. 172).

In reference to verbal difficulties, Debaggio stated that “The words are under control but the letters that form the words squirm in their own directions” (p. 20). He also stated, “Words slice through my mind so fast I cannot catch them and marry them to the eternity of the page” (p. 27). “I have only a few seconds to capture a thought before it disappears from my mind. Scraps of ideas flit like birds...Ideas evaporate like snowflakes on a warm roof” (p. 48). Debaggio described these and similar difficulties numerous times throughout his account of his experience with AD. He had difficulty writing lengthy passages, where he often got lost while writing and although he could see the words, he sometimes could not comprehend what they meant. Within four months Debaggio noticed a lessened ability to recall words, a decreased vocabulary, and problems spelling and reading. He had trouble naming the plants that he made a career of studying.

Not long after diagnosis, Debaggio began having difficulties with spatial abilities, getting lost when attempting to travel to places he had been many times. When sitting outside of his niece’s apartment, he began to think that he was not in the correct place. “My mind was flooded with images of another place nearby where she might be” (p. 128). Eventually, Debaggio had difficulty orienting himself to space or time, and had difficulty with activities of daily living, as is expected as AD progresses. He stated that before he had AD he would imagine a map when traveling to a particular destination. After AD, he was no longer able to use this ability.

Debaggio’s handwriting deteriorated to the point that he could not read it. The fine movements required for typing became extremely difficult as well. He stated that his office became very disorganized and cluttered like his mind. He quickly became obsessed with his disease and with death itself. He stated that he became very emotional

as the disease progressed, only a few months after diagnosis. Debaggio, like the other authors with AD, was very close to his pets. He stated that his cats taught him patience and that one of the few joys he had remaining as AD progressed was playing with his cats.

These first-person accounts of the experience of AD indicate a number of important points. First, it appears that all of these individuals attempted to hide their symptoms as best they could due to the obvious anxiety and embarrassment that their new, unexplained cognitive difficulties caused. Although this is an understandable reaction, these behaviors clearly make AD diagnosis more difficult. Understanding the inner experience of individuals with AD is not only important to aid in the diagnosis of the disease, but also could help individuals in the early stages of the disease identify their own symptoms, relate them to AD, and seek help. Second, the course was highly variable for all of these individuals. The effects of AD seem to shift within moments, many times for no apparent reason. Third, people around the authors of these accounts were often initially dismissive of their symptoms. When first notified of the symptoms many loved ones encouraged the individual with AD to not worry about their symptoms. Many times the same advice would be given by doctors before a diagnosis was made. Fourth, all of these individuals experienced prolonged plateau phases where they experienced a stabilization of their symptoms. Each author held out hope that something could be done about their condition and all attempted to be part of clinical drug trials, either hoping for a cure or being comforted by the idea that they were doing something for themselves and other individuals with AD. Fifth, most of these authors found solace either in pets, music, or

both. Sixth, each author had a strong desire to be understood and to understand the inner experience of others with AD.

Many initial, highly tentative hypotheses about the inner experience of individuals can be made based on these first-person accounts. For example, many of the authors reported thinking in words and images, suggesting that symbolic inner experience is maintained at least in some individuals with AD. Also, there may be unusual sensory experiences that involve color or strong sensations. Furthermore, increases in emotional experiences may be part of AD. Of course, these speculations should be taken with substantial skepticism as these speculations are based on only four individuals' experiences and are dependent on the care with which these individuals observed their inner experience.

Vascular Dementia

Vascular Dementia (VaD) is dementia that is due to a cerebrovascular event or events. Essentially, it is any type of dementia that is caused primarily by disease in cerebral blood vessels (Miceli, 2006). This disease may be verified by neuropsychological evidence and/or evidence of a cerebrovascular event or events obtained from techniques such as MRI (APA, 2000). Motor dysfunction (such as abnormal gait) and physical symptoms or cardiovascular problems (such as extremity weakness or abnormal reflexes) typically occur in VaD (APA, 2000). Usually, lesions in the brains of individuals with VaD exceed what would be considered to be normal for their age and often exist in white matter and gray matter, as well as in sub-cortical structures (APA, 2000). The DSM-IV-TR (APA, 2000) specifies that for VaD to be

diagnosed there must be the presence of dementia, defined as significant memory impairment and either aphasia, apraxia, agnosia, or disturbances in executive functioning, evidence of cerebrovascular disease, and evidence that the dementia is caused by cardiovascular disturbance (APA, 2000).

Many researchers have suggested that VaD represents a variety of conditions that have cerebrovascular pathology, as opposed to being a single entity (Libon, Price, Davis, & Giovannetti, 2004). In fact, there are many subtypes of VaD, including vascular cognitive impairment – no dementia (a mild form of VaD still characterized by small deficits in a variety of areas including memory, executive function, and language; Nyenhuis et al., 2004); multi-infarct dementia (due to multiple cerebrovascular events; VaD was once classified as “multi-infarct dementia”); single-infarct dementia; and a host of others that are categorized by the location and type of the cerebrovascular event. There is also a category for mixed-dementia, which occurs when there is the presence of dementia due to neuropathology congruent with both VaD and AD.

VaD is the second leading cause of dementia following AD (Roman, Erkinjutti, Wallin, Pantoni, & Chui, 2002; Skoog, 2004). The prevalence of VaD is approximately 1.5 percent in Western countries, and VaD accounts for approximately 20 to 30 percent of dementia cases overall (Skoog, 2004). Risk factors for VaD are essentially the same as stroke, although increased age in combination with high stroke risk puts individuals at even greater risk for VaD (Miceli, 2006). However, other risk factors include sex (male), ethnicity (Asian ethnicity increases risk), and lower educational level (Miceli, 2006). Cognitive difficulties associated with VaD include slow processing speed, reductions in executive functioning, problems with immediate memory (recognition is intact, but free

recall is compromised, primarily due to an inability to implement an effective retrieval strategy; Lezak, 1995), as well as behavioral and mood changes with a high occurrence of depression (Miceli, 2006).

The presentation of VaD is highly variable among individuals and the cognitive deficits that manifest themselves in VaD are especially heterogeneous (Poore, Rapport, Fuerst, & Keenan, 2006). The location of lesions in the brain largely determines the type of impairment that will be present. In general, symptoms of VaD will correspond to the anatomical location of lesions in the brain (Roman et al., 2004; Cummings & Benson, 1992). Still, some individuals with VaD exhibit a more global dementia that is not necessarily location specific (Paul, Garrett, & Cohen, 2003). Problems with executive function, attention, and processing speed are the most common and severe deficits associated with VaD (Almkvist, Backman, Basun & Wahlund., 1993).

As with AD, there appears to be a pre-clinical phase of VaD. Cognitive symptoms related to memory and executive function can often be found 3 years before stroke (Backman & Small, 2007). This impairment is often very similar to the pre-clinical phase of AD. One study found no difference on any cognitive measure between individuals with pre-clinical VaD and AD (Laukka, Jones, Small, Fratiglioni, & Backman, 2004). This pre-clinical phase is likely due to problems in cerebral circulation that are typically present before stroke, the incident that brings on frank VaD (Backman & Small, 2007; Laukka et al., 2004).

One of the primary treatments for VaD is reducing the probability of strokes and other cerebrovascular events. Many studies have suggested the potential benefit of the use of acetylcholinesterase inhibitors (AChEI's) for the treatment of VaD (see Bullock,

2004), but this treatment has not yet been improved by the Federal Food and Drug Administration. For example, galamantine is an AChEI that has been shown temporarily to improve cognition and executive function in individuals with VaD (Auchus et al., 2007). Donepezil, another AChEI, has also been shown to temporarily improve various cognitive functions including working memory and delayed recognition recall (Thomas, Libon, & Ledakis, 2005) as well as MMSE scores (Pratt & Perdomo, 2002). A recent study supported the effectiveness of the use of reminiscence therapy with people with VaD for the reduction of overall cognitive problems that was maintained through a 6 month follow-up (Tadaka & Kanagaway, 2007).

The symptoms of VaD and AD are often very difficult to distinguish from one another. There are many similarities between deficits in AD and VaD (such as dysfunction in memory, language, and executive function) that makes differential diagnosis difficult. The highly variable presentation of VaD causes difficulty in studies that attempt to determine different presentations between the two groups (Braaten et al., 2006). Further complicating this issue is that VaD represents a wide range of conditions with variable neurological manifestations rather than a single neuropsychological disorder (Micieli, 2006). Although VaD and AD are defined by different neurological abnormalities, both exhibit a substantial decrease in acetylcholine (Lojkowska et al., 2003). Furthermore, the presence of mixed dementia complicates differential diagnosis (Rockwood et al., 2000). Overall, the utility of using neuropsychological tests to distinguish VaD from AD has been mixed (Villardita, 1993).

However, there do appear to be some differences between the two disorders. Probably the most salient difference between individuals with VaD and individuals with

AD is that individuals with VaD tend to have more of a deficit in executive functioning, sometimes with no or little overt memory impairment, while individuals with AD have more pronounced memory difficulties, especially episodic memory (Freeman et al., 2000). However, this finding is somewhat inconsistent (Oosterman & Scherder, 2006; Miceli, 2006). A meta-analysis of WAIS subtest performance in AD and VaD demonstrated that individuals with VaD that is primarily due to sub-cortical lesions (one of the most common forms of VaD) performed worse on subtests that rely heavily on executive functioning (i.e., Digit Span backwards, Object Assembly, and Picture Arrangement), whereas individuals with AD scored significantly lower on Information, a test that relies heavily on semantic memory (Oosterman & Scherder, 2006).

Another key difference between VaD and AD is that VaD typically has a sudden onset and progresses in a step-wise manner where decreases in functioning coincide with new cerebrovascular events (APA, 2000). This is in contrast to AD, which has an insidious onset and typically advances as a steady decline after an initial plateau phase (APA, 2000). Still, although this is one of the primary distinguishing factors that separate these two groups, there is substantial evidence that for many individuals VaD has a slow onset with a slow and steady progression (Paul et al., 2003).

There are many other potential differences between individuals with VaD and AD that are not as salient. Individuals with VaD sometimes show only mild episodic memory impairment or even a total absence of episodic memory impairment (Miceli, 2006). However, working memory is often compromised in VaD due to the executive component of working memory (Miceli, 2006). Also, individuals with AD tend to have more difficulty with delayed memory and semantic fluency while individuals with VaD

tend to have more difficulty with immediate recall and phonemic fluency (Zakzanis, Leach, & Kaplan, 1999; Braaten et al., 2006).

However, these differences are not consistently found in all studies. In one study, a range of neuropsychological symptoms in individuals with VaD and AD were compared. The only differences between the presentations of the two groups were that individuals with AD had more sleep disturbances, appetite changes, and aberrant motor behavior compared to those with VaD (Fernandez-Martinez et al., 2008). In another study no difference was found among individuals with AD and VaD on any neuropsychological measures that included tests of memory and executive function, among others (Misciagna et al., 2005). At least one group of researchers has suggested that reliable differentiation between VaD and AD using neuropsychological measures is impossible (Almkvist et al., 1993). Overall, there is no consensus regarding neuropsychological differences between VaD and AD outside of the relatively more severe executive function dysfunction in VaD compared to AD and the relatively more severe memory dysfunction in AD compared to VaD, although this is not a universal difference.

It is impossible to say definitively whether the inner experience of individuals with VaD differs in some systematic way from the inner experience of individuals with AD. Because no research has been done to investigate the inner experience of either of these populations, no conclusions can be made at this point. However, some speculations can be made:

1. The inner experience of individuals with VaD may be different than those with AD. Because they have different underlying neuropathology, it is quite possible that they

have systematically different inner experience as well. However, comparing these two groups may be difficult due to the presence of mixed-dementia.

2. The inner experience of individuals with VaD will vary substantially from one another depending on the location of neurological damage, just as symptoms vary depending on location of neurological damage in VaD.

3. Features of inner experience that are possibly affected by executive functioning could be substantially altered in individuals with VaD due to the relative decrease in executive functioning in many individuals with VaD. For example, there may be content that is less goal-directed and/or future oriented than others as goal-directed behavior and planning for future events are primary components of executive functioning. Likewise, the form of inner experience of individuals with VaD could be altered in ways that reflect deficits for executive functioning. For example, inner experience could be substantially disorganized as executive functioning is important to intellectual and behavioral organization.

In spite of these speculations, virtually nothing is known about the inner experience of individuals with VaD.

Cognition in Normal Aging

“Normal aging” is commonly conceptualized as aging that occurs without the influence of neurodegenerative disorders such as AD, VaD, or Mild Cognitive Impairment (MCI). Although major cognitive impairments are not seen in normal aging, aging still consists of a virtually inevitable cognitive decline (Christensen, 2001). Because there is such substantial variability in the type and amount of cognitive decline

among older individuals and because this variability increases as a function of age it is very difficult to obtain a uniform picture of normal aging (Christensen, 2001; Hedden & Gabrieli, 2004). Furthermore, age-related cognitive decline is not linear and is domain-specific. Some areas of cognition improve over time, some do not decline significantly until very late in life, and some begin declining relatively early in adulthood. Still, the most typical pattern is a slow decline until approximately age 70 with a sharper decline thereafter (Hedden & Gabrieli, 2004).

One of the most common problems associated with normal aging is the slowing of cognitive processing speed (Salthouse, 1985). Individuals' reaction times to external stimuli begins to slow fairly consistently after the age of 30 (Finch & Zelinski, 2005). Because there is a decrease in axonal myelin starting after age 30 and myelin is important to the speed with which action potentials travel through neurons it is not surprising that reaction time becomes slower at this point (Finch & Zelinski, 2005). This processing speed deficit seems to increase steadily throughout one's lifetime but with a sharper increase in older age (Christensen, 2001). This slowing is most readily observed in cognitive tasks that are not automatic or overlearned (Hasher & Zacks, 1979).

A decrease in some types of memory, perhaps most notably working memory (Haut, Chen, & Edwards, 1999), is natural with age. Memory difficulties in normal aging appear to be primarily due to problems with attention which adversely affects encoding (Craik, 1986). In tasks that require a high amount of attention older individuals have more difficulty encoding episodic memories. When attentional demands are low, older individuals encode episodic information as well as younger individuals (Blanchet, Belleville, & Peretz, 2006). Likewise, when to-be-remembered information is presented

at a high rate, age-related deficiencies in memory increase suggesting encoding slows as a function of age (Arenberg, 1982; Poon & Siegler, 1991).

There appear to be storage and retrieval deficiencies that are related to age as well (Mejia, Pineda, Alvarez, & Ardila, 1998), although there is less of a consensus in this area. Forgetting slopes appear to remain relatively stable as people age, suggesting that storage and retrieval are relatively free of age-related cognitive decline (Trahan & Larrabee, 1992). However, free recall, compared to recognition, is much more diminished in normal aging compared to recognition suggesting some retrieval problems (Craik, 1987). Likewise, the tip-of-the tongue phenomenon is much more pronounced in older individuals compared to younger individuals suggesting a retrieval deficit (Ramsay, Nicholas, Au, Obler, & Albert, 1999; Shafto, Burke, Stamatakis, Tam, & Tyler, 2007). There also appears to be a global slowing of retrieval in older individuals (Poon & Siegler, 1991).

There is typically a global decrease in executive functioning in older individuals (for a review, see Treitz, Heyder, & Daum, 2007). Problems related to executive functioning typically observed in older individuals include problems with inhibition (Pignatti et al., 2005; Treitz et al., 2007), divided attention, attentional switching (especially when there is high cognitive demand; Baddeley et al., 1991; Ramsden et al., 2008), perseveration (Ridderinkhof, Span, & van der Molan, 2002), and task management (Treitz et al., 2007; Pignatti et al., 2005). Significant deficiencies in executive functioning have even been found in individuals with perfect scores on the MMSE (Royall, Chiodo, & Polk, 2000). Decreases in executive functioning seem to progress in a stable linear fashion throughout aging (Royall, Palmer, Chiodo, & Polk, 2004). As executive functioning is primarily

controlled by the frontal lobes decreases in executive functioning are expected as the frontal lobes are selectively atrophied in older individuals (Coffey, Wilkinson, Weiner, & Parashos, 1993).

There is substantial variability regarding linguistic decline in older individuals. Although vocabulary tends to increase with age, other functions decline. For example, the tip-of-the-tongue effect represents linguistic retrieval problems and is pronounced in old age. Likewise, naming objects and word finding problems are somewhat common in normal aging (Balthazar, Cendes, & Damasceno, 2008). Processing of both written and spoken language slows with age as well (Just & Carpenter, 1992). Essentially, as individuals age their storage of lexical and semantic information increases but their ability to retrieve this information, produce it phonologically, and learn new linguistic information decreases (Shafto et al., 2007).

Other common cognitive problems related to normal aging include a decrease in fluid intelligence, difficulty solving everyday problems (Poon & Siegler, 1991), slower processing speed of effortful non-automatic cognitive functions (Salthouse, 1985; Cronholm & Schalling, 1987), maintenance and manipulation of information in working memory (Ridderkinhof et al., 2002), attentional switching (for a review see Hedden & Gabrieli, 2004), problem solving (especially complicated problems; Cronholm & Schalling, 1987), slower performance on mental rotation tasks (Inagaki et al., 2002), and the learning of abstract words and ideas (Trahan & Larrabee, 1992). One study tested orientation, memory, language, attention, abstract thought, praxis, and perception in older individuals and found declines in all areas (Cullum et al., 2000). Most individuals in this study exhibited at least some decline on at least three of these domains.

Not all areas of cognitive functioning are adversely affected by age. Crystallized intelligence actually tends to increase with age, although it may decrease somewhat in extremely old ages (Christensen, 2001). Many aspects of memory and knowledge tend to stay stable over time including sensory memory, remote memory, autobiographical memory, semantic knowledge, semantic memory, and vocabulary (Hedden & Gabrieli, 2004; Poon & Siegler, 1991; Huppert 1991; Zamarian, Sinz, Bonatti, Gamboz, & Delazer, 2008). Also, well-learned, implicit, and intuitive skills tend to be highly resistant to aging (Hedden & Gabrieli, 2004; Poon & Siegler, 1991). A variety of studies have also demonstrated that older individuals make very good use of cues and external aids to help memory retrieval (Bäckman & Small, 1998; Giffard, Desgranges, Kerrouche, Piolino, & Eustache, 2003; Karlsson, Adolfsson, Börjesson, & Nilsson, 2003). However, internal aids to memory such as mnemonic devices are not used very well by older people in general (Wegesin, Jacobs, Zubin, Ventura, & Stern, 2000).

Neurology in Normal Aging

The human brain goes through numerous natural and expected changes throughout the lifetime losing a significant amount of its mass and volume as people get older. Significant synaptic loss and loss of brain volume typically begins between the ages of 30 and 55 (Finch & Zelinski, 2005). This loss of brain volume typically accelerates as people get older. There is an average of zero to two percent brain atrophy per year between the ages of 30 and 50 while the atrophy rate increases to three to five percent between the ages of 70 and 80 (Fox, Shahill, Crum, & Rosser, 1999).

However, the progressive loss of brain volume is non-linear and varies by brain region (Fox & Schott, 2004). The largest age-related volume loss occurs in the pre-frontal cortex of the brain (Coffey et al., 1993). An average volume loss of 17 percent occurs in the frontal lobes from ages 20 to 80 (Haug et al., 1983). Another estimate suggests that volume in the frontal lobes decreases an average of 8.9 percent per decade over the age of 65 (Van Petten et al., 2004). Likewise, glucose metabolism significantly decreases in the frontal lobes as people age (Haut et al., 1999). The frontal lobes are not the only parts of the brain that are affected by aging, but it is the area that is consistently affected the most.

Selective neuronal loss in the frontal lobes is also demonstrated on neurocognitive assessment tools. West (1996) used these tests to develop a frontal lobe aging hypothesis that suggests that age-related cognitive decline is primarily due to atrophy in the frontal lobes and accompanying cognitive impairment associated with the frontal lobes. Many researchers have replicated this pattern (e.g. Parkin & Java, 1999) and a meta-analysis of studies assessing age-related cognitive decline demonstrated that the primary cognitive decline in aging is due to frontal lobe dysfunction (Parkin & Walter, 1992). Age-related frontal-lobe dysfunction is perhaps most apparent via the significant problems that older individuals have in tasks that rely heavily on executive functioning (West 1996). Manipulation and maintenance of information in working memory, skills that rely heavily on the frontal lobes, are also significantly depleted in older individuals who age normally (Hedden & Gabrieli, 2004). Furthermore, tasks that rely heavily on the frontal lobes show more frontal lobe activation in older adults suggesting the need for increased use in coping skills in these tasks (Cabeza, 2002).

Methodological Problems in Normal Aging Research

There are many methodological difficulties that are unique to normal aging research that could lead to misleading results and interpretations of cognition in elderly individuals. One of the primary difficulties is the fact that subtle changes in cognition in individuals with neurodegenerative disorders occur well before they can be reliably detected. Therefore, individuals with MCI or pre-clinical dementia are often included in studies of normal aging thus causing an overestimation of cognitive decline in the normal elderly (Sliwinski, Lipton, Buschke, & Stewart, 1996). Furthermore, it is estimated that up to 20 percent of older individuals in the “normal” adult control groups may be in the early stages of AD (Fleischman & Gabrieli, 1998). Another difficulty is that results from longitudinal studies of aging and cross-sectional studies of aging yield results that are consistently and systematically different. Results from cross-sectional studies typically indicate greater cognitive decline than in longitudinal studies (Finch & Zelinski, 2005; Christensen, 2001). It is possible that longitudinal studies underestimate decline due to learning effects (Christensen, 2001) while cross-sectional studies are vulnerable to cohort effects that could affect results (Finch & Zelinski, 2005).

Inner Experience in Normal Aging

There has thus far been very little research investigating the conscious experience of older individuals. Most of the research related to the experience of older individuals focuses on things such as attitudes, aspirations, motivations, fears, and internal conflicts that could affect the conscious experience of older individuals but are not direct manifestations of conscious experience (for a review, see Abrams, 2007). For example,

Freud believed that individuals over the age of 50 are mentally inflexible. Jung hypothesized that older individuals have little conscious conflict and do not limit their conscious experience to societally-imposed limits. Erikson viewed the primary conflict of older age as a battle between despair and ego integrity where an individual finds happiness and comfort in finding meaning and spirituality. Although none of these theorists sought to explain how these characteristics manifest in conscious experience, one might postulate a lack of variability in content or form of inner experience, little content in inner experience involving conflict or societal rules, or despair or spiritual content as a theme of inner experience, respectively. Many other theorists have formed their own hypotheses regarding themes of experience in older individuals but do not address conscious experience directly.

Although there are many different theories espoused by many different theorists regarding common characteristics and conflicts in the minds of older individuals, there are some themes that are common across many of these theories. For example, psychodynamic theories of aging have many themes, including dealing with and integrating grief and loss, conflicts between attachment and disengagement as relationships are altered and lost, maintenance of self-identity, a changing self-identity that is based more on the past, maintenance of self-esteem and narcissistic gratification, and dealing with the inevitability of death (for a review, see Cath & Sadavoy, 1991). Many other theorists suggest that older individuals contemplate meaning and spirituality more than younger individuals and focus more on reminiscence than planning for the future. Still, the fact remains that there has been very little empirical research and very little discussion that focuses on the manifest conscious experience of older individuals.

At this point only broader characteristics and conflicts like those discussed above have been studied.

The research that does exist regarding the inner experience of older individuals has focused primarily on emotional experience. The research in this area suggests that the ability to process emotional experience remains throughout normal aging (Abrams, 2007). Some research has demonstrated that the experience of emotions may change in later life however. In a study by Gross et al. (1997) older individuals reported fewer experiences of negative emotion and more control over their emotional experiences compared to their younger counterparts. Furthermore, there is evidence that older individuals pay more attention to their positive emotional experiences than their negative emotional experiences (Carstensen, Fung, & Charles, 2003).

One study investigated the experience of individuals who had aged normally when they were feeling particularly passionate about life (Abrams, 2007). This study used retrospective interviews as an attempt to gain an unbiased depiction of the experience of being passionate about life in old age. Although this study was not aimed directly at manifest conscious experience and most participant reports focused on general themes such as the importance of attitude and humor, some participants in the study described elements of manifest conscious experience. For example, individuals described the experience of weightlessness, lacking worries or cares, being lost in one's inner world, and the absence of thought. One theme that arose regarding conscious experience across the participants was having greater access to one's feeling states when feeling passionate about life. These feelings often involved self-contentment, exhilaration, self-transcendence, and a feeling of increased connection with the cosmos.

Another study that investigated the inner experience of older individuals focused on daydreaming throughout the lifespan (Giambra, 2000). This study used retrospective self-reports that asked people of various ages to analyze the frequency and characteristics of their daydreams. The results from this study suggest that daydreaming decreases with age, with a sharp drop from the age group consisting of 76 to 81 year-olds to 82 to 87 year-olds. Likewise, absorption in one's daydreams and the emotion contained in daydreams appears to decrease with age. Many characteristics of images in daydreams also appear to decrease, including image generation, maintenance, and transformation.

Inner Experience Research

Unfortunately, the history of psychology is fraught with methodological difficulties pertaining to introspection and the study of inner experience in general. Perhaps the earliest difficulty with introspection-based methodology involved the dispute over imageless thought between German psychologists using introspective techniques to study inner experience and American psychologists (led by E.B. Titchener) using similar techniques. Monson and Hurlburt (1993) showed that the debate between these two groups was over the interpretation of their findings not the content of their findings. At a purely descriptive level, these two groups had discovered the same thing, namely thoughts that had no manifest imaginal content. The difference between these two groups lies in the interpretation of the findings. Unfortunately, because these introspectionists could not agree on such a simple matter, reports of inner experience and introspective methodology were largely discredited and careful scientific study of inner experience was mostly abandoned (Hurlburt & Heavey, 2001).

The general lack of acceptance of introspective methods has remained for almost a century. One reason that introspection is so important yet so controversial today is due to the paradox of introspection described by Schooler and Schreiber (2004). While it is impossible to deny the existence of inner experience it is impossible to observe it directly and thus study it empirically. Because inner experience is not fit for direct observation or empirical study, most psychologists have abandoned its study and introspective methodology in general (Schooler & Schreiber, 2004).

Fortunately, psychology can contribute a great deal to the understanding of why the original introspection movement failed. Hurlburt, Heavey, and Seibert (2006) identified fifteen guidelines for effective introspective research. These guidelines are informed by what psychology has learned about effective introspective methodology over the past century. The guidelines include remaining skeptical about introspective reports, introspecting with little delay, introspecting very brief, concrete moments, disturbing experience as little as possible when introspecting, introspecting in natural situations, and not requiring too much of participants who are introspecting including asking participants to infer causation for the contents of their awareness.

Although Hurlburt et al. (2006) may give the most thorough prescription for the successful investigation of inner experience, other authors have recognized the importance of some of the above guidelines. For example, Hnatiuk (1991) believed that sampling methods used as a means of introspection can be especially useful because they require little delay between recording of the inner experience and the reporting of that experience thus minimizing inaccuracies. Furthermore, reports of inner experience in the natural environment are often possible in sampling methods, and thus yield data that are

ecologically valid (Hnatiuk, 1991). Klinger (1978) suggested that two keys in attempting to accurately study inner experience is to eliminate the use of memory as much as possible and to ask individuals to describe discrete experiences rather than provide generalizations.

There remains a divide today among psychologists regarding the study of inner experience (Hurlburt & Heavey, 2001; 2004). On one side of the divide there are psychologists who believe that studying inner experience is quite easy and very important. The belief that it is fairly easy to obtain accurate reports of inner experience is most readily observed in cognitive realms of psychology, especially cognitive psychotherapy (Hurlburt & Heavey, 2001). Cognitive psychotherapy is largely based on the introspection of the client, including things such as recording thoughts (i.e., inner experience) and questioning maladaptive beliefs. However, if researchers are under the assumption that introspection is easy and that people can report their inner experiences with little or no difficulty, then scientists subject their research to a substantial amount of potential error (Hurlburt & Heavey, 2004).

Scientific studies of inner experience have found that people are often mistaken about their own inner experience when asked to describe it in a cavalier fashion without the use of systematic investigation. One systematic investigation of inner experience showed that an individual had multiple simultaneous cognitions although she was not aware that she had multiple simultaneous cognitions before the study began (Hurlburt 1993; Hurlburt, 1997). Hurlburt and Sippelle (1978) presented a case of a man with free-floating anxiety who had angry thoughts toward his children, but had no awareness that he had these thoughts prior to undergoing a thought sampling procedure.

The assumption that individuals can easily report their inner experience accurately without the aid of systematic methodology has permeated cognitive psychotherapy. This assumption has come to dominate diagnostic methodology used today. That is, the clinical interview is often used as the basis of clinical diagnosis, yet it is insufficient in gaining an understanding of the actual experience of individuals (deVries & Delespaul, 1989).

Hurlburt, Koch, and Heavey (2002) stated that there are four assumptions in the cognitive model that are related to introspection and inner experience: behavior and thinking influence one another, individuals have the ability to introspect their thoughts, individuals can introspect accurately, and individuals can change the way they think. These assumptions dominate current cognitive psychotherapy and potentially lead to misunderstandings regarding the true nature of people's inner experience.

Whereas cognitive psychotherapy represents one side of the divide that says that investigating inner experience is trivially easy, the other side states that inner experience cannot be studied at all due to the fact that inner experience is not directly observable. This is most readily observable in the theoretical framework of behavioral psychologists and scientists who believe that psychology is limited to the study of behavior (Hurlburt & Heavey, 2001). Many studies have suggested that it is very difficult for individuals to accurately describe their inner experience. For example, Nisbett and Wilson (1977) have shown that it is extremely difficult for individuals to draw accurate conclusions regarding the motives underlying their overt behavior. These authors concluded on the basis of their studies that nearly all introspective reports are unreliable and cannot be used as a basis for scientific research due to their substantial inaccuracy. Nisbett and Wilson's

(1977) study has greatly influenced the side of the divide that denies the utility of all introspective research.

Although Nisbett and Wilson's (1977) influential study discredits nearly all introspective reports, they did allow a small caveat with regard to the successful study of inner experience. They stated that if individuals could be cued to pay direct attention to their inner experience as it was occurring and could be trained to accurately report on their inner experience at the point of this interruption then accurate reports of inner experience could be possible.

There is one method that follows Nisbett and Wilson's prescription and is also designed to incorporate what psychological science has learned about reports of inner experience in the last 100 years in order to avoid the pitfalls that destroyed introspection. This method is Descriptive Experience Sampling (DES) developed by Hurlburt (1990; 1993). DES was created specifically to provide accurate descriptions of inner experience (Hurlburt et al., 2002) and to overcome the pitfalls that plagued, and eventually doomed, the introspective enterprise a century ago.

DES has five main features that make it a useful methodology for gaining an accurate representation of peoples' inner experience. First, it simply asks participants to describe their inner experience rather than interpret it. As Nisbett and Wilson (1977) have shown, individuals often have difficulty accurately giving reasons for their behavior or inner experience. Second, experience is defined as broadly as possible and encapsulates whatever participants report to be directly in their awareness at a randomly sampled moment. Whatever happens to be in an individual's awareness is what DES is interested in. DES is not interested in any pre-determined content or form of inner experience but

instead focuses on what is present in an individual's awareness at a randomly sampled moment regardless of what is in awareness (Hurlburt & Heavey, 2004). Third, DES uses random sampling in order to gain the most accurate contents of an individual's everyday awareness. Fourth, it investigates the participant's inner experience in his or her natural environment, thus providing ecological validity to the method. Finally, the DES procedure is not a hypothesis testing procedure and therefore allows for the pure investigation of inner experience, unclouded by preconceived theories about what a particular individual's or group's experience might be like.

DES uses a beeper that randomly signals participants. Participants are instructed to note any aspects of inner experience that were ongoing at the moment of the beep such as thoughts, feelings, perceptions, etc. and to jot down characteristics of those sampled moments in a notebook. During an initial instructional interview, participants are often given the metaphor that they should view the process of capturing what is in their awareness at the moment of the beep as taking a picture. Just as a photograph captures or freezes a moment in time, so too should the beep capture or freeze a moment in awareness or consciousness. After six or eight samples have been collected in what is typically a two to three hour period, the participant meets with the investigator for an extended interview about those samples. This interview typically occurs either the same day as the samples were collected or the next day in order to minimize the effects of memory distortion that come with time. The interview itself is unstructured in that there are no specific questions or goals other than to allow the individual to describe accurately and fully the contents of their inner experience at the moment of the beep. These interviews typically last about one hour. The participant is in no way asked to interpret

their inner experience or intuit motives for their experience. They are simply asked to describe its contents.

This sample and interview process is then repeated the next day and then repeated on subsequent days until an adequate number of samples are obtained. Typically participants collect approximately six samples each day. Many times, due to the length of many interviews, not all six beeps are discussed during a given interview. This procedure is typically repeated for about four to six days for a total of about 25 samples, although this number can vary substantially.

Typically, participants in the DES method need some level of training in order to accurately describe their inner experience. The requirement of a training period is not only intuitively supported in DES work, but also suggested by other researchers to increase the accuracy of introspections (Schooler & Schreiber, 2004). Furthermore, participants are often initially unprepared regarding the level of detail of each sampled experience that the interviewer is investigating. Therefore, participants are often unable to describe their experiences in adequate detail during the first interview. For these reasons, the contents of the first interview day are often not used and the first day is typically viewed as a day of training. However, some participants may be proficient enough during the first day that analysis of the first day is possible.

DES has been used to shed light on a number of important psychological phenomena related to inner experience. DES has proven to be effective in uncovering many cognitive peculiarities in many psychological disorders including anxiety, Asperger's Syndrome, borderline personality disorder, bulimia nervosa, depression, hypomania and schizophrenia (Hurlburt 1990, 1993, 1997). For example, DES has suggested that at least

some individuals with Asperger's Syndrome think almost entirely in images or have no inner experience at all (Hurlburt, Happe', & Frith, 1994). Results from DES have shown that at least one individual with borderline personality disorder had multiple, complex, simultaneous "cognitions" (Hurlburt, 1993; Hurlburt, 1997). These studies suggest that individuals with different diagnoses have substantially different inner experience and that different diagnoses may have an inner experience with a specific "signature" (Hurlburt et al., 2002). Even individuals who exhibit a seemingly mundane behavioral characteristic may have characteristics of inner experience that are linked to that behavior. For example, Hurlburt et al. (2002) found that individuals who had a high rate of speech had complex inner experience compared to others that was characterized by the consistent presence of simultaneous, multiple cognitions.

DES has identified a number of common forms of inner experience (Hurlburt 1990; 1993). The five most common forms are:

1. Inner Speech – The experience of speaking in one's own voice (but internally) that includes characteristics of typical external speech, such as pitch, pauses, inflection, etc. This is a very common characteristic although there is a significant amount of variability among individuals, with some individuals experiencing no inner speech and others experiencing it very frequently.

2. Inner Seeing – The experience of seeing something internally that is not present externally. The internal seeing may or may not have the characteristics of the actual external object. Typically, the internal seeing has characteristics of external vision (this is generally supported by research, Schooler & Schreiber, 2004; i.e., center is more in focus and more attention is paid to the center, no obvious edge or border, etc.) but not

always. The DES method has found that individuals can have no inner seeings or have over 50 percent of their sampled experiences contain inner seeings (Hurlburt et al., 1994).

3. Unsymbolized Thinking – The experience of having a thought without that thought being represented in symbols such as words or images. The participant is typically sure that there was a thought at the time of the beep but states that it did not occur in words, images, or any other symbols. For example, a participant might say that “I was having a thought about my mother and how good it feels to be at home with her but I wasn’t thinking of it in words or images or having a feeling about it or anything but I was definitely thinking it.” Some individuals report never having this form of experience while others report it in more than 50 percent of their samples (Hurlburt et al., 1994).

4. Feeling – The experience of having an emotion of any kind. These are often located somewhere in the body but not always. Again, individuals can report no experiences of feelings or over 50 percent of an individual’s samples can contain feelings (Hurlburt et al., 1994).

5. Sensory Awareness – The experience of either having an experience that is perceptual in nature (such as feeling heat on the skin) or focusing on the physical properties of an external object (such as paying particular attention to the blueness of the sky).

There are many other forms of experience that are less common. Here is a description of some of these forms:

1. Worded Thinking – The experience of explicit words that are not internally or externally spoken, heard, or seen.

2. Inner Hearing – The experience of innerly hearing but not actually producing the sound.

3. Imageless Seeing – The experience of innerly seeing something but the visual component of that something is not directly in awareness.

4. Feeling (Fact of Body) – When a feeling is present but not actually in awareness.

5. Just Doing (Talking, Reading, Laughing etc.) – Performing a behavior that is not in awareness.

There is also a category called multiple awareness. This is the experience of simultaneously having more than one experience where each experience is disconnected and unrelated to the other(s). For example, experiencing two unrelated inner seeings simultaneously or experiencing sensory awareness simultaneously with unrelated inner speech.

Other researchers have used various sampling methods to divide inner experience in different ways than those listed above. For example, many researchers have studied the “directedness” of thought, operant vs. respondent thought, task-irrelevant vs. task-related thought, fanciful vs. realistic thought, and well-integrated vs. fused thought (Klinger, 1978). However, these conceptualizations of thought are largely theory driven whereas the forms of thought outlined by Hurlburt (1990; 1993) are based on observations that are independent of any particular theoretical framework.

DES is not the only sampling method that is used to excavate the inner experience of people. Another method that systematically attempts to study the inner experience of people is the experience sampling method (ESM). ESM was designed specifically to obtain ecologically valid data regarding individuals’ experiences across a wide variety of

settings (Hormuth, 1986; Punzo & Miller, 2002; Prescott, Csikszentmihalyi, & Graef, 1981) and attempts to obtain a representative sample of a person's or population's daily experience and social settings (deVries, 1992; deVries, Dijkman-Caes, Delespaul, 1990). Although no single person can be credited with the development of ESM, Scollon, Kim-Prieto, & Diener (2003) credit Csikszentmihalyi and colleagues with the earliest study that resembles the current use of ESM. ESM has become increasingly popular since its initial development in the 1970s (Scollon et al., 2003).

ESM requires participants to fill out questionnaires repeatedly in their natural environment when signaled by a quasi-random pager, adding ecological validity to the precision of questionnaires (Hektner & Csikszentmihalyi, 2002). ESM questionnaires can be tailored to investigate what the researcher is interested in investigating including mood, thoughts, behavior, environment, any combination of these, or any specific aspects of these.

Although a number of experience questionnaires may be used, the one most commonly used is based on the MMSE and evaluates an individual's cognition, mood, motivation, and psychopathology (deVries, 1992). Typically, questions are rated by participants on a 7-point Likert scale (Punzo & Miller, 2002). There are typically 40 or more items per questionnaire and participants fill out approximately 30 to 50 questionnaires during the course of the study (Hektner & Csikszentmihalyi, 2002).

Typically, individuals are asked to record their experience from 4 to 20 times a day over a week-long period, although the frequency of beeps and length of the study may vary (deVries et al., 1990). The participants' questionnaire data are then analyzed and are often grouped so researchers can analyze experiences in specific environmental

situations, individuals, or individuals in specific environmental situations (Hormuth, 1986).

ESM has been used to study a wide variety of populations, environmental situations, and behavioral and psychological phenomena (for a review, see Hektner & Csikszentmihalyi, 2002). For example, Hillbrand and Bradley (1994) used ESM in a study that demonstrated that convicted sex offenders had significantly more sexual thoughts and thoughts involving anger towards women than did controls. deVries et al. (1990) used ESM to perform a study where depressed individuals tended to experience an increase in rumination and a decrease in focused thoughts while in public. A study conducted by Gauvin and Szabo (1992) used ESM where regular exercisers reported an increase in physical symptoms after a one week break in exercise. ESM has been used to study the distance from which individuals use computers, read, and do other work involving close visual inspection (Rah, Mitchell, Bullimore, Mutti, & Zadnik, 2001). Prescott et al. (1981) used ESM to demonstrate differences between age groups and their experience, gender and their experiences, a relationship between subjective experience and setting (i.e., work, transportation, and recreation/home), and an interaction between age groups and these settings. deVries, Delespaul, and Dijkman-Caes (1992) used ESM to study the relationship between depression and anxiety. ESM has also been used to study patterns of experience, fluctuations in experience and symptomatology, and how these patterns and fluctuations related to psychological diagnoses (deVries et al., 1990). ESM has also made important discoveries regarding the relationship between schizophrenia and environment. Individuals with schizophrenia felt best when they were with one to three other people, whereas they felt the worst when they were either alone or

in groups that contained more than three other people (deVries & Delespaul, 1989). This is an important finding that can inform group treatment practices and the structure of residential treatment for individuals with schizophrenia.

Participants appear generally to comply with ESM and find the difficulty of the task to be minimal (Punzo & Miller, 2002; Hormuth, 1986). However, there is difficulty at times responding to the beeper on time or responding at all (Hormuth, 1986). Because ESM requires participants to carry the beeper for all waking hours, individuals are often caught in situations when they cannot carry the beeper (for example, while swimming) (Hormuth, 1986; Prescott et al., 1981) or cannot respond to the questionnaire immediately (for example, while performing a difficult task at work) (Hormuth, 1986). Participants in studies using ESM typically do not respond to beeps 15 to 20 percent of the time (Rah et al., 2001).

Csikszentmihalyi and Larson (1987) have argued for the validity of ESM. They stated that ESM has shown that people's experiences correlate in expected ways with environment and that people from varying clinical populations also vary in their ESM data. That is, individuals in different diagnostic categories can be consistently differentiated through the use of ESM (deVries, 1992). Furthermore, there is typically an average to strong relationship between data obtained from ESM and data obtained from standard summary questionnaires (Csikszentmihalyi & Larson, 1987; Hormuth, 1986). Convergent validity has been shown via correlating data from ESM and physiological measures (Klinger & Kroll-Mensing, 1995). Questionnaires, procedures for instruction, and data analysis have been validated on a total that exceeds 1,000 participants (deVries, 1992).

Scollon et al. (2003) have catalogued the strengths of ESM. These strengths include the ability to understand how behavior, affect, and cognition vary as a function of environmental circumstances, increased ecological validity, increased idiographic understanding, avoidance of many of the difficulties related to introspective reports based on memory, and the ability to supplement data obtained by more traditional means such as personality tests and self-report measures that rely on global recall. Furthermore, ESM avoids error-prone retrospection and allows individuals more room in describing their experience than classic self-report measures (Klinger & Kroll-Mensing, 1995). Klinger and Kroll-Mensing (1995) pointed out numerous weaknesses to the method, such as lack of motivation on the part of the participant, difficulty completing the task, limitation to certain populations, reduction in data quality as the study continues, participant selection of when to comply with the signal, inability of participants to respond to signal immediately, reactivity, differences in time frame for reporting, and a host of data analysis difficulties. The authors concluded that ESM is beneficial and can help aid research, especially when researchers are aware of the weaknesses inherent in the method.

Another method that is similar to DES and ESM is the thought sampling method. An early version of thought sampling asked participants to record answers to questions about their external environment and mood in a notebook at random intervals (Brandstatter, 1978; Hurlburt, 1979). The thought sampling method signals participants to respond to a questionnaire regarding their inner experience and to spontaneously report their inner experience at the time of the signal (Klinger, 1978-79). In many of these experiments, individuals repeatedly fill out the Thought-Sampling Questionnaire when prompted by a

random or quasi-random beeper. The Thought Sampling Questionnaire measures experience on a number of dimensions including the sharpness, vividness, and detail of mental imagery, modalities of thought (verbal, imagery, etc.), spontaneity, fancifulness, controllability, time orientation, and extent of attention being paid to the external environment at the time of the beep (Klinger & Kroll-Mensing, 1995). Furthermore, it allows for both free responses on the part of the participants with regard to their experience as well as experimenter-designed questions designed to assess specific aspects of experience that are of particular interest to the experimenter (Klinger & Kroll-Mensing, 1995).

This method may also call for individuals simply to record their experience when prompted (Klinger, Barta, & Maxeiner, 1980; Klinger, 1984; Davis & Johnson, 1983-84) where experimenters later analyze the content of these reports to excavate features that are of interest to the experimenters. For example, individuals in one study were prompted by a quasi-random beep while taking an exam in order to study the experience of test anxiety. When the beep occurred, the participants were simply instructed to record their thoughts on a sheet of paper (Klinger, 1984). In another study, basketball players reported their last thought whenever they exited the game for substitution and at quasi-random times while sitting on the bench (Klinger, Barta, & Glas, 1981).

Think-aloud methods are also used to study the experience of people. In this method individuals are simply asked to speak out loud what they are thinking, reporting on their inner experience as it is occurring (Klinger, 1978). Individuals are often asked to perform a task (such as solving a puzzle or performing a logic problem) and to verbalize out loud what they are thinking while they are performing the task (Klinger, 1974).

Although this method has the advantage of immediacy, it has a number of disadvantages, including the fact that it feels unnatural to most participants, the participant is limited in what he or she can report at a given time, and that it may influence the content of individuals' inner experience (Klinger, 1978).

Diary methods are also used to collect reports of individuals' experiences. Diary methods are different from other thought sampling methods in that individuals can record their experience in general over a longer period of time (as long as a month) or at an instant as with other sampling methods (Hedges, Krantz, Contrada, & Rozanski, 1990). Diaries are often structured so that participants report on specific activities, cognitions, emotions, etc. that the researcher is interested in studying. For example, Hedges et al. (1990) have developed a diary that asks participants to record when they were engaged in a number of behavioral activities (i.e., driving, eating, recreation, etc.) and cognitive activities (i.e., thinking, planning, daydreaming, etc.). Participants using this diary would record how long they were engaged in the activity, where they were, and would make a new entry every time their activity changes. Validity for this diary was established by the fact that observers keeping simultaneous diaries on a participant correlated highly with the entries made by the participant. Furthermore, the entries of individuals working a white-collar job were much different during their time at the workplace than on the weekend.

Articulated Thoughts During Simulated Situations (ATSS) is a thought sampling technique that was developed by Davison, Robins, and Johnson (1983). ATSS requires participants to listen to a simulated recording of a conversation and to imagine that they are actually involved in the social interaction that they are hearing. They are told that the

experimenters are interested in what is in their awareness as they imagine they are involved in this social interaction. Participants listen to these recordings for 15 to 25 seconds and are then given 30 seconds to write down what was in their awareness during the previous segment. This process is repeated at the discretion of the experimenter.

Time-budgeting studies are similar to the methods listed above, although they are geared more toward a person's behavioral activity rather than mental activity. In these studies, participants typically use diaries to record how often they are engaged in a particular activity, how long they are engaged in these activities, and the environment in which they engaged in these activities (deVries, 1992).

The above methods have collectively yielded some important results to introspection-based methodology in general. First, participants find the tasks minimally intrusive and not very difficult (Hormuth, 1986; Hurlburt, 1979). Second, the results of experience sampling studies often show that individuals' characterizations of their experiences before undergoing these studies often differ substantially from the actual data produced from the study, suggesting that individuals are not very good at giving general characterizations regarding their own experience (Hurlburt, 1979). Furthermore, thought sampling methods can be both therapeutic for participants and "microdiagnostic" in that they can discover specific cognitive activity that is related to symptomatology (Klinger & Kroll-Mensing, 1995).

One thing that sets experience sampling procedures apart from classic assessments is that they do not rely on recall and generalizations, processes that are highly prone to distortion (Klinger & Kroll-Mensing, 1995). Furthermore, participants may vary greatly in the way they interpret items on a self-report inventory thus producing data that do not

represent the experiences of individuals in a consistent manner (Klinger & Kroll-Mensing, 1995).

Of course, determining the reliability and validity of sampling techniques is limited, as it is with more traditional methods of inquiring about inner experience (i.e., depression inventories, personality tests, etc.; Hurlburt, 1997). In these measures it is impossible to directly validate individuals' reports of their inner experience. That is, validation of an internal, non-public event simply cannot occur. Rather, the method of reporting inner experience can be the only thing validated, not the inner experience itself (Hurlburt, 1997). However, this is true whether the method is sampling inner experience, asking questions about inner experience in an interview, personality assessment, depression inventory, etc. Nevertheless, Hurlburt and Heavey (2002) have established that independent observers reliably agree in their classification of the five major forms of inner experience discovered by DES.

One sampling procedure has been successfully used with an elderly population. Hnatiuk (1991) used ESM to sample the experiences of widows between the ages of 69 and 94. Part of this study assessed how acceptable the procedure was to these individuals. Nearly 80 percent of the participants reported that it was either a positive or neutral experience and only one of the participants stated that the process changed her day to day behavior. Furthermore, a large majority of the sample was able to complete the study, although attrition rate was a bit higher in this population as compared to others. Those who remained in the study completed the records involved with ESM tasks at the same rate as different populations in other studies although many did not follow the procedures as they were instructed (i.e., did not take pagers into the community with them, did not

complete records at the time of the beep, etc.). Finally, the women's reports were found to be highly reliable from sample to sample and were found to exhibit high validity. This suggests that elderly individuals are capable of successfully completing and participating in thought-sampling procedures.

The Importance of Understanding the Inner Experience of Older Individuals

The current study was cross sectional in nature and used DES to investigate the inner experience of individuals over the age of 65 with and without cognitive impairments.

DES was used for four primary reasons:

1. DES is not theory driven and is therefore interested only in the experience of individuals. DES does not look for anything pre-determined about experience, allowing results to drive theory. This allows for an unbiased look at the experience of older individuals with and without cognitive impairment.

2. DES researchers believe that the use of questionnaires with the lack of an extensive interview may not capture individuals' inner experience accurately. Hurlburt et al. (2002) argued that individuals may have difficulty accurately reporting their inner experience because of their beliefs about their experience. For example, Hurlburt et al. (2002) stated that individuals typically do not believe that they have unsymbolized thinking at the beginning of the DES procedure. However, after undergoing repeated interviews, many individuals report inner experiences that seem to be congruent with unsymbolized experience as DES defines it.

3. DES does not require individuals to wear the beeper for as long a period of time as do other sampling methods. Individuals must carry and respond to the beeper for

approximately 2 to 4 hours a week and engage in an expositional interview that is an hour long each week. Other methods require the beeper to be worn all day for a number of days.

4. DES also has a definitive time frame across studies (i.e., the moment of the beep), a major advantage over non-sampling methods (see Nisbett & Wilson, 1988; see Hurlburt et al., 2006).

The present study used DES to investigate the inner experience of people over the age of 65, some with diagnosed cognitive impairment, some with undiagnosed cognitive impairment, and some with no cognitive impairment. The study was primarily exploratory in nature. DES has never been applied to older individuals as a group or with any older individuals with noticeable cognitive impairment. One of the study's goals was to discover if individuals with cognitive impairment could engage meaningfully in the DES process and if not why this was the case. This could lend insight into the development of cognitive impairment in older individuals and could potentially provide new ideas regarding the diagnosis and treatment of cognitive impairment in the elderly. The study also sought to uncover a "cognitive signature" (a pattern of inner experience unique to a particular group of people) in individuals over the age of 65 if one exists, as well as differences between older individuals who are and are not cognitively impaired. Cognitive signatures have been found in a variety of populations using DES and it is possible that one exists in the populations used in this study. Such a discovery could potentially aid in the understanding, diagnosis, and treatment of the cognitive impairment in the elderly.

CHAPTER 3

METHOD

Participants

There were a total of 12 participants in this study, all of whom were at least 65 years of age. Six of these individuals demonstrated no cognitive impairment and were not diagnosed with any form of cognitive impairment. The other six individuals had some form of cognitive impairment; two were diagnosed with VaD, two were diagnosed with MCI, one was diagnosed with AD, and one was not diagnosed but exhibited impairment on the MMSE and throughout the DES interviewing process. An attempt was made to find individuals with mild cognitive impairment so that they would have a good chance of being able to engage sufficiently in the DES procedure. All of the cognitively impaired individuals could be classified as being mildly or moderately impaired. The individual with AD had the lowest score (19) on the MMSE. The undiagnosed individual had a score of 21 on the MMSE (mild to moderate). The individuals with MCI received scores of 23 (mild to moderate) and 27 on the MMSE (mild). The two individuals with VaD received 29's on the MMSE suggesting very little cognitive impairment. The other 6 participants received scores of 30 out of 30 on the MMSE suggesting no cognitive impairment.

Participants were recruited from a variety of places and in a variety of ways. Eight of the participants came from the Las Vegas, Nevada area, three came from Pennsylvania, and one came from Ohio. Some responded to newspaper advertisements, some were involved in dementia support groups, some came from assisted living facilities, and some were acquaintances of the author.

All individuals reviewed and signed the informed consent form. Caregivers were consulted as needed. The study was explained to all of the participants before they signed the consent forms. All participants received \$10 per interview.

Materials

A small, portable beeper (Hurlburt, 2006) was used by each participant. The beeper randomly emits a 700-Hz tone through an earphone that each participant wore. At times participants used an external speaker rather than the presence of earphones due to hearing aids that made it impossible to insert the earphone or for variations in procedure (see individual participant descriptions for details). The average time between random beeps was varied depending on the participant and the procedure, although the most common interval was an average of 30 minutes (with a maximum interval of one hour; see individual participant descriptions for details). Most participants were given a small (3X5 in) notebook to jot down notes regarding their inner experience at each beep, but again, this varied by participant.

The MMSE (Folstein et al., 1975) was administered to all participants to assess the level of cognitive ability. The MMSE is a short test (5 to 10 minutes) that assesses very basic cognitive functioning, such as orientation to space and time, attention, memory,

language functioning, simple reading, and simple arithmetic skills. The maximum score on this test is 30 points, representing no cognitive impairment. Cut off scores for “mild”, “moderate”, and “severe” impairment vary as a function of educational level.

Procedure

All participants agreed to one of three levels of consent. Participants either consented to participate in the study but refused videotaping of the interviews (N = 3), they consented to be in the study and to be videotaped but that the videotape could not be used beyond the scope of the study or the DES lab (N = 1), or they consented to use of the videotape and agreed that the video could be used for instructional purposes beyond the confines of the DES laboratory (N = 8). All participants’ confidentiality was assured commensurate with their level of consent. Individuals in the study with a possible cognitive impairment were given the MMSE as a screening tool to make it likely that they could adequately participate in the sampling procedure; an MMSE score of 15 or higher was used as the cutoff although no participant scored below 19. A score of 18 or below indicates the clear presence of dementia in individuals with an eighth grade education (Weiner, 1991).

All participants participated in the DES procedure described by Hurlburt (1990; 1993; Hurlburt & Heavey, 2006) with small variations in some instances, described below in the summary of each participant. Essentially, participants wore a beeper that beeped at random intervals. Participants were asked to “freeze” their inner experience at each beep and to jot it down in a small note book. Participants typically collected four to six beeps and were interviewed regarding the details of each of their beeped experiences within 24

hours. Some participants were interviewed directly after the beep sounded to minimize difficulties related to memory. The purpose of the interview was to gain an understanding of the contents of each of the sampled moments. This interview essentially involved asking one question: “What was in your inner experience at the moment of the beep?” This question took a number of forms throughout the interview, but all were designed with one purpose in mind: to aid the participant in communicating the contents of their awareness at the moment of the beep. Discussion of the interview method, with annotated examples, is in Hurlburt and Heavey (2006), Hurlburt and Schwitzgebel (2007), and Hurlburt and Akhter (2006). Interviews typically lasted about one hour. Please see the transcripts of excerpts from interviews from this project below for examples of sampling interviews.

This sample/interview procedure was then repeated up to six times. These interviews were videotaped depending upon the level of consent of the participant. Descriptions of each sample were written by the researchers. The salient characteristics of the inner experience of each participant were identified. Each written description was coded by the author and this project’s advisor, Dr. Russell Hurlburt, according to applicable forms of inner experience identified by Hurlburt (1990; 1993; Hurlburt & Heavey, 2006). Although there were some initial disagreements about coding in a small minority of samples a consensus between the two raters was reached for all samples. This study was prepared to discover some never-before-described forms of inner experience as well, discussed below. Although salient characteristics are typically of the form of experience, salient characteristics that were content-related were also identified.

Results

The results of the study are presented in the following chapters. Each participant was given a separate chapter and a pseudonym and all potentially identifying information was altered. Chapters 4 through 9 present participant summaries of the six seemingly unimpaired individuals. Chapters 10 through 15 present participant summaries of each of the six impaired individuals. These chapters are arranged in order of apparent cognitive impairment based on MMSE scores from least impaired to most impaired; pseudonyms were selected so these chapters would be in alphabetical order. Chapter 16 presents across participant results and discussion as well as diagnostic and treatment implications of the results, limitations of the study, and suggestions for future research.

CHAPTER 4

UNIMPAIRED PARTICIPANT “ANNA”

Anna was a 71 year-old female who completed high school and has taken many college classes, although she never completed a degree. She had no evidence of cognitive impairment and scored a 30 on the MMSE indicating that she likely has no cognitive impairment. She contacted the researchers after reading about the study in a local newspaper. Anna was not familiar with the DES procedure prior to the study. She was fairly adept at becoming acclimated to the DES process. As is typical of DES participants of any age, she gave somewhat unreliable reports of her experience on the first sampling day (samples from day one will not be included in the analysis) but by day two gave reports that appeared very reliable. During and after day two, Anna was very confident in the reports of her samples. Therefore, 23 samples from sampling days 2 through 6 will be analyzed.

A summary of Anna’s experience frequencies is shown in Table 1. Although the forms of Anna’s experiences were sometimes difficult to classify due to their complexity and idiosyncratic nature, feelings were the most prominent form in Anna’s experience, present in 48 percent of her samples. Other forms in Anna’s experience were sensory awareness, (39 percent), unsymbolized thinking (35 percent), inner speech (22 percent), and inner seeing (17 percent). Anna also experienced laughing (4 percent), just doing (2

percent), and had no experience in 4 percent of her samples. She experienced multiple awareness in 54 percent of her samples.

Table 1
Percentages of characteristics in Anna's samples of inner experience

Characteristic	Percentage
Feeling	48
Inner Seeing	17
Inner Speech	22
Just Doing	2
Laughing	4
No Experience	4
Sensory Awareness	39
Unsymbolized Thinking	35
Multiple Awareness	54
Number of samples	23
Total number of characteristics ^a	48
Characteristics per sample	2.09

^aTotal number of characteristics excludes categories that are not directly experienced (in this case, Just Doing, Laughing, No Experience and Multiple Awareness), and counts uncertain instances as .5.

The “Percentage” column in Table 1 refers to the percentage of samples that contained each of the form categories. Forms that appeared to be ambiguously between two categories were counted as .5 in each category. Also, if it was not clear if a certain experience was present at all or not right at the moment of the beep, it was counted as .5.

Feelings

Feelings were the most common form of experience for Anna and were present in 48 percent of her samples. These feelings often had a physical component (74 percent) that sometimes also had a mental component (35 percent).

Below is an example of a feeling that occurred in isolation that had both physical and mental components:

Beep 2.2 – Anna was sitting at the computer while a song by a female singer was playing. At the moment of the beep, Anna was feeling sad, experienced primarily as a lump in her throat and also probably as a feeling of heat behind her eyes and cold on her forehead. She was not certain about these two aspects of the experience, but said that she was 70 percent sure that they were there. The sadness was about being old, about the things that she had done when she was younger (as at the time when this particular song might have been popular). Also, although Anna wasn't paying particular attention to the music that was playing, she was somehow aware of the music and this music may have brought on the experience of sadness.

On one occasion a feeling was entirely mental:

Beep 4.2 – Anna had finished writing her description of beep 4.1. She had just sighed and turned her attention back to the computer with relief. At the moment of the beep, Anna was experiencing relief/accomplishment at getting all of her experiences down in the notebook for beep 4.1. This was experienced as the release of the ideas/experiences of beep 4.1 (see below) and/or the words associated with the ideas/experiences of beep 4.1 from herself into the external world. The ideas/words were somehow visually present but not explicitly seen. There also may have been an experience of getting ready to not think, but it is not certain the extent to which (if at all) or how this was present at the moment of the beep.

Anna had only one feeling experience that was entirely physical and occurred without the presence of other forms of awareness:

Beep 3.3 – Anna was lying on the bed and talking to her partner Sarah about the progress that Sarah’s academic department has made. At the moment of the beep, Anna was feeling proud of Sarah for helping the program progress so much. This pride was experienced physically as a release of tension that is somehow similar to sighing, although actual sighing was not taking place at this moment. The feeling of pride may have included a feeling of pride in herself for being partnered with a women who was achieving such an accomplishment; it was not clear whether Anna actually recalled feeling that at the moment of the beep, or was presuming that it was there.

Anna had two feelings that contained a visual component. One of these is beep 4.2 above where ideas and or words were somehow visually present. Below is the other occurrence of a feeling with a visual component that also includes an instance of sensory awareness and an ambiguous experience that is either sensory awareness or just doing:

Beep 5.5 – Anna was tossing a salad and talking with her friends. One of her friends had just asked Anna if she grew the vegetables for the dinner in her backyard. Just prior to the moment of the beep Anna had sarcastically said “I hand picked all the veggies” and everyone was laughing, including Anna. At the moment of the beep, Anna was aware of the colors in the salad, an instance of sensory awareness. She was also experiencing a very slight pleasure at the way the colors in the salad looked. Anna may have experienced this pleasure partially as a vibration in her vision, but she was very unsure when talking about this aspect of her experience. Also in Anna’s awareness was both the experience of her own laughter and the laughter of her friends.

Sensory Awareness

Of Anna's 23 samples, 39 percent contained sensory awareness. Beep 5.5 above contains a clear instance of sensory awareness (noticing the colors in the salad) as well as one that was ambiguously between sensory awareness and just doing (awareness of the laughter). Here is a sample that contains four different sensory awarenesses (sensation of tapping, seeing finger tap, hearing finger tap, and seeing time change):

Beep 5.2 – Anna was setting the timer on her oven. She was in the process of using the oven keypad to get the appropriate time (1 hour and 30 minutes). At the moment of the beep, she was tapping the keypad 30 times in quick succession to get the minute part of the display to 30 and was very close to 30. Anna was focused on this process. She was feeling the physical sensation of tapping the key pad on the end of her finger, seeing her fingers tap on the keypad, hearing her fingernails make a clicking noise on the keypad, and seeing the timer display change as she pressed the numbers on the keypad.

Unsymbolized Thinking

Unsymbolized thinking was present in 35 percent of Anna's samples. Here is a clear example of unsymbolized thinking with a feeling:

Beep 4.4 – Anna was playing poker on the computer. She was thinking about going to California next week. At the moment of the beep, Anna was cognitively wondering if she could arrange going to California with the interviewers so to not break DES arrangements. She was also experiencing a feeling of mild anxiety about possibly breaking DES arrangements. The anxiety was very mild and was experienced both physically and mentally. The physical experience was located in the upper chest, neck,

and head, was well below the skin, and was similar to the heat of blushing, but not exactly. There was a rising to this experience, as it originated in the upper chest and rose to the head. The mental component of the anxiety was not explicit, but somehow affected Anna cognitively, although Anna was not entirely sure about this component of the anxiety.

Inner Speech

Anna had inner speech in 22 percent of her samples. Below is an example of inner speech with an instance of sensory awareness:

Beep 6.5 – Anna was having difficulty getting the lid on a to-go cup of coffee. At the moment of the beep, Anna was innerly speaking in her own voice “Damn to go cup, lid doesn’t fit.” She was also feeling the pressure on her hand as she was trying to screw the lid on the cup.

Inner Seeing

Seventeen percent of Anna’s samples contained inner seeing. Here is an example of an incidence of inner seeing:

Beep 5.4 – Anna was cutting her friend Jane’s hair and was simultaneously having a conversation with her. Anna was talking, but she had no idea what she was saying—the words were apparently just rolling out of her on autopilot, as were the actions of cutting the hair. Rather than pay attention to either of those activities, at the moment of the beep, Anna was innerly seeing a vegetable chopper that she owns. The inner seeing was very sharp and was floating with no background like a hologram or a projected image. The lid

of the imagined chopper was down; she could see the transparent plastic bottom and the top part of the chopper. Anna was somehow aware of the chopper from different angles, but was not actually seeing it from different angles at the moment of the beep. Anna's interest in this seeing was in the mechanics of how the chopper works rather than in how the chopper looks.

Here is another example of an inner seeing accompanied by a feeling and an unsymbolized thought:

Beep 4.1 – Anna was playing poker at the computer. Earlier that day, she had been playing Canasta with some friends. One of her friends (Jan) had made a mistake and had repeatedly criticized herself and her Canasta partner for it. At the moment of the beep, part of Anna's experience was a mixture feelings and thoughts related to the incident that were somewhat homogeneous in that they were all mixed together to form a mostly uniform experience. The predominant part of this experience was Anna's questioning of whether or not she was too tough on Jan. The word "tough" or "too tough?" was present to Anna visually and was experienced as a grayish/pinkish/beigeish color that had jaggedy edges, was not overwhelmingly large, was flat, was pliable, and was clear. Anna was very specific about the jaggedy edges of the experience; when drawn, she commented that the drawing was too jaggedy and that the jags weren't sharp enough. Anna knew that the visual experience meant the word "tough" or "too tough?" at the moment of the beep. There also may have been a cognitive component to this experience where Anna was questioning if she was too tough on Jan. Also at the moment of the beep, Anna was experiencing doubt/indecision about whether she did the right thing in confronting Jan. This was experienced as an "icky," sour, almost nauseous feeling in the

upper chest and throat region. She was also simultaneously thinking cognitively that she did the right thing by confronting Jan. Also at the moment of the beep, but not as predominant, was the thought that Jan was a jerk. This thought was not in words. There may also have been the experience of simultaneously loving Jan but thinking she's annoying as well, but this was not entirely clear.

Multiple Awareness

Multiple awareness was very common for Anna, occurring in 54 percent of her samples. Beeps 5.5 (where Anna was noticing colors in the salad and experiencing pleasure) and 5.2 (where Anna was experiencing four sensory awarenesses while setting the timer) above are examples of multiple awareness. Beep 4.1 above where Anna was experiencing the word "tough" or "too tough" visually while simultaneously experiencing the feeling of being icky and the unsymbolized thought of Jan being a jerk is another example of multiple awareness.

It is notable that Anna did not begin reporting multiple awareness until the third day of sampling, but by day six all six of Anna's samples contained multiple awareness. This is most likely due to Anna's training and increased sensitivity to her experience.

Unusual Aspects of Experience

A substantial number of Anna's experiences were very unusual either in complexity or form and are worth describing here. Below is a description of an experience that contained a substantial complexity of inner seeings:

Beep 3.4 – Anna was talking with Sarah. Sarah had said shortly before the beep that Anna had not changed very much since they met. Anna was in the process of saying “I wasn’t the P.T.A. lady when I met you,” meaning that she had changed a lot prior to meeting Sarah, and was laughing at that thought. At the moment of the beep, Anna was recalling how she has changed over her life. This recollection consisted of the inner seeing of numerous freeze-frame pictures of herself (Anna estimated about 50 of them) that were experienced in extremely rapid succession like fast time-lapse photography. Anna could describe some of the inner seeings. One inner seeing was of an actual photograph of her when she was about 19 years old taken from the side and wearing a full-length white polka dot on blue dress. One of the last inner seeings was of Anna as the P.T.A. lady that she was before she met Sarah. The inner seeings often showed Anna having a facial expression that was indicative of her emotional state at that phase of her life. For example, one showed a very fearful expression as she was generally very anxious at that stage of her life. The inner seeings also showed Anna as she was at that particular time of life, with variations in a number of aspects of her physical appearance. Many of the inner seeings were of Anna’s face from an extremely close range that showed Anna’s face from just above her eyes to about her chin. There was also a knowing that her children were related to some of the pictures. There may have been other knowings around or during the experience of the inner seeings, but this is highly speculative as it was not discussed in detail. It was not clear if the inner seeings proceeded in chronological order or not. It should be noted that Anna did not mention these freeze-frames until well into the conversation about this beep and that when she first mentioned them she used many subjunctifiers. However, after this initial

uncertainty, Anna was very confident about the existence and nature of these freeze-frames. Anna was also aware of her laughter. The laughter blended in with the recollection of change.

Anna also had two instances of feelings that had visual components. These examples are listed above in beep 4.2 where she was somehow visually experiencing ideas or words, and beep 5.5 where pleasure involved vibration in her vision. Visual components to feelings are highly unusual.

Some of Anna's experiences of inner seeings also had the uncommon feature of movement and analysis. Beep 5.4 above where Anna was innerly seeing the chopper is one example. Here is the other example:

Beep 6.4 – Anna was at the computer working on an article that she is writing. She was reading a part of the article where she had written about a helicopter-carrying ship. At the moment of the beep she was re-reading “which would divide and slide open and allow a helicopter pad to be raised to deck level.” At the moment of the beep, Anna was innerly seeing the scene she was re-reading. She was innerly seeing a colorful scene including the deck of the ship splitting and the helicopter pad rising. There was no helicopter on the pad. Anna was also in the process of gradually changing the perspective from which she was seeing the inner seeing. The perspective started from above and then went below the deck, as if she had gone through the deck of the ship. The inner seeing under the deck was of the elevator. There was also a light green light under the deck. From this perspective she was primarily interested in how the elevator worked. Also at the moment of the beep, Anna was thinking about what was in Harold's imagination (Harold is a character in the book). There were no words in this thought,

but rather the understanding of the concept. Anna was also seeing an after image of the last few words she was reading. They appeared as if they were coming toward her off of the computer screen and were fading away.

Anna also had at least one experience that seemed to be somewhat undifferentiated or lacking some aspect of experience. This was beep 4.2 that contained ideas and words that were somehow present visually but lacked actual visual qualities so that Anna could not “see” these ideas and words.

Discussion

Anna had many features of inner experience that are noteworthy, such as a high rate of multiple awareness, visual components to some feelings, motion and analysis in some inner seeings, complexity in some experiences, and a lack of common aspects of experience at times. It is unclear if any of these aspects of Anna’s experience are related to age or a process of degeneration of her inner experience. The complexity of her experience suggests that her experience is quite rich and not degenerating at all, although it is conceivable that an inhibitory or attentional deficit could create rich and complex inner experience. Overall, Anna was a very convincing participant and even when her experiences were very complex and/or unusual she typically demonstrated a high level of confidence in her reports.

CHAPTER 5

UNIMPAIRED PARTICIPANT “BENJAMIN”

Benjamin was a 68 year-old male with no diagnosed or notable cognitive impairment. He scored 30 out of 30 on the MMSE suggesting that he had no cognitive impairment. He was an acquaintance of one of the researchers and agreed to undergo the DES process. He did not receive education after high school and currently does work in genealogy, writing independently as well as in partnership with professors from a small rural college.

Benjamin seemed fairly adept throughout his first day of sampling at narrowing his experience to the moment of the beep. He was able to make distinctions between events and experiences that came slightly before or slightly after the beep. However, Benjamin did exhibit enough inconsistencies during his first day to eliminate these samples from the analysis. All other beeps will be considered in analysis, a total of 19 in five days. Beeps 4.2 and 4.4 were excluded because they occurred while he was writing descriptions of the previous beep.

As shown in Table 2 below, Benjamin’s most common form of experience was sensory awareness, present in 84 percent of his samples. Other forms that Benjamin experienced were unsymbolized thinking (42 percent), unvocalized inner speech (29 percent, (see below for a description of unvocalized inner speech), and worded thinking (5 percent). Benjamin also was just talking in five percent of his samples and had no

experience in five percent of his samples. Benjamin had multiple awareness in 79 percent of his samples.

Table 2
Percentages of characteristics in Benjamin's samples of inner experience

Characteristic	Percentage
Just Talking	5
No Experience	5
Sensory Awareness	84
Unsymbolized Thinking	42
Unvocalized Inner Speech	29
Worded Thinking	5
Multiple Awareness	79
Number of samples	19
Total number of characteristics ^a	45.5
Characteristics per sample	2.39

^aTotal number of characteristics excludes categories that are not directly experienced (in this case, Just Talking, No Experience and Multiple Awareness), and counts uncertain instances as .5

As in Table 1, the “Percentage” column in Table 2 refers to the percentage of samples that contained each of the form categories. Forms that appeared to be ambiguously between two categories or if it was not clear that they were present at the moment of the beep were counted as .5 in each category.

Sensory Awareness

The most salient feature of Benjamin's sampled experience was the frequent presence of sensory awareness which was present in 84 percent of his samples. The only samples that clearly did not involve sensory awareness were one sample when Benjamin was just talking and another when he had no inner experience. Below is an example of sensory awareness (with an unsymbolized thought):

Beep 6.2 – Benjamin was in his garage. He was thinking about cleaning the earpiece of the beeper. He was considering possible ways to clean it. At the moment of the beep, Benjamin was thinking about water and alcohol as a means of cleaning the earpiece. This experience was not in words. Benjamin was also noticing the colors outside as he viewed them through the garage window. He was noticing mostly green, but also pink, white, and yellow.

Benjamin often experienced multiple sensory awarenesses at one time. He experienced 28 clear instances of sensory awareness with an additional six potential sensory awarenesses contained in 17 samples. If the unclear instances are counted as .5, Benjamin averaged 1.8 instances of sensory awareness in the 17 samples that contained sensory awareness. The most sensory awarenesses that he experienced at one time was four. Below is an example of a sample containing four sensory awarenesses and an unvocalized inner speech:

Beep 2.1 – Benjamin was in his house playing Sudoku on a hand held electronic device. He was having some difficulty with the game, but had just figured out many of the numbers. At or very near the beep, Benjamin had five overlapping experiences. First, Benjamin was innerly saying “I got it now,” referring to figuring out the numbers on Sudoku. This was experienced internally as if he was externally speaking, but the words came significantly faster and did not have qualities such as volume and pitch. Second, just after this inner saying had begun, Benjamin became aware of his sister Laura speaking on a phone in another room in the house. Right at the beep, Benjamin was hearing Laura speak, but was not comprehending what she was saying. Third, a motorcycle was approaching on the street in front of Benjamin’s house. Benjamin was

hearing the sound of the motorcycle at the moment of the beep. Fourth, Benjamin was aware of the smell of chicken being cooked. Finally, Benjamin was faintly aware of the sound of traffic passing by his house. The sound was a whooshing sound.

Benjamin's sensory awareness was typically auditory in nature. Of the 34 possible instances of sensory awareness 27 were auditory in nature. Every time Benjamin had an instance of auditory sensory awareness it consisted of his simply hearing something in the external environment. Three of the other instances were visual, two were olfactory, one was tactile, and one was gustatory.

A frequent theme of Benjamin's auditory sensory awareness was traffic. He experienced 11 instances of sensory awareness related to traffic spread across 50 percent of his samples. Benjamin's awareness of the motorcycle passing in beep 2.1 above is an example of traffic-related sensory awareness. On six occasions Benjamin was hearing a voice (always either one of his sisters or the television). The words being spoken were never comprehended, but the voices themselves were in Benjamin's awareness in these instances. On three occasions Benjamin was hearing sparrows. Beep 2.1 above, is an example of both hearing traffic and a voice.

Unsymbolized Thinking

Unsymbolized thinking occurred in 42 percent of Benjamin's samples. Here is an example (with sensory awareness):

Beep 5.1 – Benjamin was sitting outside on his glider. He was reviewing notes written by an acquaintance who is in ill health. At the moment of the beep, Benjamin was thinking about the health of this man. There were no words or images accompanying this

thought. This thought was not strong in Benjamin's awareness, but it was definitely present. Benjamin was also faintly aware of the sound of sparrows tweeting. There may have been more than one, but Benjamin was not certain. He was simply hearing the sparrow(s).

Unvocalized Inner Speech

Benjamin frequently experienced a form of inner speech that was similar in many ways to typical inner speech (i.e., words were present, it was experienced as being produced by Benjamin, the words came in sequential order, they were meaningful, etc.) but also differed substantially from typical inner speech in two important ways:

1. The speech was not vocalized - Benjamin was confident that specific vocalized qualities such as inflection, pitch, and volume were not present in these experiences at the moment of the beep but that it was still as if he was innerly speaking words. Benjamin did not report this lack of vocalization until sampling day four but once he recognized that these experiences were not vocalized he stated that similar experiences in the prior four days also were not vocalized. It is likely that Benjamin did not report this until day four because prior to this day Benjamin was simply asked if these experiences had auditory qualities, which he affirmed. When Benjamin was asked specifically if these experiences had volume, pitch, and/or inflection he said that they did not. Benjamin also may have had a presupposition that his internal worded experience had to be vocalized, but once an alternative possibility became an option this pre-supposition disappeared. Regardless, Benjamin's reports that his worded experiences prior to day four were not

vocalized were very believable as were his reports about his worded experiences on and after day four.

2. These experiences occurred almost instantly - Benjamin stated very early on that his worded experiences occurred very fast. He later consistently reported that they happened “almost instantly.” However, the words themselves were not experienced as being rapid. That is, whereas the words were experienced as being produced at a normal rate of speech the entire spoken sequence was apprehended as occurring almost instantly.

Here is an example of one of these experiences:

Beep 4.5 – Benjamin was walking through his kitchen to go outside. At the moment of the beep, Benjamin was innerly saying, “Gonna go sit on the glider.” The words occurred very fast, almost instantaneously. It was as if Benjamin was speaking the words and the words were definitely present. However, there were no vocalized qualities to the experience. The words had no volume, no pitch, and either no or flat inflection. The experience was apparently “spoken but not auditory.” Benjamin also may have been hearing his sister Stephanie laugh at the moment of the beep, but the laughing may have ended just before the moment of the beep.

Benjamin often stated that his unvocalized inner speech was frequently directly preceded by unsymbolized thinking. Benjamin viewed his unsymbolized thinking as a thought that had not yet been fully formed. He described unvocalized inner speech as the fully realized form of the thought and often discussed the transition from unsymbolized thinking to unvocalized inner speech. Although Benjamin is very adept at making subtle distinctions in the temporal progression of his experience, it is still quite possible that this

is more of a generalization about his inner experience than anything that was caught exactly at the moment of the beep.

Worded Thinking

Benjamin had one sample that contained worded thinking along with sensory awareness and a possible unsymbolized thought (wondering about the title):

Beep 2.2 – Benjamin was listening to classical music on the radio but was not aware of the music at the moment of the beep. Benjamin was mulling over who the composer of the music he was, trying to think of many possibilities. At the moment of the beep, Benjamin was thinking that it was Rossini. The word “Rossini” was definitely present at the moment of the beep, but it had no auditory or visual qualities. It also was not experienced as being spoken, but was simply present in Benjamin’s awareness. There also may have been a wondering what the title of the piece was that was connected to the Rossini experience, but Benjamin was not entirely certain. Benjamin was also aware of someone yelling somewhere in front of his house. The Rossini experience began slightly before the yelling, but both appeared to be present at the moment of the beep.

Multiple Awareness

Multiple awareness was present in 79 percent of Benjamin’s samples. All of the beeps mentioned above are examples or clear instances of multiple awareness except for beep 4.5, where Benjamin was innerly saying “gonna go sit on the glider” and may have been hearing his sister laugh. Beep 4.5 is a questionable occurrence of multiple awareness because he may have been hearing his sister laugh in addition to having an unrelated

occurrence of unvocalized inner speech, but it is unclear if the awareness of his sister laughing was actually present at the moment of the beep. The only samples that clearly did not contain multiple awareness were one where Benjamin was just talking, one where he had no inner experience, and one where he had one sensory awareness. Here is the one instance where Benjamin was experiencing only a sensory awareness:

Beep 4.3 – Benjamin had just finished writing his response to 4.2. At the moment of the beep, he was quickly going over it to make sure that there were no major errors. He was not comprehending what he was reading. He was also hearing his sister Stephanie talking on the phone. He was not comprehending what she was saying or hearing any words in particular.

Discussion

Benjamin was very adept at focusing on and describing the moment of the beep. He made very small distinctions between what came before, at, and after the moment of the beep, seemingly on the order of tenths of seconds. He was also quite skilled at distinguishing between things that were not in his awareness and things that were faintly in his awareness. Benjamin was an excellent participant in every conceivable way.

Benjamin's experience is notable in seven ways: (a) the frequent presence of sensory awareness, (b) the frequent presence of auditory sensory awareness, (c) the frequent awareness of traffic-related awareness, (d) the presence of inner speech that was unvocalized, (e) the nearly instantaneous nature of unvocalized inner speech, (f) the frequent presence of multiple awareness, and (g) the limited range of form Benjamin

experienced. These characteristics suggest the following things about Benjamin's inner experience and his engagement in the DES process:

1. He is unusually aware of sensory information coming from his environment, especially information that is auditory in nature.
2. He is pre-occupied with traffic. In fact, when the interviewer suggested that Benjamin may be pre-occupied with traffic, he stated "No, I'm obsessed with it."
3. He lacks some aspects of experience that are typically present in the inner experience of others. For example, inner speech is a very common form of inner experience and typically has qualities of vocalization. However, Benjamin's unvocalized inner speech lacks vocalized qualities such as volume, pitch, and inflection. This unvocalized inner speech is also nearly instantaneous and therefore lacks the temporal dimension that inner speech usually has.
4. He lacks a wide range of form in his inner experience as his only forms of experience were sensory awareness, unsymbolized thinking, unvocalized inner speech and a single occurrence of worded thinking.
5. He may be especially adept at describing the fringes of his experience and that auditory awareness is frequently at the fringes of his experiences. This sometimes seemed to be the case, but it was almost as common that Benjamin's auditory sensory awareness was quite prominent in his experience.

CHAPTER 6

UNIMPAIRED PARTICIPANT “CLARA”

Clara was an 81 year-old woman with no apparent cognitive impairment. She scored 30 out of 30 on the MMSE (suggesting no cognitive impairment) and had a Master’s degree in a health-related field. She was referred to the researchers by a family member who had gained knowledge of the study. Clara was not familiar with DES prior to sampling but was very adept at DES from the first day with the apparent ability to narrow her experience to the moment of the beep and report it reliably and accurately. Therefore, her samples from the first day were counted in the analysis below. Thirty-five samples were discussed across six sampling days.

As shown in Table 3, Clara had a wide range of forms of awareness in her samples. Overall, 33 percent of her samples included unsymbolized thought, 30 percent of her samples included inner speech, 26 percent included inner seeing, 16 percent included feelings, 11 percent worded thinking, 6 percent just doing, and 3 percent each for imageless seeing and sensory awareness. Nine percent of her samples included multiple awareness. Below is a more in-depth look at each of these forms:

Table 3

Percentages of characteristics in Clara's samples of inner experience

Characteristic	Percentage
Feeling	16
Inner Seeing	26
Imageless Seeing	3
Inner Speech	30
Just Doing	6
Sensory Awareness	3
Unsymbolized Thinking	33
Worded Thinking	11
Multiple Awareness	9
Number of samples	35
Total number of characteristics ^a	43.5
Characteristics per sample	1.24

^aTotal number of characteristics excludes categories that are not directly experienced (in this case, Just Doing and Multiple Awareness), and counts uncertain instances as .5

As in Tables 1 and 2, the “Percentage” column in Table 3 refers to the percentage of samples that contained each of the form categories. Forms that appeared to be ambiguously between two categories were counted as .5 in each category. For example, in the fifth sample from day six, it was ambiguous if Clara’s experience was an instance of inner speech or worded thinking. Therefore, this sample was counted as .5 inner speech and .5 worded thinking. Also, if it was not clear if a certain experience was present at all or not right at the moment of the beep, it was also counted as .5.

Unsymbolized Thinking

Clara had 11 instances of unsymbolized thinking and one instance which may have been unsymbolized thinking. If one counts the uncertain instance as .5, then 33 percent of

her samples included unsymbolized thinking, as shown in Table 1. Here is an example of unambiguous unsymbolized thought:

Beep 4.3 – Clara was standing in her living room. At the moment of the beep, she was thinking about whether to clean the bathroom or to dust the living room. This was a wondering about the next course of action she would take that contained no words, images, or symbols. It was a “mental thought.”

The one sample where it was unclear if Clara was experiencing an unsymbolized thought occurred in beep 2.6. It was not clear if this beep contained symbols (i.e., words) or not:

Beep 2.6 – Clara was sitting in her apartment and looking out the window. She had moved to Las Vegas within the past year. At the moment of the beep, she was wondering why she was not adjusting to living there better than she has been. This was experienced as an unworded thought process that was accompanied with the definite presence of the word “adjusting,” although no spoken words or images of the word were actually experienced.

Inner Speech

Clara experienced inner speech on ten occasions and one additional occasion where she may have been experiencing inner speech. If the questionable occasion is counted as .5, she was experiencing inner speech in 30 percent of her samples, as shown in Table 3.

Here is an example of an unambiguous instance of inner speech:

Beep 6.5 – Clara was thinking of how she could talk a family member into letting her have her car for the weekend while the daughter was out of town. At the moment of the

beep, Clara was innerly speaking “Can I talk Lisa into letting me have the car this weekend when they go out of state?” The beep came near the word “car.” Clara was producing this speech internally in what was experienced as her own voice.

The one occasion that was uncertain was when Clara was uncertain if there were vocal qualities to her experience, making it possibly more of a worded thought than inner speech:

Beep 4.5 – Clara was standing in the living room after she had finished cleaning. At the moment of the beep, Clara was innerly saying to herself “Why am I so slow getting things done now. Is it part of old age or having less to do?” Clara was sure that words were present, but she was not sure whether or not these words were experienced vocally. Either the words were present and were heard vocally or the words were present without any vocal qualities. Clara was also sensing an emotion of frustration. This frustration was a mental process and was not independent of the verbal experience.

Inner Seeing

Clara was innerly seeing on nine occasions, or 26 percent of the samples. On eight of nine occasions, Clara’s inner seeings were in black and white. On the other occasion, it was in brown and white. Here is an example of an inner seeing in black and white:

Beep 3.5 – Clara was sitting in her front yard watching traffic and thinking about an experience she had had the previous week. She had been at the DMV, and because she had a walker, she had been instructed to go to the beginning of the long line of people. At the moment of the beep, she was innerly seeing a long line of people. This line was

on her right and the people were facing largely away from her at a diagonal, left to right. There was no background. This seeing was clear and detailed, but in black and white.

Here is another example of an inner seeing, this time in conjunction with inner speech:

Beep 5.2 – Clara was sitting outside knitting. She was innerly speaking in her own voice “Flowers, leaves, and green grass in March.” The beep came on the word “grass.” She was also innerly seeing a small group of flowers standing in a dirt bed. She was not certain what kind of flowers they were, but they were small and similar to pansies and viewed from a perspective that was within a few feet. The inner seeing was in black and white.

Clara had one example where the inner seeing was not in black and white but was in brown and white with an inner speech:

Beep 5.6 – Clara was outside knitting. The previous day she had gotten copies of pictures of her brothers. These copies contained four pictures on approximately an 8x11 inch sheet. At the moment of the beep, Clara was innerly seeing this sheet that was very similar to how it exists in reality. This experience was very clear. Clara could make out the details in each of the four pictures (such as who was in each picture, the positions of the people, and some of the surrounding details). This experience was in brown and white (as the reproductions were in real life). Also at the moment of the beep, she was innerly speaking in her own voice “The picture of my brothers were reproduced and they came out better than the originals.” Clara was not sure if this was the exact phrase she was innerly speaking, but she was certain that the beep came on the word “reproduced.”

Feelings

Clara had five samples with feelings and another sample that may have involved a feeling. If this sample is counted as .5, then 16 percent of Clara's samples involved feelings. A clear example of a feeling was presented in sample 4.5 above where Clara was experiencing frustration at being slow. Here is another example (accompanied by inner speech):

Beep 5.3 – Clara was outside knitting. She was innerly speaking in her own voice “Why am I living alone? Some of the relatives think it’s strange that I can do it.” The beep occurred on the word “alone.” She was also aware of being angry at the moment of the beep. This anger was a mental process with no symbols or physical sensation. The inner speaking was more prominent in her awareness than the anger. Clara estimated a ratio of 85 to 15 between the inner speaking and the anger.

The one instance where it was uncertain whether or not Clara was experiencing a feeling was in beep 4.2. This beep was accompanied by inner speech that may or may not have had a separate experience of a feeling:

Beep 4.2 – Clara was in the kitchen. At the moment of the beep she was innerly saying “Now I have to do the dishes.” The beep came between the words “to” and “do.” Clara was also aware of feeling compelled to do the dishes. However, this feeling did not seem to be separate from the words and did not exist independently from the words.

Worded Thinking

Clara had three unambiguous instances of worded thinking and two instances where it was not clear if she was experiencing worded thinking. If these two ambiguous instances

are counted as .5, Clara had worded thinking in 11 percent of her samples. Below is a clear instance of worded thinking:

Beep 6.1 – Clara was thinking about the shootings that occurred at Virginia Tech earlier that day. At the moment of the beep, she was thinking, “How useless it was. (pause) The poor parents.” The beep came during “the poor parents.” These words were in her awareness, although they were not spoken, heard or seen. The entire phrase occurred all at once. That is, the phrase “the poor parents” appeared simultaneously, not in a sequence where “the” came first, “poor” second, and “parents” third.

The two instances where it was uncertain if worded thinking was present occurred in beeps 2.6 (where Clara was wondering about not adjusting to Las Vegas) and 4.5 (where Clara was wondering why she is getting slow) above. It was not clear if beep 2.6 was an unsymbolized thought or worded thought and it was not clear if beep 4.5 was an incidence of inner speech or worded thought.

Just Doing

Clara had two instances of just doing, constituting six percent of her samples. Below is an example of one of the two occurrences of just doing:

Beep 6.2 – Clara was staring at a picture of her and her husband. At the moment of the beep, she was not aware of any inner experience other than the seeing of the picture. She stated that she had been staring at the picture for approximately 20 minutes, as if she had been locked onto the picture. Clara found this weird and surprising; she believed she had never done this before. She attributed it to the shock of the Virginia Tech killings.

Imageless Seeing

Clara had one experience of innerly seeing (in conjunction with two feelings) where there was nothing actually being seen, a phenomenon DES calls imageless seeing. As seen in Table 1, this makes up three percent of her samples. Here is her one instance of imageless seeing:

Beep 2.5 – Clara’s friend Joan had sent her a picture of Wayne, Clara’s recently deceased husband. Clara was in the process of writing a thank you note to Joan, and paused while she considered what to write. At the moment of the beep, Clara was somehow visualizing Wayne’s face as it had been shortly before he died. However, there was no actual face being innerly seen, although it was understood to be a seeing phenomenon. There was also a feeling of sadness that was connected to this visual experience; this sadness was somehow experienced in her head. She was also thinking/feeling irritated at Joan for sending the picture—an irritation that, if expressed in words (which it was not) might be something like, why did she send it, she should mind her own business, I don’t want a picture like this, butt out! This negative thinking/feeling, contrasted with her general sense that she should say thank you for sending the present, had brought the letter writing to a temporary halt.

Sensory Awareness

Clara had one instance of sensory awareness, constituting three percent of her samples. Here is the one example of sensory awareness that was accompanied by a feeling:

Beep 3.4 – Clara was experiencing pain and numbness in her hand due to arthritis. At the moment of the beep, she was aware of the fingers of her right hand being in a curled position and numbness throughout each of the fingers. She was also frustrated by the pain which was an intense emotional experience. Clara stated that she felt like she wanted to cry, although the literal experience of wanting to cry was not in her awareness. She was not sure if this part of the experience was in her head or contained in her body.

Content Themes

Clara also had some themes involving the content of her experience. For example, Clara was judged to have had from 9 to 12 samples that involved negative content. Of those that have been discussed above, six had negative content: beep 2.5 where Clara was innerly seeing her husband's tombstone and feeling sadness, 2.6 where she was thinking about not adjusting well to living in Las Vegas, 3.4 where she was experiencing pain and frustration, 4.5 where she was feeling frustrated, 5.3 where she was experiencing anger, and 6.1 where she was thinking about the Virginia Tech shootings and thinking about the poor parents.

Clara was also judged to have had seven, possibly eight samples with family-related content. Family-related content was counted when she was clearly having an experience that involved a specific family member. This most commonly involved her husband or her daughter, but others involved other family members as well. Of those discussed above, three had family-related content: beep 2.5 where she was thinking about her husband, beep 5.6 where Clara was innerly seeing pictures of her brothers, and beep 6.5 where she was thinking about her daughter's letting her drive.

Clara had four, possibly five samples that contained content related to death. Three of these involved her husband and two involved the shootings at Virginia Tech that occurred on sampling day six. Beeps 2.5 (when Clara was visualizing her husband's face as it looked before he died) and 6.1 (thinking about the "poor parents" of the victims of the Virginia Tech shooting) discussed above are two examples.

Clara also had three beeps thinking about the beeper specifically. Here is an example: **Beep 2.1** – At the moment of the beep, Clara was drinking coffee and was aware of waiting for the beeper to go off and wondering if it would go off. This was a mental process that did not contain any words, images, or symbols, nor did it contain any emotional or physical experience.

Discussion

Samples from the first sampling day

DES reports often exclude discussion of the first sampling day on the logic that the first day is typically required as training in the method. Clara, however, seemed to grasp the method immediately, so we have discussed all her samples including the first day's to this point and have included Clara's first day in the analysis below. The only moderately large change that would occur by not counting day one is that Clara's inner seeings would drop from 26 percent to 14 percent because five of Clara's nine possible inner seeings occurred on day one.

Missing features of inner experience

A substantial amount of Clara's experience was missing an important feature. Specifically, all nine of her inner seeings lacked color other than black, brown, or white.

Also, she had three, four, or five instances of worded thinking which is similar to inner speech in that it is a clear verbal experience, but it has no auditory qualities. Also, in Clara's experience the words were present simultaneously rather than in a sequential manner that occurs in inner speech. She also had one instance of imageless seeing, which can be conceptualized as an inner seeing that does not have visual qualities. The meaning of experience that is lacking in common features is unclear. However, one interpretation is that it somehow represents a deficiency in inner experience.

Unfortunately it is difficult to determine if this is the case. It is quite possible that Clara always had inner experience that was missing common features and therefore does not represent deterioration in inner experience. Nevertheless, this is a somewhat unusual occurrence that is shared with some other participants in this study.

There have been very few investigations regarding color in mental imagery. However, since the 1940's psychological researchers debated the extent to which people dream in black and white versus color. Many researchers attempted to estimate the percentage of time people dreamed in black and white and color based on interviews (for a review, see Schwitzgebel, 2002). Fifty-six percent of respondents in a poll by America On-Line in 1999 stated that they dreamt in color while 31 percent stated that they dreamt in black and white or both black and white and color (Schwitzgebel, 2002). Prior to the early 1900's, dreams were largely assumed to be in color, but, according to Schwitzgebel (2002), this trend changed due to the presence of black and white media (newspapers, then TV) in the culture. Schwitzgebel (2002) speculated that this could be due to black and white media actually changing the way that people dream, but concluded that it is much more likely that the reports of people's dreams changed rather than the dreams

themselves. He also offered the possibility that the color or lack thereof in dreams is undetermined and not explicit in the dreams themselves. Schwitzgebel (2002) only briefly discussed the possibility of black and white inner seeings while awake, but did suggest that this phenomenon as at least a possibility.

Although there are no investigations about the presence of color in the visual images of older individuals there have been discussions regarding color in the visual images of children. Investigations into the presence of color in early childhood memories have found a range of approximately 10 to 40 percent of memories where colors are directly mentioned (for a review, see Clark, 2004). In one study where participants were directly asked if color was a part of their childhood memories only 34 percent of the memories contained color (Howes, Siegel, & Brown, 1993). Clark (2004) estimated that approximately 1 out of 6 reports of childhood memories contain color when it was not directly asked for. This may be important to the current study as it suggests the possibility that children may have to develop the ability to have color as a component of their mental images. This would make color in imagery a developmental process that could increase with age, but then decline in some individuals as they reach old age.

Although color in the mental imagery of older individuals has not been investigated, many aspects of mental imagery in older individuals have been investigated. Perhaps the most attention has been paid to mental rotation in both younger and older individuals. Older individuals consistently perform more slowly in mental rotation tasks relative to their younger counterparts (Dror & Kosslyn, 1994). For example, it appears to take longer for elderly individuals to form, maintain, and manipulate mental images (Dror & Kosslyn, 1994; see Palladino & De Beni, 2003). Older individuals also appear to

generate different types of mental images than younger individuals. For example, Palladino and De Beni (2003) had participants generate a mental image for each word on a 40 word list. The participants had 40 seconds to generate each image. Older individuals tended to generate images that were less specific and more self-referential (i.e., their images were of things they have actually observed) than younger individuals. Older individuals also had more irrelevant information in their images compared to younger people, but each group had the same amount of relevant details. However, older individuals produced less details overall than younger individuals when time constraints were reduced to 20 seconds (Palladino & De Beni, 2003).

The possibility that images change as a function of one's age has been considered by Fodor (1981), who suggested that children could think in images while adults think in words. Also, various studies on imagery suggest that more detailed images take longer to construct (see Kosslyn, Pinker, Smith, & Schwartz, 1981). Furthermore, there is evidence that the vividness of an image is inversely related to the time one is allowed to form that image (Campos, Perez-Fabello, & Gomez-Juncal, 2006). This suggests that the quality of images (in this case, vividness) may not be present instantly but rather take time to develop.

One might infer from the above investigations that more detailed images take a higher level of mental effort. Assuming that an image in color is more detailed than one in black and white, this might suggest that it takes more mental effort or cognitive resources to have a color image than a black and white image. Therefore, the exclusive presence of black and white images opposed to color images in Clara's awareness could be due to a deficiency in cognitive functioning.

Content of inner experience

Clara had some themes in the content of her experience. It is not clear if this is significant or not. It is possible that Clara experienced a limited range of content, although the rest of Clara's content appeared typical in terms of range. It is also possible that Clara ruminated about some of these topics. The negative content may represent that Clara was depressed and there is some research to suggest that people who are depressed tend to ruminate (Nolen-Hoeksema & Morrow, 1993).

CHAPTER 7

UNIMPAIRED PARTICIPANT “DOLLY”

Dolly was a 67 year-old woman with a Bachelor’s degree in Liberal Arts. She exhibited no cognitive impairment and scored 30 out of 30 on the MMSE suggesting no cognitive impairment. She was referred to the study by a daughter of another participant. Dolly was not familiar with DES prior to the study. Dolly was quite adept at narrowing her focus to the moment of the beep and describing inner experience early on in the sampling process. Therefore samples from her first day were included in the analysis. There were seventeen samples discussed across three sampling days.

As shown in Table 4, Dolly had a wide variety of forms of experience in her samples. Overall, 50 percent of her samples included unsymbolized thinking, 26 percent included feelings, 18 percent had inner speech, 12 percent contained feeling fact of body, while sensory awareness, just doing, and no experience were each involved in six percent of the samples. Multiple awareness also characterized six percent of the samples.

Table 4

Percentages of characteristics in Dolly's samples of inner experience

Characteristic	Percentage
Feeling	26
Feeling Fact of Body	12
Inner Speech	18
Just Doing	6
No Experience	6
Sensory Awareness	6
Unsymbolized Thinking	50
Multiple Awareness	6
Number of samples	17
Total number of characteristics ^a	16.5
Characteristics per sample	0.97

^aTotal number of characteristics excludes categories that are not directly experienced (in this case, Feeling Fact of Body, Just Doing, No Inner Experience, and Multiple Awareness), and counts uncertain instances as .5

As in Tables 1 through 3, the “Percentage” column of Table 4 refers to the percentage of samples that contained each of the form categories. Forms that appeared to be ambiguously between two categories were counted as .5 in each category. For example, in beep 1.2 below, it is unclear if the experience is an instance of unsymbolized thinking or a feeling. Therefore, this sample was counted as .5 unsymbolized thinking and .5 feeling. Also, if there was substantial skepticism that a certain experience was present right at the moment of the beep the form of that experience was scored as .5 as well.

Unsymbolized Thinking

Dolly's most common experience was unsymbolized thinking. Unsymbolized thinking was present in 50 percent of Dolly's samples. Below is an example of one of Dolly's unsymbolized thoughts:

Beep 3.2 – Dolly was sitting at the computer doing research on video cameras she was considering buying. She was looking at different models of cameras on her computer screen. At the moment of the beep, Dolly was wondering what camera to buy. This was a mental process that contained no words or images. She was also aware of what was on the computer screen.

Dolly had three instances where it was not clear if she was experiencing an unsymbolized thought or a feeling. Here is an example of one of those instances:

Beep 1.2 – Dolly was using color blocks on a piece of paper to work on her brochure. At the moment of the beep, she was thinking why making the brochure was so hard today and was experiencing frustration. She does not think there were words associated with this experience but was not entirely sure. This was more of a mental experience than a physical feeling.

Inner Speech

Dolly had inner speech in 18 percent of her samples. Here is an example that also includes a feeling:

Beep 2.1 – Dolly was sitting outside drinking coffee. At the moment of the beep, she was innerly saying “I enjoy the outside quiet.” This inner speaking had the same characteristics as external speech. The beep sounded right after the word “quiet.” Dolly was also enjoying the external quiet as well as the internal quiet at the moment of the beep, but it was difficult to say how this enjoyment took place. She also said she was experiencing inner quiet although she was speaking to herself; even so, she understood this inner speaking to be somehow quieter than her inner chatter had been earlier.

Feelings

Dolly had one, possibly two experiences of feeling in addition to the three that were not clearly a feeling or an unsymbolized thought. Here is the one clear example of a feeling:

Beep 1.1 – Dolly was on her computer, working on designing a brochure. At the moment of the beep, she was feeling frustrated: she did not like the design although she had been working on it for a long time, and would have to change it again. This frustration was experienced as a pressure that pushed inward in the middle of her torso below her heart. This was a somewhat intense emotional experience.

The uncertainty in the second occurrence is because Dolly was not certain if the experience was at the moment of the beep or not.

Other Forms of Awareness

Dolly also had two instances of feeling fact of body, one sensory awareness, one just doing, one sample with no inner experience, and one instance of multiple awareness.

Discussion

Samples from the first sampling day

Although the first day of DES is typically not counted, Dolly was fairly adept at narrowing her focus to the moment of the beep and reliably describing her inner experience on the first day of sampling. However, Dolly did have some inconsistencies and presuppositions during her first day, so although her first day has been included in the discussion thus far and in the table above, there is reason for some skepticism.

However, the difference between an analysis that includes the first day and an analysis that excludes the first day is not large. The only notable differences are that three of Dolly's seven clear instances of unsymbolized thought occurred on day one and two of the three experiences that were between an unsymbolized thought and a feeling occurred on day one. If day one were to be excluded, her percentage of unsymbolized thought would move from 50 percent to 27 percent and the percentage of feelings would move from 26 percent to 14 percent.

Conclusion

Perhaps the most important aspect of Dolly's experience is that it was fairly clear and substantially varied. Dolly also was able to perform the DES task well, even on the first day. Overall, her inner experience and ability to perform the task was similar to that of young adults.

CHAPTER 8

UNIMPAIRED PARTICIPANT “ELLEN”

Ellen was a 68 year-old woman. She contacted the researchers after reading about the study in a Las Vegas newspaper. She was not familiar with the DES procedure prior to the study. She received 30 out of 30 on the MMSE which does not indicate the presence of cognitive impairment.

On Ellen’s first sampling day she, like many other first-day participants of any age, had apparently not adopted a careful understanding of “the moment of the beep.” This was evidenced by Ellen’s difficulties discussing the form of her experience in her samples as well as her uncertainty about the actual content of her experience at the moment of the beep. She was also contradictory at times during her reports and was often unsure if what she was describing was at the moment of the beep, before the moment of the beep, or after the moment of the beep. Therefore, samples from this day will not be analyzed.

Ellen improved during her second sampling day, but she still had substantial difficulty. Her ability to focus on the moment of the beep and to understand what is meant by inner experience improved, but her focus was still not entirely clear. For example, she was uncertain at times when exactly the beep came in her awareness and

often tried to resort to logic to determine when the beep sounded. Furthermore, Ellen changed her responses dramatically on at least two occasions.

Ellen continued to struggle somewhat throughout her six days of sampling. She became less contradictory as time went on, but continued to have persistent difficulty with questions about form. She periodically seemed disorganized in general and in her responses to the beep. It is also notable that she routinely became frustrated with the detailed nature of the interviewers' questions, which she expressed directly. She also stated on one occasion that she felt as if the interviewers did not believe her due to their persistent questioning. Overall, all of Ellen's 21 beeps from day two to day six will be analyzed, except for beep 6.4, which Ellen did not respond to. Many of these beeps involved contradictions or substantial changes during the course of the description of the beep. Therefore, additional skepticism is needed for many of Ellen's samples. Below are examples from early in the interview process and on the last day that demonstrate both Ellen's improvements and continued uncertainty even on the last day of sampling:

Beep 2.3 – Ellen was sorting through a number of papers related to a car she had purchased. She was searching for a particular piece of paper and was looking at a sales slip. It was difficult to pinpoint Ellen's experience at the moment of the beep. At first she stated that she was worried and that there was tension in her upper body, but she could not state where. She then thought that this worry was in her head, experienced as tightness behind her eyes. She later said that she may have been somehow experiencing tension, but this was not in her awareness at the moment of the beep. She stated at this point that what was in her awareness was that it was not self-evident that this was the paper that she needed, that she was frustrated with herself and concerned that she would

have to continue searching. She reported that there were no words or images in this experience. At this point, Ellen was very frustrated by the questioning process.

Therefore, questioning about this beep was stopped. A clear understanding of Ellen's experience at this beep could not be discerned. Beep 2.3 was scored as a possible feeling or unsymbolized thought.

Beep 6.1 – Ellen was driving, but apparently little or no attention was devoted to this task. At the moment of the beep she was thinking, “I think I would call myself a liberal democrat.” At first, Ellen could not discern whether or not this thought was in words; perhaps “a liberal democrat” was in words but the rest of the thought was not.

Eventually, Ellen believed that the entire sentence was present in words, but these words were not heard or spoken and all the words were in her awareness simultaneously rather than being spoken in a sequence. Although Ellen was certain of this by the end, her initial uncertainty leaves room for skepticism. Beep 6.1 was scored as a possible worded thinking and a possible inner speech.

As best could be ascertained given the uncertainty about her samples, Ellen's primary form of experience was unsymbolized thinking, present in 69 percent of her samples as shown in Table 5. Other forms of experience were feelings (18 percent), inner speech (14 percent), inner seeing (11 percent), worded thinking (7 percent), feeling fact of body (5 percent), imageless seeing and inner hearing (1 percent each). Multiple awareness was present in 24 percent of Ellen's samples.

Table 5
Percentages of characteristics in Ellen's samples of inner experience

Characteristic	Percentage
Feeling	18
Feeling Fact of Body	5
Imageless Seeing	1
Inner Hearing	1
Inner Seeing	11
Inner Speech	14
Unsymbolized Thinking	69
Worded Thinking	7
Multiple Awareness	24
Number of samples	21
Total number of characteristics ^a	33.5
Characteristics per sample	1.60

^aTotal number of characteristics excludes categories that are not directly experienced (in this case, Feeling Fact of Body and Multiple Awareness), and counts uncertain instances as .5 or .33.

Like Tables 1 through 4, the “Percentage” column of Table 5 refers to the percentage of samples that contained each of the form categories. Forms that appeared to be ambiguously between two categories were counted as .5 in each category. Forms that were ambiguously between three categories were counted as .33. Also, if there was substantial skepticism that the form of experience was actually present at the moment of the beep then the experience was also counted as .5.

Some experiences may have appeared ambiguously between two or three forms of experience because Ellen had difficulty accessing her experience. That is, some of these experiences may not represent an actual ambiguity between or among forms of experience, but when forced to code these experiences the most accurate way is to represent them as ambiguously between two or three forms as that is the best that could be discerned from her descriptions. Here is an example of one of the three instances that

Ellen's experience was coded as three possible forms of experience (unsymbolized thinking, inner speech, and inner hearing):

Beep 5.6 – Ellen was watching Jeopardy. The question involved a novelist from Minnesota. At the moment of the beep, Ellen was trying to think of the novelist from Minnesota. At first, Ellen said she was thinking the words “novelist from Minnesota,” but she had some difficulty describing the nature of this experience. She was not sure if she was hearing the words or saying the words internally; then she was not certain if the words were present at all; she later said that she was saying the words to herself. Due to Ellen's difficulty accessing her experience additional skepticism is needed for this sample.

Unsymbolized Thinking

Unsymbolized thinking appeared to be present in 69 percent of Ellen's samples, by far the most common form of experience for her. There were 12 of 21 samples where it appeared likely that unsymbolized thinking was present at the moment of the beep. Here is an example where an unsymbolized thought was likely present at the moment of the beep:

Beep 6.3 – Ellen was having a conversation on the phone with her friend Jane. Jane had just said something regarding a 14.99 percent interest rate. At the moment of the beep, Ellen was thinking that 14.99 for a couple of hundred of dollars does not sound right. There were no words in this experience. This experience was a process of inner calculation.

Ellen may also have been experiencing unsymbolized thinking on six other occasions, but either her uncertainty or lack of reliability in her report was substantial enough to warrant significant skepticism. Beep 2.3 above where Ellen was searching for paperwork regarding her car is an example of one of these ambiguous instances.

Difficulty Apprehending Experience

Ellen had substantial difficulty apprehending her experience throughout sampling. Difficulty apprehending experience was present on 13 of 21 samples with the possibility of an additional four samples. If the uncertain instances are counted as .5, Ellen had difficulty apprehending experience on 71 percent of her samples. Difficulty apprehending experience was present in all of the samples presented above except for beep 6.3, where Ellen was unquestionably internally calculating. Here is an example where it was not clear if Ellen had difficulty apprehending her experience.

Beep 6.2 – Ellen was listening to the McNeil report on the radio and looking at a tote bag. At the moment of the beep, Ellen was wondering if she dropped her eraser upstairs where she stores her tote bag. This wondering did not contain words. Ellen was also visualizing the spot where she leaves her tote bag. She was innerly seeing the bottom part of the corner of her bedroom wall and part of the floor. She may also have been innerly seeing the tote bag leaning against that wall, but was not sure. She saw something against the wall, but it was not very vivid. The entire inner seeing was dark and unclear. The thought seemed to have started before the inner seeing, and then continued so that both thought and inner seeing were present at the moment of the beep. This example is considered not clear because although Ellen is convincing that she was

experiencing an inner seeing at the moment of the beep she had some uncertainty about one of the substantial details of the inner seeing (i.e., the presence of the tote bag).

Symbols

Symbols (i.e., words or images) occurred possibly in 7 out of 21 samples. However, every time a symbol may have been present, there was substantial reason for skepticism. Ellen reported a possible four inner speakings. However, in all of these situations she exhibited substantial uncertainty regarding the presence of the experience itself or the presence of the actual words in the experience. Ellen reported three possible inner seeings. In two of these, Ellen had substantial difficulty describing the details of the inner seeing, and in the other she was very uncertain if there was an inner seeing at all. Perhaps Ellen's most certain occurrence of symbolic experience (inner speech) occurred in beep 6.1 above where she was thinking the words "liberal democrat" but even then it was uncertain if the experience was actually in words.

Content Themes

One theme that ran through many of Ellen's samples was negative or anxious content. This content was sometimes in the form of a feeling, but often seemed to be more accurately characterized as unsymbolized thinking. She was judged to have experienced annoyance in two samples directly. In one sample she was annoyed but this was not directly in her awareness. She also had experiences of worry, frustration, angst, insecurity, self-consciousness, and self-criticism. Overall, these experiences were present consciously in 8 of the 21 samples and were present once where it was not directly

apprehended. Below is one example of self-criticalness and one of annoyance, respectively:

Beep 3.3 – Ellen was backing out of a parking space in a parking lot. Another car was going to pass her, driving toward her from her right. She was looking at this car. Ellen initially stated that at the moment of the beep, she was determining if she should wait or pull out, but she wavered in her certainty as to the existence of this experience at the moment of the beep. She also said that she was judging or criticizing herself, telling herself to just make a decision as to whether to pull out or not and to quit dawdling. She stated that this self-judging was automatic and that there were no words in any of these experiences. The only aspects of this beep that Ellen seemed confident in were the actual external events occurring at the beep and that there were no words in her experience at this beep. Ellen went back and forth in her descriptions of what was in her awareness at the moment of the beep. This raises skepticism about any and all of the specific contents reported at the moment of this beep.

Beep 5.5 – Ellen's dog was whining. At the moment of the beep, Ellen was feeling quite strongly irritated about the dog being spoiled. Ellen initially said that this irritation was throughout her body, but later said that it was more mental than physical. She was also trying to decide if she should get the dog a treat. There were no words or images in this experience. The irritation had begun before she considered getting the dog a treat, but both were present at the moment of the beep. Although the exact form of the irritation is uncertain it appeared that Ellen was somehow experiencing irritation at the moment of the beep.

Discussion

Perhaps the most notable aspect of Ellen's experience with DES is that she had substantial difficulty apprehending her experience, especially the forms of her experience. She did not evidence general difficulty with communication and received a perfect score on the MMSE. However, when describing her beeps Ellen often appeared to be having substantial difficulty and seemed disorganized and frustrated at times when describing her inner experience (evidenced by her frequent contradictions), but this was not evident when speaking with her casually.

Ellen's difficulty apprehending her experience could be due to many factors:

1. Ellen's inner experience is somewhat undifferentiated and/or unclear – It is possible that Ellen's experience is such that it is so diffuse and/or unclear that it is difficult to determine exactly what is occurring at the moment of the beep. Evidence for this exists in the fact that Ellen often wavered on her descriptions of her experience, especially regarding form and was clearly frustrated throughout the interviewing process. It is possible that there is no clear form in Ellen's experience, and, at times, no clear content. This appears to be the most likely candidate for Ellen's difficulties.

2. Ellen's lack of symbols in her inner experience makes it difficult to describe – Participants often have difficulty describing unsymbolized thought early in the interviewing process, but typically improve over the course of the DES process. It is possible that Ellen has predominately, if not entirely, unsymbolized thought, but for some reason did not benefit from training in describing this experience. However, because Ellen exhibited no other cognitive deficiency and participants typically benefit from training, this is not a likely candidate.

3. Ellen does not have adequate ability to introspect – Ellen’s frustration and her non-verbal behavior suggested that it was very difficult for her to go through the interviewing process. This may be due to a decreased ability to introspect, and hence increased frustration, effort, and difficulty describing her experience. However, because Ellen did not exhibit any particular difficulties in higher-order thinking, as might be present in someone who could not introspect adequately, this appears to not be a strong explanation.

4. Ellen cannot focus on the moment of the beep – Ellen’s contradictions suggest that she may not be able to narrow her experience down to a single moment. This may cause a difficulty in describing experience. Forms of experience may change over a period of time. If Ellen is reporting on a longer period of time (say, a few seconds for example) and is experiencing many forms of experience during this time, this may make her experience difficult to describe. However, Ellen did not exhibit any problems with attention either informally or on the MMSE, so this is not very likely.

CHAPTER 9

UNIMPAIRED PARTICIPANT “FAY”

Fay was a 70 year-old woman with a Bachelor’s degree in political science. She contacted the researchers after reading about the study in a local newspaper. Fay was not familiar with the DES procedure prior to the study. She had no psychiatric diagnosis at the time of the study. She received a perfect score of 30 on the MMSE which does not indicate the presence of cognitive impairment.

Fay’s first day of sampling was very difficult. She had more trouble than most describing her inner experience although she appeared to have adequate intellectual ability. She was very easily led by the interviewers and often changed and contradicted her reports as the interview continued. She also had difficulty reporting her inner experience rather than external circumstances that may have been related to her inner experience. For example, in Beep 1.1, she stated that she was thinking about a church. When queried further, Fay repeatedly referred to the church itself and why it had been closed rather than reporting her inner experience. This pattern repeated itself throughout each of the beeps on the first day.

Similar difficulties occurred during the second sampling day, although they appeared, perhaps, to have lessened somewhat. Fay’s conception of the moment of the beep appeared to shorten slightly, but was still substantially larger than what DES defines as

the “moment” of the beep. Fay also was better able to discuss her inner experience more efficiently with fewer intrusions of discussions of external reality, although this was still a problem. Fay also had difficulty operating the beeper. Some of her samples on this day were caused by her turning the beeper on and off, causing it to beep. Below is an example of a sample from day two that was obtained via proper DES procedure:

Beep 2.1 – Fay was at her rental property. She reported having three experiences at or near the moment of the beep. She frequently wavered regarding which of the three components was in her awareness. Fay reported that she was innerly seeing herself holding a broom and moving from the front door of her property toward a dust bin. This seeing reportedly contained movement. However, Fay was not sure of the viewpoint from which the seeing was being perceived, making the interviewers skeptical about whether an actual inner seeing was involved. Fay also reported that at or near the moment of the beep she was innerly seeing a property manager whom she had not hired. The inner seeing reportedly was of her face, from the front, in color with medium clarity. The face was expressionless. Finally, Fay stated that she was innerly seeing the property manger she had hired. This was reportedly a full-body image from the front.

Throughout this beep, Fay gave clues to suggest that she may be describing reality rather than her actual experience. For example, when asked if the two images of the property managers were separate or on top of one another she said “They’re separate. They probably don’t even know each other.” As a result, the interviewers were not confident about determining whether Fay was experiencing three, two, one, or no inner seeings at the moment of the beep.

Although Fay appeared to be adequately intelligent (evidenced by her eloquence and substantial vocabulary), she continued to have substantial difficulty focusing on the moment of the beep and describing her inner experience during the third and fourth days of sampling. During discussion of every beep on days three and four, Fay described long conversations that were either imagined or remembered (in her inner world or part of her inner experience) as well as real conversations. She could not describe at all where in the conversations she was at the moment of each beep although the question “what was in your awareness at the moment of the beep” was posed numerous times in a variety of ways. When Fay was prompted to describe only the moment of the beep she would invariably describe entire conversations rather than a moment within that conversation. Likewise, Fay was repeatedly told that the interviewers were only interested in her inner experience rather than background information or facts of reality. Still, Fay would nearly always describe facts of reality and background information in conjunction with events that were in her awareness. This made it extremely difficult to ascertain what Fay’s experience was at any of the beeps on the third and fourth days.

On day five, the standard DES procedure was altered and Fay was interviewed immediately after the beep in an attempt to minimize any potential interference that memory disturbances may have played in Fay’s difficulty with the DES process. The investigators stayed in a back bedroom of Fay’s house while she wore the beeper and went about her activities in the rest of the house. When the beep sounded, she came immediately to the researchers and the expositional interview was conducted on the spot. This procedure seemed to help reduce slightly Fay’s reference to external reality when describing her inner experience, but it did not eliminate it entirely. Fay continued to have

difficulty describing the form of her inner experience. Also, her descriptions continued to be contradictory at times. Below is a sample from day five:

Beep 5.3 – Fay was playing Scrabble on her computer and at the moment of the beep Fay apparently somehow thinking about the word “slotter.” Fay’s descriptions of this thought process were inconsistent, so it is impossible to know exactly what was in her awareness at the moment of the beep, but the general idea was wondering whether or not “slotter” was a word; that she would play it and find out whether or not the computer would reject it or not; that she could remember that the word had been played in some past Scrabble game, but she couldn’t remember the outcome of the protest. These sub-thoughts may have all been parts of the same thought process that were all present at the moment of the beep, or they may have been explicit thoughts that were in the vicinity of the beep but not simultaneous, or they may have been ways of describing her activity, none or which was actually present in her experience at the moment of the beep. The interviewers pressed her on those issues. For example, the interviewers asked twice if there were words in her experience at the moment of the beep and both times she described external reality (i.e., the words on the Scrabble board and that she didn’t know if “slotter” was a word or not) instead of answering directly about her experience. Thus Fay’s reports of her experience seemed discursive or wandering; however, there did seem to be limits on how far that wandering could go. For example, Fay confidently and believably said that she was not, at the moment of the beep, thinking of other computer Scrabble systems and their ways of responding to incorrect words, but may have been thinking about that near the beep. This may be evidence that Fay has some reliable access to her experience at the moment of the beep. However, the investigators’ overall impression was that Fay did not, even when

interviewed immediately after the beep, distinguish adequately between what was in experience at the moment of the beep and what were the characteristics of the situation surrounding her at the moment of the beep.

Discussion

It appears that none of Fay's samples can be considered reliable due to her substantial inconsistency, seeming inability to focus on the moment of the beep, and reliance on external reality throughout the sampling process. This unreliability continued even when the retrospection of the sampling procedure was minimized as much as possible—conducting the expositional interviews within a minute of the beep. There are many possibilities for Fay's difficulties:

1. Fay has undifferentiated inner experience - Fay reported throughout the DES process that she was having many possible inner experiences at the moment of the beep. Although this may signify an inability to focus on the moment of the beep, it may signify undifferentiated experience. That is, Fay may have a vast array of content in her inner experience at any given time that does not occur in temporal order. This may make it difficult to express exactly what was in her experience because so much was in her experience, especially if her experience is predominately non-symbolic. Given Fay's overall command of language and seemingly high intelligence, this appears to be a likely candidate.

2. Fay lacks inner experience or has no inner experience – If Fay has no inner experience or very little inner experience she may rely on discussions of external reality and may not fully understand the DES procedure, as the target of DES is inner

experience, something that she may not have. It is common that individuals with no inner experience, rather than reporting that they have no inner experience instead discuss external reality rather than internal experience, as Fay did. Individuals that seemingly have no inner experience are also often inconsistent, as Fay was. This suggests that no inner experience is a fairly strong possibility in Fay's case.

3. Fay cannot introspect – Evidence for this hypothesis can be found throughout Fay's descriptions. In nearly every sample, she spoke more about external reality than inner experience. If she cannot introspect, then she could not describe inner experience. Skepticism for this lies in the fact that Fay did not exhibit any other deficiencies in cognitive or social abilities, other than somewhat diminished eye contact. This is still certainly a possibility, but does not appear as likely as some others.

4. Fay does not have the cognitive abilities to focus on the moment of the beep – It did not appear that Fay could narrow the window of her inner experience to a discreet moment, evidenced by her continued discussion of events that happened vaguely near the beep and the vast array of content she discussed at each sample. Fay did not appear to have difficulties with attention or other cognitive abilities, however. She scored 30 on the MMSE; she has and uses a wonderful vocabulary, and evidences a mastery of skills both in real life (she manages several properties) and in recreation (she successfully plays competitive Scrabble). So a general cognitive deficit seems unlikely.

5. Fay has rigid pre-suppositions about what inner experience is – Evidence for this hypothesis is shown throughout the interviews as the nature of Fay's descriptions changed very little from the first day to the fifth day, which is somewhat unusual as participants become trained in the DES process. Fay did not exhibit any rigidity in any

other way, however, and does not seem to have difficulty learning in any other area. Therefore, this possibility is unlikely.

6. Fay actually experiences entire conversations in a moment – Many of Fay’s beeps revolved around the inner experience of conversations. She could never pinpoint the exact point in the conversation that she was experiencing. However, the fact that Fay seemed to not distinguish very well between internal experience and external reality suggest that there is much more involved than simply unusual inner experience in Fay’s case. Therefore, this possibility is somewhat unlikely.

CHAPTER10

IMPAIRED PARTICIPANT “GARY”

Gary was a 70 year-old male with a diagnosis of Vascular Dementia (VaD), which he received in 2003. He received a score of 29 on the MMSE, missing only one item in the recall section which suggests that he has little or no cognitive impairment. He was recruited from a local support group. Gary was not familiar with the DES procedure prior to sampling. During the initial interview, after the initial introduction and explanation of the DES task, Gary was given a “practice beep:” he was given the beeper that was set to beep within 10 minutes after being set. He was instructed to wear the beeper and walk, with his wife who had accompanied him to the interview, the 100 yards to the University Student Union and have a cup of coffee; when it beeped, he was to respond as instructed and return to the interview site. He followed those instructions adequately, and his performance in the interview seemed to indicate that he understood at least preliminarily what was asked of him. However, because Gary was new to the procedure and this beep was for purposes of training only, the contents of the beep will not be analyzed. The first real sampling day and its interview were scheduled for the following week.

When Gary arrived for the first interview, he reported that he had forgotten to bring his notes about the beeps to the first interviewing day. Gary’s wife reported that Gary had had a small stroke between the initial training day and the first day of interviewing. She

stated that he had “really gone down hill” but that we probably would not notice anything. Eventually, it was determined that Gary had not had a stroke, but had had a transient ischemic attack (TIA). A TIA is a cerebrovascular event that occurs when blood flow to part of the brain is blocked temporarily. Although an individual may experience stroke-like symptoms, blood flow eventually returns and there is no permanent damage to the brain (Weigh et al., 1999). For training purposes, we interviewed Gary about the beeped experiences as best he could remember them. Because these beeped experiences were not discussed in the standard manner, they were not be included in the analysis.

For sampling day two, Gary had some difficulty operating the beeper. He had apparently missed a beep and confused the battery-saving “chirps” with beeps. He also had some difficulty understanding what was meant exactly by “inner experience” and “moment of the beep.” He had collected two beeps the morning of the interview and two beeps two days prior to the interview. Therefore, this interview was again used only for training purposes.

Gary substantially improved his undertaking of the DES process for the third interview day: he remembered his notebook, and was responding to beeps, not chirps. Therefore, beeps will be analyzed starting with this day (day three) and will go through day six for a total of 18 beeps.

Gary’s responses throughout the interviews included frequent generalizations. For example, when asked about his at-the-moment-of-the-beep experience, he frequently used phrases like “I usually...” and “In general...” Such locutions frequently signal that the participant is not describing actual beeped experience, and thus skepticism about his

reports may be warranted. In such cases, the interviewers took great care to try to focus Gary on the moment of the beep rather than on generalizations. This rarely, if ever, changed Gary’s descriptions of the experience at each beep; that is, he dropped the use of the phrases “I usually...” and “in general” and averred that the description adequately conveyed the beeped experience. We eventually came to believe that it is likely that Gary’s “I usually...” and “in general” reflected simply a style of communication rather than a suggestion that he was indeed generalizing. That is, we came to believe that his descriptions usually conveyed his experience at the moment of the beep although some additional skepticism was warranted in certain instances.

As shown in Table 6 below Gary had a fairly wide range of experiences. Worded thinking was the most common form of experience and was present in 69 percent of his samples. Other experienced forms were inner seeings (22 percent), feelings (14 percent), unsymbolized thinking (8 percent), and sensory awareness (6 percent). Multiple awareness was present in 24 percent of Gary’s samples.

Table 6
Percentages of characteristics in Gary’s samples of inner experience

Characteristic	Percentage
Feeling	14
Inner Seeing	22
Sensory Awareness	6
Unsymbolized Thinking	8
Worded Thinking	69
Multiple Awareness	24
Number of samples	18
Total number of characteristics ^a	23
Characteristics per sample	1.28

^aTotal number of characteristics excludes categories that are not directly experienced (in this case, Multiple Awareness), and counts uncertain instances as .5

As in Tables 1 through 5, the “Percentage” column in Table 6 refers to the percentage of samples that contained each of the form categories. Forms that appeared to be ambiguously between two categories were counted as .5 in each category. Also, if it was not clear if a certain experience was present at the moment of the beep it was also counted as .5.

Worded Thinking

By far the most common characteristic of experience for Gary was a verbal inner experience that somehow had no auditory qualities that resembled worded thinking. This type of experience was present in 69 percent of Gary’s samples. These experiences typically contained some qualities of speech, such as words appearing sequentially, with pauses and inflections at appropriate places, but the words were not innerly heard nor innerly spoken. Nevertheless, the words were clearly present to Gary. Although this experience involved a stream or sequence of specific words, Gary could often not pinpoint the exact word that was in his awareness at the moment of the beep (that is frequently true as well for those who experience clear inner speaking). Sometimes there was a visual quality to this verbal experience, as if Gary were seeing the words, usually moving left to right. The worded part of the experience also typically occurred slightly faster than the rate in which words are normally spoken. Here are some examples of this type of experience:

Beep 3.1 – Gary was at home reading the newspaper. He had just turned to a page with an article about a pastry chef with an accompanying photograph and had just read the caption to the photo. At the moment of the beep, Gary was wondering if his daughter’s

roommate knew the pastry chef and if she had worked with him. This thought was in words, but had no auditory qualities. This worded experience started with “I wonder if,” but Gary was not sure of the exact words after this introduction, although he was certain of the subject of the experience. The thought was experienced very quickly (less than a second) and was almost simultaneous with the beep (Gary could not discern whether it occurred a moment before, a moment after, or at the exact time of the beep).

Beep 4.2 – Gary was gathering things that he needed to leave his house and was talking to his wife Alice. At the moment of the beep, Gary was wondering if he had everything that he needed to leave, if Alice had everything she needed to leave, and was thinking about a doctor to whom he owed money. These thoughts were in words, perhaps somewhat like speech but with no auditory component, and were faster than regular speech, but also perhaps somewhat visual. The sentences seemed to interrupt each other, and the entire rate might have been a bit faster. For example, before Gary could complete thinking “Do I have everything I need?” another thought, such as, “Does Alice have what she needs?” would interrupt the first thought. Then a third, also worded, thought would interrupt the second before it had completed, and so on. The impression was of a jumble of thoughts, all of which were incomplete.

Beep 5.1 – Gary was eating breakfast and reading a newspaper article about the possibility of deleting the motto “In God We Trust” from U.S. currency. At the moment of the beep, Gary was thinking something very similar to, “How are other people and religions going to react to this newspaper article?” There were words present in this experience but there was no auditory quality to the experience, although the experience did have aspects of speech (such as the question mark at the end being implicit in the

experienced word), the words were sequential, but a bit faster than if actually spoken. This aspect of Gary's experience compromised about half of his awareness. The other half was the actual article that Gary was reading and comprehending.

At times, Gary's worded experience was more visual than at other times. The visualness of Gary's worded experience seemed to fall on a continuum where at times it was not visual at all (the above beeps, for example) and at other times it was substantially visual. Below is an example of two somewhat visual worded experiences (occurring simultaneously with an inner seeing) that fall somewhere in the middle of the continuum:

Beep 6.1 – Gary was at home eating breakfast. At the moment of the beep, Gary was having three simultaneous experiences. One of these experiences was wondering if people he knows are affected by the fires in southern California. This was experienced as innerly seeing a neighborhood that he knows and has been to in California; this area is seen to be in flames. He is not sure what specific neighborhood he was innerly seeing, but the houses in the inner seeing were familiar and it was a specific place that he has been. He was confident that the neighborhood was not actually affected by the fire; that is, he was representing the California fires by imaging a familiar California neighborhood and superimposing the flames. The inner seeing was fairly clear, in color, and there was motion in the picture (i.e., the flames were moving). The second experience was feeling bad for the people in the fire. This experience clearly involved words, although Gary could not recall the exact words during the interview. There was no auditory quality to the words. These words were occurring a bit faster than speech and seemed somehow to move from left to right. There also may have been some visual quality to the words, but the exact nature of this visual quality was difficult to discern. The third experience was

wondering if the beeper was going to sound while he was thinking about the fire. This was experienced as words, but with no auditory quality. The words were moving a bit faster than actual speech, the words may have been moving left to right somehow, and there may have been a visual quality to the experience, but Gary was not certain of this. This was also a thought process similar to previous beeps. Thus there were two worded experiences occurring simultaneously during this sample. All three of these experiences were equally present in his awareness.

The following is a summary of Gary's most visual worded experience accompanied by an inner seeing:

Beep 6.3 – Gary was attending a support group and was talking about coin collections.

At the moment of the beep, Gary was innerly seeing a coin book that he owns. There was little detail to this inner seeing, and the inner seeing was out of focus. Gary could discern that the book was open and almost white in color. The coins were not very detailed and looked like round disks that were a little darker than the book. There were about 45 coins that he was innerly seeing in his experience. He could also see about five empty holes in the book that did not have coins. These holes were a bit darker than the book and coins. This inner seeing filled his visual field. Gary was also seeing words scroll across the middle of the inner seeing. The words were something very similar to “when am I going to get the rest of the quarters that are being issued this year?” These words were in focus. The words were similar to the words that scroll at the bottom of some television news channels, but were vertically in the middle of his image and were moving faster. The verbal part of this experience was similar to previous beeps in that the words did not have an auditory quality, moved faster than normal speech, and moved from left to right.

However, the worded part of this experience was clearly visual and the words were clearly seen moving from left to right when others were typically more vaguely visual.

Inner Seeing

Gary experienced inner seeing on 22 percent of his samples. Six of Gary's samples potentially had occurrences of inner seeing, however only two of these were clear and convincing. The other four inner seeings were present on day five and all occurred while working on a crossword puzzle. All four of these inner seeings lacked substantial detail which is grounds for increased skepticism. Below are two examples from day five:

Beep 5.2 – Gary was eating breakfast and just beginning a crossword puzzle. Gary was thinking of words that could go in the crossword puzzle, specifically in the “1 Across” and “1 Down” section. At the moment of the beep, Gary was imaginarily seeing words for both “1 Across” and “1 Down” superimposed on the blank crossword puzzle he was actually looking at. At the time of the expositional interview, he could not recall what the words were, but he seemed to indicate that he could have written them down had he known the interviewers wanted that detail. The imaginarily seen words were in capital block letters as if he had written them. He was not focused on the entire puzzle, just the upper left corner where “1 Across” and “1 Down” were. Gary's lack of detail (i.e., which words he was imagining) suggests that there should be some skepticism regarding the accuracy of Gary's report at this beep.

Beep 5.3 – Gary was again working on a crossword puzzle. He had completed some of the puzzle, but was now going back and trying to fill in the blank spaces. At the moment of the beep, Gary was imagining a word superimposed on the crossword. He was

envisioning one word in the middle of the puzzle. He was not sure what the word was or if it was going across or down. Gary's lack of detail in describing this beep is grounds for some additional skepticism.

Feelings

Gary experienced feelings on 14 percent of his samples. Here is a summary of his clearest experience of a feeling, coupled with an experience of a worded thought:

Beep 5.4 – Gary was outside of his house checking the landscaping and sprinkler system. He was checking for wet dirt where water had come out of the sprinkler, signifying that the sprinkler was working. The dirt was in fact wet in the appropriate areas. At the moment of the beep, Gary felt relieved that the dirt was wet and the sprinkler system appeared to be working. This relief was experienced as a tingling on the surface of his upper torso that included his chest and his back. Also, somehow related to the relief, Gary was thinking that he was glad the sprinkler worked, that the crew seems to have done their job properly, and that they set up the system properly. This experience was similar to past experiences in which Gary was thinking in words that had no auditory quality.

Unsymbolized Thinking

Gary experienced unsymbolized thinking on eight percent of his samples. Here is his clearest experience of unsymbolized thinking:

Beep 3.2 – Gary was in the kitchen getting ready to make a bowl of cereal. He was looking at various boxes of cereal. At the moment of the beep, Gary was trying to

determine which type of cereal he was going to eat. This was a mental process that did not contain words or images.

Lack of Variability in Content

Another notable feature of Gary's experience is that the content of his awareness often remained the same or similar from across a day's samples. For example, on day three, Gary was aware of being late on two occasions (3.3 and 3.5). On day four, Gary was thinking about his wife's eye problems or a closely related topic during on four out of five beeps (4.1, 4.2, 4.4, 4.5). On day five, Gary was aware of a crossword puzzle on four out of six beeps (5.2, 5.3, 5.5, 5.6).

Discussion

Gary's non-auditory verbal experiences are rare among other people sampled. It is difficult to determine for certain why this form of experience is common for Gary. One possibility that is consistent with a degenerative view of inner experience is that Gary has lost the ability to have inner experience that is auditory in nature. He may have had genuine inner speech in the past, but now must experience inner speech with no auditory component and a substitute visual component. It is also possible that Gary has always had this form of experience, although it is rare.

Possible evidence for a theory of degeneration of Gary's experience may also be present in his inner seeings. When Gary did report an inner seeing, it typically lacked substantial detail. Furthermore, only one of Gary's possible six inner seeings was in

color. The others were in black and white, although four of the inner seeings were related to crossword puzzles that were black and white in reality.

Gary's consistency of content across beeps is also unusual. Typically participants report a high degree of variability in the content of their experience from beep to beep. It is possible that Gary was fabricating the content of his beeps and did not bother to change the content on every beep. This seems unlikely as Gary showed no evidence of being untruthful, although he had a tendency to utilize generalizations at times. For example, when asked detailed questions about his non-auditory verbal experience he would often refer to the fact that that is just how he thinks. Another possibility is that this lack of variability of the content of Gary's experience may also be due to a degenerative process associated with his dementia.

Although Gary had some initial difficulties with the DES process and sometimes spoke in generalizations, his reports of his inner experience starting on day three were fairly convincing. He exhibited virtually no cognitive impairment, and although some of his experience lacked details and he was inconsistent in his reports at times, it was fairly convincing overall that Gary was accurately reporting his actual momentary inner experience.

CHAPTER 11

IMPAIRED PARTICIPANT “HENRY”

Henry was a 72 year-old male who was recruited from a support group in Las Vegas, Nevada. He has a high school diploma and attended college briefly. He was diagnosed with VaD in 2001 after having a stroke. He obtained a score of 29 on the MMSE, losing a point on delayed recall, suggesting mild or no cognitive impairment.

Henry was not familiar with the DES process prior to this study. During the initial meeting, Henry was given a “practice beep” to help familiarize him with the DES process. He seemed to understand the DES process well from the outset, although he was led fairly easily by the interviewers regarding the details of his experience. This beep seemed to contain properties of inner speech; however, because this beep was used for practice purposes only, it will not be included in analysis.

On the first full sampling day (day one), Henry had substantial difficulty understanding what was meant by “the moment of the beep.” Henry’s definition of the moment of the beep seemed to encompass several seconds near the moment of the beep. He recorded and spoke about what he was doing and experiencing for many seconds around the beep for all six beeps that were discussed. Therefore, he was not able to report his experience with the specificity that is required for the DES method to be useful. He also relied on generalizations about himself and his relationship with his wife when discussing the beeps and was easily led when given suggestions. During the interview,

the interviewers' attempted to refine Henry's understanding of what is meant by "the moment of the beep" so that he would hopefully narrow his attention to the precise moment of the beep for the next sampling. Therefore, the content of the beeps collected for this day will not be analyzed.

Henry collected beeps the morning of the interview on day two. Prior to the interview, Henry seemed to be confused about the moment of the beep. He stated that he now understood that the researchers were interested in the "impact" of the beep (i.e., his reaction to the beep). The procedure was further explained before the interview began. The samples from this day were taken with great skepticism and therefore were will not be analyzed due to Henry's lack of understanding of the process. Furthermore, Henry continued to discuss experiences occurring many seconds before and after the beep. Finally, Henry may have been fabricating his experience at times, for example during beep 2.5:

Beep 2.5 – Henry was talking to Todd, one of the interviewers, before the interview began, when the beep sounded through Henry's earphone. Henry, according to Todd's observation, may have been talking about Thanksgiving or what Todd was currently doing in school. During the subsequent interview, Henry stated that at the moment of the beep he was saying, "Todd, what are you doing in school?" and that the beep came between the words "Todd" and "what." However, although Henry asked Todd about school, Todd's recollection is that Henry did not ever ask "Todd, what are you doing in school?" Henry may also have been aware of being in a happy mood at the moment of the beep, but he again discussed his general happy mood when asked rather than his experience at the moment of the beep. When Dr. Hurlburt, the other interviewer,

inquired whether this mood was experienced bodily and/or mentally, Henry seemed to agree that it was bodily and mental, as if following Dr. Hurlburt's suggestion.

Henry collected the beeps from day three on the morning of the interview for day three. He appeared to have taken few notes and referred to them very little during the interview. He often changed his reports of his inner experience and was easily led. All of these factors indicated the need for substantial skepticism and will not be analyzed. Here is an example from this day:

Beep 3.3 – Henry was at home eating lunch with his wife and they were discussing going out later that evening with friends. Initially, Henry reported that he was saying “What clothing are you going to wear?” out loud to his wife, stating that the beep had come between “you” and “going.” He later stated that he had specific clothing in mind that he was going to wear and that at the moment of the beep he was asking for approval from his wife about what he was going to wear that night. It was difficult to discern whether this was a change in his report about his experience (from being about his wife's clothing to being about his own clothing) or whether the question about his wife's clothing was actually a part of his consideration of what he should wear. We tried to differentiate those aspects without success. He also reported a desire to move that was similar to a previous beep. We asked to see Henry's notes for this beep; they simply stated “eating lunch, getting ready for affair for today.”

To increase Henry's chances of success, the researchers interviewed Henry immediately after he was beeped on day four. Henry wore the beeper in his home while the interviewers waited outside. As soon as the beeper sounded Henry came outside and notified the interviewers and the interview then took place. Nevertheless, Henry

continued to have difficulty reporting his experience and focusing on the moment of the beep. It appeared to the researchers that after four sampling days and one practice beep that Henry was not going to be able to give reliable reports of his inner experience. It was also clear that Henry was becoming somewhat frustrated with the interviewing process. For these reasons, sampling with Henry was terminated.

Discussion

There are many possible explanations for why the interviewers could not gather reliable data from Henry:

1. An obvious difficulty throughout sampling was Henry's inability to narrow the moment of the beep to a specific enough time frame to report momentary experience. This was clearly a challenge for Henry and was certainly a contributing factor to the low reliability of Henry's reports. It cannot be determined, however, if this was the sole reason for Henry's difficulties.

2. It is also possible that Henry has inner experience but cannot communicate it properly. It is difficult to discern if this is the case although he did not exhibit any problems with communication outside of DES. Although Henry did not seem frustrated at an inability to describe his experience, he was often frustrated at the highly detailed questions inherent in the DES procedure. He also did not openly state that he could not describe his experience. It is still possible that Henry used generalizations and confabulations because these were simpler ways to describe his inner experience.

3. It is possible that Henry could not adequately remember what was occurring at the moment of the beep. Henry reported no difficulty remembering his inner experience.

Evidence against this possibility can be seen in the fact that the reliability of Henry's reports did not improve even when he was interviewed immediately after receiving beeps. However, it is possible that Henry's memory, especially for details, faded so quickly that immediate interviewing showed no benefits.

4. It is possible that the beep disrupted Henry's inner experience to the point that he could not retrieve it. This may help explain why Henry did not improve upon immediate interviewing after samples.

5. It is possible that Henry does not have inner experience or his inner experience is unclear and/or undifferentiated. Individuals who do not have inner experience or have unclear or undifferentiated inner experience often have a range of difficulties similar to Henry's. Because Henry appeared to have adequate cognitive abilities to perform the DES task successfully this appears to be a likely explanation.

CHAPTER 12

IMPAIRED PARTICIPANT “IRVING”

Irving was a 97-year old male living in an assisted living facility in Pennsylvania. Although he did not have a diagnosis of dementia, he exhibited some mild memory impairment during sampling. The interviewer met with Irving approximately 2.5 weeks prior to the first sampling day to explain the procedure and gain consent. At the beginning to the first sampling day Irving stated that he remembered who the interviewer was, but could not remember some of the specifics of the initial meeting. He received an MMSE score of 27, missing a point each for orientation, attention and calculation, and recall. This score is indicative of mild cognitive impairment and is well above average for Irving’s age.

Irving was not familiar with the DES procedure prior to being involved in this study. He was sampled on 6 days, most of which came within a 2 week period. In total, 24 samples were collected. During the first 3 sampling days, the interviewer waited in the hall of Irving’s assisted living facility while he wore the beeper in his apartment. When the beeper sounded, Irving called the interviewer on his phone prompting the interviewer to walk down the hall to Irving’s room and immediately interview him. During the last 3 sampling days the interviewer remained in Irving’s apartment with him while he wore the beeper, sometimes sitting quietly and sometimes engaging Irving in conversation while

he was wearing the beeper (see below). For every beep, Irving was sitting in a chair in his living room, at times reading the newspaper.

Irving seemed to understand the task very well during the first sampling day. He was typically confident in his reports and seemed able to distinguish among before, after, and at the beep. However, during the first day the typical thoroughness of questioning was lessened slightly as Irving appeared distressed at times with overly detailed questioning. Also, Irving was given options for answers frequently rather than truly open-ended questions to help acclimatize him to the procedure and not overwhelm him. This lessened rigor in the interview procedure and evidence from later days of sampling are grounds for substantial skepticism regarding Irving's reports from this day. Here are two samples from day one:

Beep 1.2 – Irving had just glanced at the newspaper where he had read an article about the New York governor's sex scandal. He was not reading the newspaper at the moment of the beep. Irving stated that at the moment of the beep he was innerly seeing the governor making his public announcement that he was involved in the scandal and his wife was standing next to him. Although Irving believed that the governor was talking in his experience, he was not hearing any words (i.e., his mouth was moving but there was no sound being made in Irving's experience). This seeing was exactly the same as the announcement he had seen the previous evening on television, although it is not clear if Irving was seeing a television screen in his experience. Irving was confident in his description of the inner seeing and described many details. For example, the governor and his wife were viewed slightly to the side, the governor's wife was on the governor's right, he could see the governor from about the bottom of the neck up, he could see his

wife from about the middle chest up. Irving could not tell what they were wearing, although the inner seeing was very clear. However, because of the variation in interviewing for this day and later evidence, this beep should be taken with substantial skepticism.

Beep 1.4 – Irving was sitting in a chair in his apartment. The previous evening, Irving’s son and wife had visited him and mentioned that they were having a dinner for him soon and would invite many people. Irving reported that at the moment of the beep he was wondering who was going to be at his dinner. This wondering appeared to have no symbols. Also, within this same experience, Irving was somehow thinking of his son. It is not certain how his son was present in this experience, but Irving was fairly certain that his son was in this experience. Irving also may have been remembering his son and wife visiting the previous night, but he was not certain if this was in his experience and if it was it was much less prevalent than the wondering. Irving was slightly inconsistent during the interview for this beep, but once the discussion of what was before, after, and at the beep occurred, Irving became much more consistent. Nevertheless, Irving’s account was not very believable when considering the lack of rigor of the interview and evidence from later sampling days.

Irving seemed to have substantial difficulty on the second sampling day that he did not exhibit on the previous sampling day even though these sampling days occurred on consecutive days. He specifically had three consistent difficulties during this sampling day. First, Irving was not able to limit his focus to the moment of the beep. For all samples on this day he described what was in his experience at and around the beep but could not reliably discern exactly what he was experiencing at the beep from what was

near the beep. Second, Irving consistently described external reality rather than his experience. Third, Irving was often inconsistent in his descriptions. There appear to be three possibilities for this change:

1. Irving's abilities fluctuated from the first to the second sampling day.
2. Irving was over-confident his first sampling day and was not actually reporting his inner experience very accurately. After receiving some training in truly observing his inner experience and increasing his awareness of his task, his ability seemingly declined as his attempts to observe his inner experience became more forthright.
3. The interviewer did not lead/aid Irving as much on the second day. Taking away this leading had a substantial impact on Irving's ability to perform the task.

Although option one is possible, options two and three appear much more likely. Regarding option two, as sampling continued, Irving had a difficult time distinguishing reality from inner experience and narrowing his focus to the moment of the beep. Regarding option three, the interviewer aided Irving much less on the second day than the first, asking more open-ended questions rather than giving Irving multiple options.

Irving also did not respond to the beep on two occasions during the second sampling day when the interviewer happened to be with him when the beeper sounded. On the first occasion, the headphone was out of his ear, so he appeared not to hear the beep (and stated he did not hear the beep when asked). On the second occasion, Irving was talking when the beep sounded. The interviewer called Irving's attention to the beep before Irving was finished talking, so it is not clear if he would have noticed the beep once he stopped talking. Irving spoke continually throughout the sounding of the beep with very little pause. The beep was sounding approximately 30 seconds before the interviewer

notified him. For these reasons, very little could be discovered about Irving's inner experience on this day, although a great deal was discovered about his ability to participate in the DES process. Below is a sample from day two:

Beep 2.2 – When asked about the moment of the beep, Irving said that he was thinking about a vacation he took with his wife and children many years ago. He then proceeded to tell a very long story about the actual vacation. When asked again what exactly was in his awareness at the moment of the beep he said “more or less the first part of the trip.” When asked if he was thinking about a specific aspect of the first part of the trip at the moment of the beep he stated that he may have been thinking about the part of the trip when his son went across a particular state line (the interviewer is not sure which one, although Irving knew which one it was). Irving stated that this was very close to the beep, but was not sure if it was exactly at the beep. He then said that he was thinking more about the excitement of his children during the trip at the moment of the beep. He stated that the excitement part of his experience and the state line part were close to one another and occurred close to the beep. Irving was fairly certain that he was not experiencing any symbols at the moment of the beep. Throughout this beep, Irving appeared to rely heavily on external reality. It was difficult to determine to what extent Irving was discussing the actual trip and to what extent he was discussing his inner experience.

Irving exhibited the same difficulties during day three that he did on day two. Approximately half an hour after initially setting up the beeper for Irving, he had not yet called the interviewer in from the hallway. The interviewer went to Irving's room to check to make sure nothing was wrong with the beeper or Irving. When the interviewer

approached Irving the interviewer could hear the beeper sounding. Apparently, the beeper sounded either just before or after the interviewer entered the room as it sounds for only one minute. Irving did not respond to the beep. The beep ended very shortly after the interviewer approached him. Irving gave no indication of being aware that the beep sounded and the beeper was simply reset by the interviewer.

Irving called the interviewer for the second beep (3.2). Irving stated that at the moment of the beep he was thinking about seeing Barack Obama's minister on television the night before. Irving then went on to discuss the minister himself, what he was wearing, the effect it will have on Obama in the election, his concern about ending the war in Iraq, and other issues. When Irving was repeatedly asked what he was experiencing at the moment of the beep, he was very inconsistent, but always mentioned something in relation to Obama's minister or an issue surrounding him. Eventually, Irving stated that he was uncertain exactly what he was experiencing at the moment of the beep but that it had something to do with the minister.

Irving did not call the interviewer for beep number three (3.3). The interviewer again checked on the beeper. Irving was looking at the interviewer as he approached. The interviewer asked Irving if the beep had sounded and Irving said that it had not. The interviewer was actually right beside Irving bending down to listen for the beep when it sounded. Irving stated that he was thinking about a trip he took with his father in 1933 and then explained various details of the trip. The interviewer attempted to make a distinction between what Irving was experiencing at the moment of the beep and the reality of the trip. Irving again was not certain exactly what he was experiencing at the

moment of the beep, but that it had something to do with getting ready to go on the trip. He was again unable to describe the form of his experience.

It appeared at this point that there was the possibility that Irving was creating stories about his inner experience rather than actually describing his inner experience despite repeatedly being instructed to describe inner experience at the moment of the beep. First, Irving has reported thinking about something substantial at every sampled moment so far except for beep 1.3 where he reported no inner experience. During this beep, the interview for 1.2 had just ended and the interviewer was still in the room. Second, it seems unusual that Irving would have been thinking about a trip with his father from 1933 when he was in the midst of interacting with the interviewer (beep 3.3).

For sampling day four, the interviewer remained in Irving's apartment with him while he wore the beeper. For most of this day, the interviewer sat in a chair approximately 12 feet to the left of Irving, but still slightly in front of him. The interviewer may have been in Irving's peripheral vision. Irving could easily turn his head to see the interviewer. Irving notified the interviewer when the beeper sounded. Throughout this sampling day, Irving sat in a chair in his living room.

Because Irving seemed to be thinking about something substantial at nearly every beep, the interviewer asked Irving after the interview for beep 4.3 if he was trying to think of things while wearing the beeper. He stated that he was attempting to think of things and was instructed that he was not to do so. He was encouraged to simply behave, both internally and externally, as if he were not wearing the beeper. Irving stated that he was not attempting to think of anything for beep 4.4. Still, this beep was similar to others

in that it was very similar to an actual event that had happened in the past and had substantial content:

Beep 4.4 – Irving reported not attempting to think of anything in particular prior to this beep. At the moment of the beep Irving was reportedly thinking about a meeting that he had earlier in the day. The meeting was for residents of his assisted living program. Irving was innerly seeing a man (Steve) next to him asking a question about a model cottage in an adjacent facility. Steve was on the right side of the inner seeing while the man running the meeting was on the left side but in the distance. This was the same perspective that Irving had in reality. There were other people in the inner seeing that were attending the meeting but Irving could not describe any details about these people or how many there were. The inner seeing itself was fairly clear and it was either in black and white or had very little color. Irving may have also been hearing Steve talking in his experience. He was talking very loudly, but was difficult to understand (both in real life and in his experience). Irving was not certain of the exact words Steve was saying.

The interviewer again remained in the room while Irving wore the beeper for sampling day five. Irving was reminded that he was not to be trying to think or experience anything in particular. At beep 5.1, Irving again reported an experience that seemed like it could have been a story rather than his actual inner experience. Because Irving's only report that did not seem to involve the possibility of a story occurred while in the midst of conversation (beep 1.3), the interviewer engaged Irving in conversation after the end of the interview for beep 5.1 until the end of the interview for beep 5.5 in order to determine if Irving would still report story-like content in his inner experience during conversation, to assess Irving's ability to process the beep in the midst of

conversation, and to investigate if Irving could accurately describe what was occurring externally at the moment of the beep. Therefore, beeps 5.2, 5.3, 5.4, and 5.5 occurred in the midst of conversation and had fairly drastic effects.

Beep 5.2 – Irving was just given the MMSE. Irving had just said “I appreciate that I’m as good as I am” referring to his cognitive ability. The beep sounded slightly after he finished this sentence. Irving did not respond to the beep but rather kept having a conversation with the interviewer with small periods of silence in between talking (a few seconds). The beep continued to sound during the conversation and Irving did not respond. Eventually, Irving recognized the “chirp” of the beeper while he was talking about 4 minutes after the beeper initially sounded.

Beep 5.3 – Again, Irving did not respond to the beep while he was talking. When the beep sounded, Irving simply continued to talk with no pause in his talking. Eventually Irving reported hearing the chirp sound. The interviewer did not hear the beep this time so it is uncertain how long it took for Irving to recognize the chirp. This seemed to be the same thing that happened during beep 5.2. However, the interviewer cannot determine how long the beeper was going off.

It appears that talking often interferes significantly with Irving’s ability to process the beep, but not always:

Beep 5.4 – Irving was telling a story about a sexton he knew when he was younger who liked to tell stories. This time, Irving immediately recognized the beep even though it sounded while he was talking. At the moment of the beep, Irving was reportedly innerly seeing the sexton standing outside of a church door on the steps. Irving stated that the inner seeing was clear and the sexton was only a few feet away from the perspective of

the inner seeing and Irving could see most of his body. He was wearing trousers, but Irving could not describe them. Irving may have also seen himself in the inner seeing, but only reported this when specifically asked. Irving may have been standing a little to the left of the inner seeing while the sexton was talking. Irving could not hear what the sexton was saying in his experience. Irving frequently intertwined reality with his inner experience during this interview. For example, when directed toward his inner experience Irving seemed to describe it and then continued to discuss reality. Irving also said that the inner seeing was in the summer, but later said that this was an external fact and not necessarily part of his experience at the moment of the beep.

Beep 5.5 – This beep occurred immediately after the end of the interview for 5.4. Irving had just said “I can see him standing and talking.” There was a pause in the conversation when the beep sounded and Irving heard it and responded to it. Irving was just getting ready to tell the interviewer more about the sexton, but it was not clear if this was in Irving’s experience or not. Irving was not sure what, if anything, was in his awareness at this beep. It is the DES procedure to omit interview of beeps that occur when other beeps are being examined.

Due to a conflict in Irving’s schedule only two beeps could be collected for day six:

Beep 6.1 – Irving began this interview by discussing his son and his wife in general and how they own a house in Ocean City, New Jersey and how his family is currently in Ocean City, New Jersey. When questioned specifically about the moment of the beep, Irving stated that he was wondering what his son was doing today (the day of the interview). Specifically, he was wondering if he was running on the boardwalk or if he was repairing something. When questioned further, Irving stated that he was wondering

at the beep if he was running, but later said that this came a little bit after the beep. Near the end of the interview, Irving stated that this experience came a little before the beep. Irving also stated that at the moment of the beep he was innerly seeing his son repairing something. This inner seeing was unclear and difficult to describe, although his son seems to have been holding a hammer (Irving later added a saw to the inner seeing). Finally, Irving stated that he was not sure which of the above was exactly at the moment of the beep, saying that he did not think that he did very good with this beep and that what occurred at the beep “slips my mind.”

Beep 6.2 – Irving was sitting in his chair. After approximately 35 minutes, the interviewer asked Irving if the beep sounded (it was set for a maximum of 30 minutes). Irving said it had not. Irving was then asked if he was hearing little beeps (i.e., chirps) and he said no. The interviewer listened to the beeper and it was in chirp mode, signaling that Irving had missed the beep. Irving did not appear to be asleep during this beep, but was not watched closely.

Discussion

There were numerous reasons for skepticism regarding Irving’s reports:

1. Irving misunderstood the procedure somewhat, especially during the first four days of sampling. Specifically, Irving believed that he was to attempt to think of something while wearing the beeper. When this was discovered, Irving was repeatedly instructed that this was not part of the procedure. Still, the nature and extent of the content of Irving’s reports did not change. It is possible that Irving did have substantial content in

his inner experience, but it appears likely that the extent of the content would change if he was no longer attempting to think of something substantial.

2. Irving had difficulty answering open-ended questions about the details of the content of his experience. He often appeared confident when given options, but was often inconsistent. He had even more difficulty answering questions about form unless given options.

3. Irving was frequently inconsistent in his responses in general.

4. Irving often intertwined descriptions of actual events with descriptions of inner experience. It is very difficult to discern to what extent Irving was describing inner experience versus external reality, but it is clear that the two often overlapped.

If Irving's interviews are taken as valid, one of the most consistent features of his experience was remembering events that have occurred in his life, mostly recent events, whether they were interactions he had with others, things he had read about in the newspaper, or thing he had seen on television. Irving reported no instances of inner speech, but did frequently report inner seeings, many of which may have had limited color. Irving may have had limited occurrences of unsymbolized thinking and feelings, but did not report sensory awareness.

However, the above list of difficulties suggests that Irving's reports cannot be taken at face value. Here are some possibilities for interpreting Irving's responses. These are by no means definitive conclusions, but hypotheses based on the evidence:

1. Irving may have not entirely understood what was meant by "inner experience." His reports were almost always more focused on external reality rather than inner experience. Irving often answered questions about inner experience in an appropriate

manner, but was inconsistent, could often not describe details, needed options to be able to answer, and typically returned to describing external reality as soon as he felt he adequately answered a given question about inner experience.

2. Irving may not have entirely understood what was meant by “moment of the beep.” Irving’s reports were often but not always somewhat general temporally, although he could usually answer appropriately when directed to the moment of the beep and given options and/or close-ended questions.

3. Irving may have been fabricating his reports. He may actually not have had inner experience, may not have been able to process the beep, may not have been able to recall inner experience even when interviewed immediately, and/or may not have understood the task at all. Therefore, he thought of real-life stories to tell and answered inner experience questions as realistically as possible. Evidence for this hypothesis includes the substantial content of his reports, inconsistencies in his reports, inability to get to exactly the moment of the beep, and an inability to describe details. However, Irving appeared to be giving substantial effort and appeared to take the process seriously, making this hypothesis seem unlikely.

4. Irving may have no inner experience. It appears common for people with no inner experience to have difficulty reporting inner experience and often avoid stating that they have no inner experience, reporting reality in its place. Furthermore, Irving’s difficulty with details and inability to answer open-ended questions may be further evidence for this. This appears to be a likely possibility given the fact that although Irving has some cognitive impairment it cannot entirely explain his inability to produce a single reliable report.

5. Irving was somehow thinking about what he reported at or near the beep, but could not describe it very well, either due to a misunderstanding of some step or all of the procedure, has weak inner experience that is difficult to report, or forgot details nearly instantly. Irving could answer some questions about his experience, but typically not detailed ones. He also needed options or closed-ended questions regarding the specifics of his experience. He typically was very confident about the general topic he was thinking about at the moment of each beep, but was not nearly as confident regarding form or details of these experiences.

One of the most interesting findings sampling with Irving was the difficulty that he had responding to the beep during conversation despite only minor hearing difficulties. He responded to the beep on only one out of four occasions while engaged in conversation. He consistently was able to respond to the beep when not in conversation, although he did miss three beeps while not in conversation (one while sleeping, one when the head set came out of his ear, and one under normal circumstances). It is possible that he had exhausted his cognitive resources during conversation in a way that did not allow him to respond to the beep. It is also possible that he could not hear the beep for some reason while talking. However, on some occasions he did not respond to the chirps even after the conversation had ended. When asked after the conversations if he was hearing chirps, he sometimes responded that he did hear them and other times said that he did not hear them.

CHAPTER 13

IMPAIRED PARTICIPANT “JUNE”

June was an 84 year-old female living in an assisted living facility in Pennsylvania. She received a score of 23 on the MMSE, which is indicative of mild to moderate cognitive impairment and is below average for a woman of June’s age and level of education (Master’s degree). Although she did not have a diagnosis of dementia, she did exhibit some memory impairment. She was highly verbal and spoke very well, exhibiting no linguistic or memory impairment in casual conversation. However, June did exhibit some memory impairment if she was asked specific questions that required episodic memory. The interviewer met with June approximately 2.5 weeks prior to the first sampling day. Upon arriving at the first sampling day, June stated that she remembered who the interviewer was, but could not remember some of the specifics of the meeting or the interviewer’s name. During this sampling day, June collected six beeps and was then interviewed after all six were collected.

June had substantial difficulty understanding the DES process on the first sampling day. On a few occasions June said things like “what I came up with for this one” or “what I thought to write for this beep.” The interviewer then asked if June responded to the beeps by inventing a thought. She initially said yes, but quickly recanted saying that she did not quite understand the interviewer’s question.

Another key difficulty on the first sampling day was June's inability to understand the difference between discussing generalizations and focusing on the moment of the beep. For example, for the first beep June said that she was concerned about a friend who is ill. The interviewer acknowledged that she was concerned in general about her friend, but asked her if she was experiencing concern at the moment of the beep. June said she was sometimes experiencing concern and said that she was not at other times. The interviewer attempted to explain avoiding generalizations and the difference between generalities and the moment of the beep in a variety of ways, but June did not seem to understand and stated that she was not certain if she understood or not.

Throughout the interview, June repeatedly discussed generalizations and external reality rather than her momentary inner experience. Several attempts were made to clarify the DES process, inner experience, and the moment of the beep. It was not clear to what extent June understood DES on the first day but it was clear that she was not able to give reliable reports of her inner experience on this day.

Due to June's difficulty during day one, the sampling procedure was changed from the standard procedure used on day one. June wore the beeper while in her apartment at her assisted living facility while the interviewer waited in the hall. When the beep sounded, June called the interviewer and was immediately interviewed after the beep.

However, between the first and second beep of this day it was discovered that June did not understand the DES procedure at all. After beep one the interviewer became suspicious that June was not responding to a beep at all. She had seemed to not understand the difference between "moment of the beep" and what she thinks in general (see day one description). Now on day two, after preparing the beeper and reiterating the

instructions to June, she called the interviewer within 5 minutes to signal that the beep had sounded. When interviewed, June continued to discuss her general experience. She began the interview with the statement “all morning I have been thinking” and then described wanting to contact a friend in the western U.S. June continued to seem perplexed by questions regarding the moment of the beep.

After the interview for beep 2.1, the interviewer instructed June to call him when the beeper sounded. June asked “What am I supposed to be thinking about now?” The interviewer again explained that she was not to think about anything specifically, that the interviewer was interested in her naturally occurring experience, and that she should make no effort to think about anything but just continue as if the beeper were not present.

June again called the interviewer within 5 minutes after the interview for the first beep ended. Upon beginning the interview for this beep the interviewer asked June if the beep had sounded and she said that it had not. June apparently believed that her task was to create thoughts, and when she had created a thought she was to call the interviewer. It is not clear what June thought the function of the beeper was. The interviewer explained the method to June again. Still, she did not seem to entirely understand. June then explained that she was having a bad day, that she had not slept well, and that she was frustrated and could not concentrate. June estimated that this occurs about once every 2 weeks. At this point sampling day two was ended.

For the third sampling day, the interviewer stayed in the room while June wore the beeper. She seemed equally confused on this day regarding the DES procedure as she was on the previous days. After the DES procedure was reviewed and the beeper was set up, June immediately began talking about what she had been thinking all day long. She

then seemingly tried to think of things to tell the interviewer prior to the beep's sounding. This continued despite multiple explanations of the procedure by the interviewer. Eventually, June seemed to realize that she was to wait for the beep to identify a moment. However, when she was interviewed after the beeper sounded it seemed that June still could not understand what was meant by "the moment of the beep" as she would talk about what she was thinking in general throughout the day. She was again instructed that she did not have to try to think of anything in particular as she seemed to misunderstand this aspect of the process and continued to misunderstand after repeated explanations.

For the first beep, the interviewer heard the chirp sounding (the interviewer did not hear the beep prior to the chirp). When asked if she heard the chirps, June stated that she did. When asked if the actual beep had sounded she said that it did. June and the interviewer were having a conversation while the beeper was sounding. June was again reminded of the DES procedure. After this incident, June sat quietly, waiting for the beep.

June then responded to two beeps. Here is a description of one of those responses:

Beep 3.2 – At and before the beep sounded, the interviewer and June were talking about her granddaughter. Specifically, June had just finished saying that she thought her granddaughter would get married shortly after graduating from college. Throughout the interview for this beep, June spoke in generalities. She often responded to questions about her momentary inner experience with statements such as "that's what I was thinking about the whole time" or "Well, really, that's what's been on my mind." She was also very inconsistent with her reports and was easily led throughout the interview. She began the interview by saying that she was thinking about her granddaughter going

to Mexico. She then elaborated, saying that she was thinking about what she would be experiencing when she got there. She then stated that she was thinking about the people who live in Mexico and that she would be anxious to speak with her about her opinion about Mexico. When asked which of these was in her experience at the moment of the beep, she said that all of them were. When asked how those were in her experience, she stated that she had been thinking about these things all day. When asked if she was having an inner seeing, she said that she absolutely was, but could not describe the inner seeing. When asked if she was innerly speaking, she said that she absolutely was, but could answer no further questions about form. It appeared that she simply did not understand what was meant by “the moment of the beep,” did not understand what was meant by “inner experience”, or often confused reality with inner experience and could not reliably answer questions about form.

For the fourth beep, the interviewer and June were in the midst of conversation. June was not sure what, if anything, was in her experience at the moment of this beep.

It was clear that June was having substantial difficulty engaging meaningfully in the DES procedure after 3 days of sampling even though she was interviewed immediately after the beeps occurred. Therefore, the fourth day consisted of many variations to the DES procedure to try to determine the exact nature of June’s difficulty with DES.

To begin sampling day four, June was instructed to undergo the DES process as usual, but, at the moment of the beep, instead of reporting inner experience June was simply to report what she was seeing. This experiment was done to help determine if June could get to the moment of the beep while focusing on a supposedly easier task

(reporting external vision as opposed to inner experience). It also allowed the interviewer to verify the accuracy of June's report as she would be reporting on external phenomena.

When the first beep sounded, it took June approximately 20 seconds to respond to it. Her initial response, after 20 seconds, was "do I turn it off?" After being re-instructed, a new random interval was initiated. When the beep sounded, June reported that she was seeing a man talking to a woman on television. She first said that she was not sure which of the two (or both) were on the screen at the moment of the beep, but later said that the man was on the screen. June stated that she was not seeing anything else. She could describe some details, but the characters were still on the screen so she may have been relying on that information.

June was indeed watching "Just Shoot Me" at the moment of that beep, and a man and woman on the show were talking. The interviewer is unsure exactly who was on screen right at the moment of the beep as the screen shots were switching back and forth fairly rapidly. Nevertheless, June's report was either entirely accurate or very close to being entirely accurate.

The interviewer was talking to June at the moment of the next beep while her eyes were directed toward the television. The interviewer paused when he heard the beep sound and after approximately one second June notified the interviewer that it was sounding. It was unclear if June was responding to the beep or to the interviewer's pause. At first, June stated that one of the characters on the television had just gotten up and run from a table in a restaurant. She then stated that one character was sitting and eating while another was standing nearby and talking.

June was looking at the television at the moment of this beep. She seemingly described the correct sequence of events (one character standing and talking, the other sitting and eating, and then the standing character walking or running away), although the interviewer was focused more on June than the television during this beep. Again, June's description was at least close to being accurate, although June was unsure what point in the sequence the television program was in when the beep went off.

It was still not certain, however, that June was responding to the beep itself. The interviewer's pause and instant questioning did not allow for much interpretation on June's part regarding what was to be done when the beep sounded. However, it did seem that June was able to narrow the moment of the beep down to at most a few seconds.

For the next experiment June was asked to think about either one or both of her granddaughters and to continue thinking about them until she was notified by the interviewer. The interviewer waited approximately ten seconds then asked her to describe her thoughts. This was done in order to: 1. simplify the procedure for June by eliminating the beeper. Perhaps there was something about the beeper that destroyed June's inner experience, was too distracting, caused misunderstanding, etc.; and 2. to attempt to see if June could report inner experience under fewer demands (i.e., purposefully creating inner experience rather than trying to catch it "on the fly"). June could not exactly describe what she was thinking, but rather talked about her youngest granddaughter in general. The interviewer decided that this experiment was set up somewhat poorly and may have been a bit too broad for June and therefore decided to move on to a clearer variation of this procedure.

June was then instructed to think about her youngest granddaughter. She was told that the interviewer was going to snap his fingers rather than use the beeper (i.e., the finger snap would simulate the beep). When the interviewer snapped his fingers she said, “I just think she is very courageous.” June then began to discuss various aspects of her granddaughter’s life and personality, such as the fact that she is in her twenties, that she is in love, that she gets very good grades, and that June is happy for her. When asked if she was thinking of all, some, or none of these things at the moment of the finger snap, June stated that she was thinking of all of them “because we’re just so proud of her.” When questioned further, June stated that she has great admiration for her granddaughter and that she is very energetic. When questioned, she said that these things were also present at the moment of the beep. The interviewer then began asking June about form, using both open-ended questions and providing options. After the first form question June stated, “She’s a very attractive young lady” and continued to talk about her granddaughter. After the second form question, June stated that “I really think about them” (them meaning both of her granddaughters).

It was clear that June was not describing her momentary experience. In fact, it is likely that she was not describing her experience at all. This modified procedure suggested that June either has virtually no understanding what is meant by “moment of the beep” (or finger snap in this case), or has no understanding of what inner experience is, or has no inner experience at all. Perhaps there are other options as well. Her previous descriptions, as well as this one, suggest that she was describing generalities rather than experience at the moment of the beep, although she had shown some evidence for understanding the “moment of the beep” concept during the television experiment

described above. This is evidenced by both the content (i.e., multiple topics in awareness, easily led into descriptions of new content, etc.) and language of her descriptions (discussing what she has been thinking during the day or previous few days, the inability to describe form, etc.). Furthermore, June continued to discuss reality (i.e., “She is a very attractive young lady.”) rather than inner experience.

The interviewer then asked June if she could visualize her granddaughters if she tried, and June stated that she could. June was then instructed to form an inner seeing of either or both of her granddaughters. June said that this was difficult to do and then started talking about her eldest granddaughter living in the eastern U.S. She was asked repeatedly if she was having an inner seeing of her and June repeatedly said “yes.” When she was asked to describe the inner seeing she would discuss the granddaughter in reality, and did not provide any details that would suggest an inner seeing.

Interestingly, June often used the word “see.” For example, the interviewer asked her to describe the details of the image (the interviewer did not use the word “see”) and June stated, “I can see them getting excited about it,” and continued discussing her granddaughter and her friends in general. When asked, she said that she was not having an inner seeing. This happened on two occasions (i.e., June using the word “see,” going on to talk about her granddaughter in general, and then saying that she was not describing an inner seeing).

At some point either during or after this portion of the interview, the interviewer gave the following paraphrased example of an inner seeing:

“Right now, I am visualizing my parents’ garage in my head. I’m seeing it as if I’m looking at it from the back of the house. It’s a sunny day, sometime in the afternoon. I

can see part of a tree in the upper left hand corner of the image.” June was then asked if she could visualize something like that, and she said that she thought she could. She was then asked to visualize the house that she lived in for most of her life. When asked to describe the inner seeing, she described the house in general and various circumstances surrounding the house. For example, she said that “It was a very nice house. It had four bedrooms,” and then went on to talk about people that used to visit. The interviewer asked about the visual characteristics of her inner experience, giving examples to distinguish this from reality, but June continued to talk about the reality of the house and memories that she had involving the house. It seemed clear that either June was not having a visual experience at this point or that she could not describe it at all.

Finally, June and the interviewer returned to the initial procedure where June was to describe what she was seeing at the moment of the beep. June seemed to perform best in this scenario, so further investigation was done.

When the beep sounded the next time she stated that she was seeing a couple of guys talking on television. However, June was clearly describing what was on the television while she was talking. When the beep had sounded a commercial was on television that did not involve men talking. By the time she started describing what she was seeing when the beep sounded the show had come back on. She stated “there were a couple of guys talking, and look, there they are.” When asked if she was certain that was what she was seeing at the moment of the beep she said that she was. This is more evidence that June could not get to “the moment of the beep” or perhaps perform the DES task in general, although it was explained many times in a variety of manners.

During the next beep, June was watching a commercial. She said that she was seeing a golden retriever in the commercial at the moment of the beep. There was a golden retriever on the television near the beep, but the interviewer thought that it was on a second or two before the beep, not at the beep. She stated that she was focused on the dog and was not really seeing anything else. The dog on the commercial was computerized, so the interviewer asked if it was a real dog or a computerized one and June stated that it was definitely real. Then, the television program came back on and two men were talking and shaking hands. When this came back on, June stated that she was seeing two gentlemen talking and shaking hands at the moment of the beep. June was asked again if she was seeing these men specifically when the beep first sounded, and she said yes.

Throughout this sampling day, June was engaged in conversation with the interviewer. This conversation was detailed, appropriate, and provided no evidence of cognitive impairment, except in instances when June was attempting to remember details and times of upcoming appointments. However, when the discussion turned to DES-related topics, it was clear that June had substantial cognitive impairment, evidenced by many phenomena:

1. June exhibited substantial variability in responding promptly to the beep. To various beeps she responded instantly, after a delay of a second or two, or after approximately 20 seconds. She demonstrated no evidence of hearing loss. Up until and including the most recent sampling day she had not once asked the interviewer to repeat himself during conversation and always seemed to understand what the interviewer was saying in casual conversation. Nevertheless, June clearly had some difficulty responding to the beep in a timely manner. Delayed reactions did not seem to be directly associated

with June's being involved in other activities. For example, it took June approximately 20 seconds to respond to the first beep. At the time, June and the interviewer were engaged in light conversation, but there were one or two significant pauses in the conversation during the 20 second period that would have allowed her to respond to the beep if she was indeed distracted by talking or listening during the conversation. At other times, June responded much faster even in the midst of conversation. June's difficulty seemed to lie in processing the beep itself, processing the beep adequately but having trouble physically responding to it, or both.

2. June had substantial difficulty describing what was occurring externally at the moment of the beep. June did an adequate job of describing what she was seeing during the first beep, described what was at and somewhat near the beep during beep two, and did not describe it at all during the next to last beep.

3. June had little if any ability to describe any aspects of inner experience that might be occurring at the moment of the beep. She almost always referred to her experience in generalities and could not, for example, distinguish between something she had thought during the day or preceding days and the content of some experience that might have been occurring at the moment of the beep. This evidence suggests that June could not consistently narrow her attention to a moment, or that she did not understand the concept of "moment of the beep," or that she had no inner experience whatsoever.

4. June had substantial difficulty understanding what was meant by inner experience. When asked about her inner experience, her responses were almost always mixed with external reality. When asked specifically about the form of her experience, she would inevitably refer to content, usually the content of external reality. It is possible that June

has inner experience but cannot describe it, that she has no inner experience and therefore there is nothing to describe, or that she does not understand what the interviewer means by “inner experience.”

5. June could not engage in an adequate discussion of inner experience when the beeper was removed and June was asked to imagine familiar people and places in her life. Again, June described having numerous experiences during this exercise, including many suggested by the interviewer. She also described reality rather than inner experience and relied on generalities rather than her in-the-moment experience. This again suggests that June cannot describe inner experience, that she has no inner experience, or that she does not understand what is meant by inner experience.

6. June may not have understood the language involved in the DES process. Her understanding of the purpose of the beeper, the moment of the beep, and inner experience varied drastically. She often felt confused when discussing these concepts and answered questions about these concepts that often do not reflect an understanding of them (e.g. describing reality when asked about inner experience, describing what she was currently seeing when asked about what she was seeing at the moment of the beep, etc.). This difficulty persisted despite four days of repeated description and explanation of all of these concepts, using direct definitions, metaphors, and visual prompts.

For sampling day five, more variations on the standard DES procedure were used. For the first beep, June was simply to describe exactly what she was doing at the moment of the beep, whether it was talking, hearing the interviewer talk, getting ready to talk, hearing music, etc. After this was described to June, the interviewer asked “Do you understand?” June said “No, not really, but let me tell you about what I’ve been thinking

today.” The interviewer then re-explained the procedure and June stated that she understood, although she still appeared uncertain.

Before the first beep, the interviewer had asked June about her granddaughters. June spoke about one of them for about 4 minutes. After this, she began talking about the other granddaughter. Shortly afterward, a woman came into June’s room to take out the trash, interrupting the conversation. After she left (about 2 minutes later), the interviewer asked June “What were we talking about?” June thought for a few seconds and said “Oh yes, my sons.” In reality, the conversation involved her granddaughters, although there had been a discussion of her sons earlier in the meeting.

In the period leading up to the first beep, June had been talking about her sons hunting, how they love going out in the forest, and how they loved swimming. At the moment of the beep, June was saying “They turned out to be fine young men, and they...” June did not respond independently to the beep, but the interviewer notified her that the beep was sounding almost instantly after it began sounding. The beep came right around “and they.” June stated that at the moment of the beep she was talking about her sons and “keeping track of them.” She then continued to talk about her sons. June was not able to report the exact words at the moment of the beep, and although she was correct that she was talking about her sons, she was not able to accurately say what exactly she was talking about at the moment of the beep.

June was then instructed to try to pay attention to either what she was saying or what the interviewer was saying at the moment of the beep. She was asked to report the exact words and subject of the conversation at the moment of the beep if possible.

At the moment of the second beep, the interviewer was talking about the DES method. June had asked what the interviewer was looking for in his study. The interviewer was stating that he was not looking for anything specific, but that studies in psychology often are looking for something specific. At the moment of the beep, the interviewer was saying “people are looking for something specific.” It is not certain exactly where the beep came in this phrase, but it was definitely during this phrase. June could not describe the exact words that were being spoken. She stated that, at the moment of the beep, the interviewer was talking about what people are thinking.

The interviewer explained the procedure again to June. She then said “I’m trying to tell you what I’m thinking” and then described what she had been thinking lately. It appeared in this instance, and at other times, June believed that her task is to simply tell the interviewer what she has been thinking recently in general. The procedure was explained again, and June seemed to understand.

At the moment of the third beep, June and the interviewer were talking about the importance of travel. The interviewer was saying that people who have never traveled tend to think that the world is very similar to the area in which they have lived, but when they do travel they tend to appreciate differences in other cultures. The interviewer was specifically saying “When you go somewhere, you appreciate it.” The beep occurred within this statement. June alternately stated that, at the moment of the beep, the interviewer was saying “you should appreciate it” and “I should appreciate it.” When asked about the general subject that was being discussed at the moment of the beep, June stated that the interviewer was saying that he would like to travel.

June exhibited some memory problems between the third and fourth beeps. Earlier in the meeting, the interviewer told June what sports he had played in high school. A similar subject arose again and June again asked what sports the interviewer played in high school. Also during this period, June stated that she thought that when her sons go hunting they are more interested in partying than hunting. This was the third time that she made this statement during the interview.

At the moment of the fourth beep, June was saying “I was born and raised in Scranton. And my husband was in the service, and he came out and we were married and lived in Chambersburg. From there we moved to York. After he got out of the service...” The interviewer did not hear the beep, but June’s first visible reaction came just after “service.” However, June said that she was talking and then noticed the sound and seemed to think that it may have been sounding a bit before that. Still, she first noticed it very close to the word “service.” June stated that the exact words that she was saying at the moment of the beep were “I lived in Scranton.” She stated that the subject was where she was living and what she was doing, which was generally true.

June exhibited two more instances of memory problems after this beep. The interviewer and June had discussed the street that June lived most of her adult life on at least two occasions during previous meetings (Maple Avenue). The interviewer asked her what the street was and June could not remember at first, but after about 15 seconds, said Maple Avenue. June also wanted a list of the interviewer’s relatives who grew up in York as she might know them from being a school nurse and wanted to look them up in a yearbook. The interviewer wrote the interviewer’s name (Todd) and the names Mike, Randy, and Linda. Shortly after this, June became confused and believed that the

interviewer's name was Randy. June seemed to exhibit more memory problems than in the past during casual conversation on this day, but did not report having a "bad day."

For sampling day six, the interviewer used a beeper with an external button that would allow the interviewer to control when the beep sounded. The button was on the end of a long wire so that the interviewer could sit well across from June while still operating the beeper.

A series of activities were performed using this beeper. For the first activity, the experimenter held ten index cards. Written on each card in large writing was a single number from 1 to 10. The cards were held in front of June in a stack so that she could only see the card that was on the top of the stack. The interviewer removed the card facing June, placing it at the bottom of the stack revealing a new card and a new number. This was repeated fairly quickly (about three every two seconds). June was asked to identify which number she was seeing when the beeper sounded. The interviewer varied the amount of time between beeps so that June would not see a pattern in the timing of the beep (approximately 5 to 20 seconds between beeps and 6 to 50 cards).

For the first three trials, the cards were in order from 1 to 10. June began by calling out the numbers that she was seeing before she heard a beep (i.e., "one, two three"). The interviewer reminded June of the procedure and gave her two examples. June was then accurate on three subsequent trials. The cards were then scrambled. The interviewer re-explained the procedure to her. June was accurate on the first trial. She then said "nine" before a beep sounded. She was then accurate on the next two trials. The cards were shuffled again and June was accurate on the next two trials. She then said "five" before the next beep ever sounded. She was accurate on the next two trials. On the following

trial June called out the correct number before the beep. She then pressed the white button on the beeper (which resets the beep), apparently to make it sound (but the interviewer is not entirely certain of the motivation). She also pressed the white button of the beeper on the next two trials. She was accurate on the next trial, but then called out a number in the absence of a beep, then pressed the white button on the next two trials.

The task was then re-explained to June and the headphones were removed and the onboard speaker was used to deliver the beep so that the interviewer could hear the beep clearly and ensure that June was actually receiving the beep. On the next two trials before the beep sounded, June again called out a number and then pressed the white button. The interviewer explained to June that she should wait for the beep and not touch the white button until told to do so. She then called out a number without any beep at all. The instructions were then thoroughly re-explained to her. She stated that the interviewer was confusing her and that she did not entirely understand. June then did the next ten trials accurately (i.e., she identified the correct numbers at the moment of the beep) even when beeps came very close to a transition in the cards. June kept holding the white button down for a period of time to stop the beeper even though she was told repeatedly to press it very quickly and then release.

This demonstration suggests that:

1. June could perform the task at times, but her ability varied substantially.
2. June may have had difficulty understanding the task. This was especially evident at the beginning, when June began calling numbers out before the beep occurred. This was also suggested when June would respond to a number before hearing the beep, and then press down on the white button.

3. June may have difficulty with inhibition given her calling out of numbers before the beeper sounded. She also could not inhibit pushing the white button on the beeper when instructed not to do so.

4. June may have had some problems with learning and these problems may be related to memory. Even after repeated instruction, June often made mistakes with the procedure.

June's second task was to tell the interviewer what she was seeing on the television at the moment of the beep. June was instructed to focus only on what she was seeing rather than the content of the conversation on the television because this would make June's reports easily verifiable and allowed her to focus only on a small part of her external environment. However, in an attempt to simplify the task, the interviewer may have made it even more difficult, as it is likely that June does not watch television in this manner in her everyday life (i.e., rather than just watching and understanding what is occurring, trying to focus on exactly what she is seeing on a moment-to-moment basis). Immediately after this task was explained to her, she began to tell the interviewer what she was currently seeing on television, trying to update as the scenes on the television rapidly changed. The instructions were then re-explained.

For the first beep, a man was talking on the Florence Henderson Show about performing at a fair in Seattle. The camera angle was a fairly close shot of only the man. At the moment of the beep, June did not initially react. It is not certain if June heard and/or processed the beep, and if so, to what extent. After about two seconds, the interviewer turned to her and asked what she was seeing on the television at the moment of the beep. She said "they were just having a conversation." When June was asked if

there were both Florence Henderson and the man, or just one or the other on the screen at the moment of the beep June stated that it was both of them. Both of them were on the screen while June was describing this beep, but not at the beep. When asked who was talking at the moment of the beep, June said the man was. She could not describe any other details without relying on actually looking at the man on television as she described the scene.

The interviewer re-explained the procedure before the next beep, emphasizing freezing the visual scene at the moment of the beep. At the moment of the beep, there was a commercial with a child of about 7 years of age talking about autism. June accurately stated that there was a little boy talking about autism at the moment of the beep. The interview was then interrupted by the entrance of a staff member. She spoke with June and the interviewer for approximately 3 minutes and then left. June was asked if she remembered what had been on the television at the moment of the beep and she stated that she did not remember.

Upon returning attention to the television, a new male guest was talking about his experience as a psychic. June spontaneously stated that it was the same man that was being interviewed before the commercial, but this was not true.

For the next beep, June again did not respond. After several seconds, the interviewer turned toward her. June said "I turned it off," which was accurate. June had not turned off the beeper instantly, but it was very shortly after the beep began to sound. The procedure was again re-explained to June.

For the next beep, the same male psychic was talking with Florence Henderson about an experience he had of talking to his grandmother after her death even though he had

never met her. The camera showed only him. June again did not respond initially until the interviewer looked at her. She then turned off the beep after the interviewer looked at her and stated that the man was explaining something about his grandmother. She said that she was seeing them in conversation. When asked if she was seeing both or one of them, she said she was seeing both of them at the moment of the beep. When this question was asked, both of them were on the television. June was directed to the moment of the beep, but still stated that she was seeing both of them.

June then seemed a bit distressed. She stated that “I don’t know if I’m just getting old or my mind’s not working, but T.V. doesn’t make sense to me.”

There are three potential explanations for these results:

1. June continued to have difficulty understanding the procedure. The nature of this misunderstanding will be discussed at the end of this day’s summary.
2. June could not adequately “freeze” her experience, as she often confused what she was seeing while describing the beep with what was occurring at the moment of the beep.
3. June did not have any awareness of what she was seeing, and therefore could not respond adequately to the beep.

June’s third task followed her request to switch to a television channel that plays easy listening music. This channel had music accompanied by still pictures, sometimes of the musician, other times of nature scenes. The pictures lasted about 20 to 40 seconds before switching to the next picture. June was asked to attempt to memorize what she was seeing in the picture. She was then to describe what she had seen in the picture as soon as the television switched to a different picture. The first picture was in black and white and showed a man from chest up smirking somewhat. Around his face was a saxophone.

When the picture changed, the interviewer asked her to describe what she had just seen. She stated that there was a horn of some sort. When asked if he was holding the horn or not, she said he was (this was not accurate; the horn was somewhat suspended to frame his head). When asked if he was playing the horn, she said he was not (which was true). June stated, when asked, that his hair was dark (true). She said he did not have much of an expression (could be considered true), that he was sitting down holding the horn (the sitting down could not exactly be discerned from the picture), and that it was in black and white (true).

The same procedure was used for the next picture. It was of a man sitting down, holding a guitar, looking away from the viewpoint of the camera. The picture was “browened out” so that the picture appeared to be largely in brown and white. June was mostly correct in her description, although she had to be prompted with questions. She was slightly inaccurate when she said he was looking at the guitar rather than away from the viewpoint of the camera. She could not accurately name the instrument. She said it was a banjo or some kind of stringed instrument. It is unlikely that this was due to lack of knowledge of musical instruments as June’s father was a musician and she has always had a strong love of music. When asked if there was color, June said there was some color, but the colors were not bright, which was accurate, although she did not mention that everything had a brownish hue.

This suggests that:

1. June can form memories long enough to describe them somewhat accurately, although with some mistakes.
2. June may have benefited from trying to memorize the picture.

3. The beeper may be significantly distracting for June as she was largely successful in this task when no beeper was involved.

4. What occurs after the beep may distract June. Because there were only still pictures being shown rather than continual discussion or switching of camera angles on the television show, this task may have been a bit easier for June.

For the fourth task, June was read a list of one syllable nouns that was about twelve words long and was asked to identify which one was said right before the beeper sounded. Again, the interval between beeps was varied so that she could not get used to a pattern.

June did not understand this task. It was explained twice, and June said she would give it a try. For the first five trials, the words were read at a moderate pace, about two per second, stopping when the beep sounded. June was accurate in all of these trials. However, this may not represent her ability to respond to the beep as she simply needed to repeat the last word that she heard. Nevertheless, the procedure may have helped as an introduction to the next task.

The speed was then increased to as fast as the interviewer could read the words accurately, about three to four a second. June got the first trial correct. On the second trial, she could not remember. She was correct on the third trial. The interviewer then continued to read words after the beep sounded. On the next three trials, June was one word late (i.e., she identified the word that came just after the beep). On the next trial, she identified the word that came four words after the beep. June was then correct on the last three trials. June was asked if she could identify any of the words from the list about 5 minutes later as they were read several times. She could not. The interviewer told her

that they were all one syllable nouns and the first one was chair. Still, June could not identify any of the words, although she was not initially asked to remember them.

June's fifth task was a return to the task of describing what was on television when the beeper sounded. June immediately began to describe what she was seeing, even though no beep had sounded. The procedure was re-explained three times. June stated that she was not certain if she understood, but would do her best.

The first beep for this task occurred during a commercial for John McCain. June did not initially respond to the beep. After a short period (about two seconds), the interviewer asked her what she was experiencing at the moment of the beep. At the moment of the beep, John McCain was shaking hands with someone. When asked, June said she did not know what was at the moment of the beep, that her mind was "somewhere else." For the second beep, guests were being introduced on the Dr. Phil show. At the moment of the beep, a woman was on screen being introduced. About a second after the beep, the camera switched to another person. June stated that they were discussing something but was not able to report what she was seeing at the moment of the beep. Again, June did not respond until the interviewer prompted her shortly after the beep began.

For the next beep, Dr. Phil was on the television, although they switched to another person about a half second after the beep. When asked what she was seeing on the television at the moment of the beep, June stated that they were having a controversy of some kind (which was true), but that she did not know what they were talking about and did not know what she was seeing at the moment of the beep.

June then stated that she was feeling somewhat confused and the interview was ended.

Discussion

The following are important issues that arose over the course of 6 days with June:

1. It is impossible to accurately investigate June's inner experience due to her inability to describe inner experience, focus on the moment of the beep during the standard DES procedure, and otherwise meaningfully engage in DES.

2. It is possible that June has no inner experience or very little inner experience. However, because she could not engage in the standard DES procedure in a meaningful way, this is difficult to answer. However, other reasons for her difficulty were apparent, so this can only remain a speculation.

3. June can do the following:

a. June can have seemingly normal conversation. The only abnormalities occur when issues of recent memory are discussed. Otherwise, she speaks quite well on a full range of topics.

b. June can hear the beeper. She can respond to it, but in a very inconsistent manner. She would usually not respond to the beeper until prompted additionally by the interviewer.

c. June can discuss generalizations about her experience, although it is impossible to discern if these generalizations are accurate.

d. June may be able to communicate the general topic she was thinking of at a given moment, but this seems unlikely due to her inability to engage in the process.

e. June can report what is occurring in her external environment at the moment of the beep, although this reporting is inconsistent. She has accurately reported the topic of conversation, numbers she was seeing on a card, words that were just said to her, and what was on the television at the moment of the beep. However, June also was inaccurate many times in all of these situations.

f. June can form memories (pictures on music channel) and immediately describe them with minimal detail and some inaccuracies.

Perhaps the most important question is why June had such substantial difficulty with DES? There are many potential reasons for this:

1. No or little inner experience – Individuals with no or very little inner experience often have substantial difficulty with DES.
2. Lack of understanding of the purpose of the beep/beeper – June repeatedly asked questions regarding the purpose of the beep/beeper. She also was frequently confused as to what to do when the beep sounded.
3. Problems with inhibition – At the outset of sampling days, June frequently simply began discussing what she was experiencing either throughout the day, the day before, or at that moment rather than waiting for the beeper. Furthermore, June frequently called out numbers on the number naming task prior to the beep, suggesting difficulty with inhibition.
4. Inability to “freeze” experience – June would often discuss her ongoing experience (internal and external) rather than freezing it at the moment of the beep.
5. Distraction after the beep – June had more difficulty with tasks where information was presented after the beep. Specifically, in the word naming task, she was much more

accurate when the interviewer stopped reading words at the beep compared to when the interviewer kept reading words. Of course, in the former case, June may have been responding to the cessation of the list rather than the beep itself.

6. Weak memory trace – June may not have been able to remember her experience long enough to communicate it post-beep.

7. Beeper destroys experience for June – June’s experience may have been completely destroyed by the beeper, making it difficult if not impossible to report.

8. Difficulty learning new tasks – June simply could not learn the DES procedure. Perhaps this is due to a deficiency in learning.

Another way to conceptualize June’s difficulty is to break down the processes that occur when one is involved in the DES procedure. The following is not meant to be an assertion that this is the definitive way that DES occurs, but it is one way to divide the process. These steps do not necessarily occur in this exact sequence and may overlap:

1. There is a welter of inner and outer processes ongoing in and around the person. Some may have more or less of this welter; some may have no inner or outer awareness. In June’s case, she is aware of her external environment at times. It is impossible to discern if she has inner experience.

2. Out of that welter, the more-or-less-normal person selects or transforms some part or parts to be “experienced” as DES defines the term. That is, they determine what is before the footlights of consciousness. This is a continuous and idiosyncratic stream of experiences. If June can do this, she cannot communicate it or it gets disrupted by the beep or she cannot remember long enough to communicate, etc. It is also not readily apparent if June has inner experience.

3. At some moment, in the welter, the beep sounds in the real physical environment.
4. Vibrations are collected by the pinna.
5. Collected vibrations are transduced, converted into neural impulses. June appears to have no problem with this as she exhibited no hearing problems throughout sampling.
6. Impulses are interpreted. The beep becomes part of awareness. This is somewhat unclear in June's case. She typically did not respond to the beep instantly or independently. Sometimes she responded to the beep, although typically she did not respond and needed to be notified by the interviewer to respond to the beep.
7. The participant then reports what was ongoing in experience just before the beep came into awareness. June cannot do this. Although she can sometimes report external experience, she can never report momentary inner experience.

Still, it is impossible to definitely state why June is having problems with the DES procedure. However, speculations can be made:

1. Hearing itself is not an issue for June, although efficiently processing the beep may be.
2. It is possible that June has no inner experience. Very often, individuals with no inner experience have substantial difficulty understanding the questioning involved in DES, including the concept of inner experience. However, it is also possible that June could not answer adequately due to cognitive difficulties. This is unlikely though because June appeared to have enough cognitive ability to get much closer to successfully engaging in DES. Therefore, a lack of inner experience is at least a likely partial explanation for June's problems with DES.

3. Problems with inhibition cannot entirely explain June's difficulties. Although inhibition was a problem at times throughout sampling, it does not explain why June could not understand "moment of the beep" or understand the function of the beep/beeper.

4. Inability to freeze inner experience may be a problem, but again, it cannot account for everything. June could freeze external experience under the right circumstances.

5. Memory problems were present, but do not account for all of June's problems with DES. If memory was the only difficulty, it is likely that a substantial variation in June's ability to respond to the beep would be observed as a function of the length of time since instruction. June had difficulty whether the instructions were given to her just before the beep sounded or if the beep sounded after a substantial period of time since instruction. One alternative explanation is that June's working memory is so poor that memory is substantially deficient within seconds. June's ability to engage so meaningfully in conversation suggests that this is not the case.

6. June was almost always confused by what her task was in DES, the point of the beeper/beep, the meaning of "moment of the beep," and the meaning of "inner experience." There was a definite problem in comprehension and learning with DES that was not apparent in casual conversation. It is possible that the task was too unusual and/or unnatural for her to understand.

CHAPTER 14

IMPAIRED PARTICIPANT “KAREN”

Karen was an 88-year-old Caucasian female. She lived alone, but received assistance from her daughter and son-in-law. She was not diagnosed with a cognitive disability or neurodegenerative disease, but she did appear to exhibit some cognitive deficiencies. She scored a 21 on the MMSE, missing all items related to working memory and attention. This score suggests that moderate cognitive dysfunction is indeed present, specifically in the areas of working memory and attention. A total of 14 beeped experiences were discussed over the course of 3 days.

Four beeps were discussed on the first sampling day. Karen was not able to wear the earphones with the beeper due to wearing hearing aids in both ears. Therefore, the beep was delivered through an external speaker. The volume of the speaker was adjusted to be comfortably loud, but using the external speaker rather than the earphone may have complicated the process for her.

On the first day, Karen had substantial difficulty understanding her task as a participant in this study. Upon inquiring about the first beep, Karen stated that she wakes up at night thinking about different things, such as her children. Specifically, she stated that she wonders why her son had to die so young. Karen was not wearing the beeper at the time of this experience, and therefore clearly misunderstood what the interviewers were asking. Furthermore, this indicated that Karen did not initially have a clear

understanding why the interviewers were in her house, why she wore the beeper the previous day, and what function the beeper served.

Karen's daughter stated that when the beeper would sound, Karen would look to her for instruction. This further indicated that Karen did not understand the purpose of the beeper. Eventually, it appeared as if Karen began to gain a limited understanding of the function of the beeper and the function of the interview. For example, she began talking about her inner experience at or around the moment of the beep.

It is extremely unlikely that Karen's reports were about experiences actually ongoing at the moment of the beep on the first sampling day. First, since it seems that she did not understand the function of the beeper at the time of the interview, it is highly unlikely that she understood its function while wearing the beeper the previous day. Second, she often described her inner experience by referring to self-generalizations. For example, during the description of the first beep she stated that when she sits in her chair she often worries about people breaking into her home. Although it is possible that she was thinking about this topic at the moment of the beep, she seemed to present it as a self-generalization. Third, Karen was quick to agree with the interviewers when they made suggestions regarding her inner experience. For example, when the interviewer asked her if she was thinking about a key to the screen door in the first beep, she confirmed this hypothesis. Likewise, when the interviewer suggested that she was feeling afraid during this beep, she agreed with this as well. This could be indicative of a misunderstanding of the procedure, a lack of a firm grasp on the memory of her experience, an absence of inner experience or lack of clarity in her inner experience for which she tries to compensate, or a general cognitive malleability. Fourth, it seemed clear that Karen was

unable to focus on the moment of the beep. She described her experience at the moment of the beep in a manner that suggested she was describing a few seconds of experience rather than a moment. For example, when describing the third beep, she stated that she was thinking about questions a man was going to ask her. She stated that she was thinking about several questions in a sequence rather than one in particular that would have been caught at the moment of the beep. Likewise, during beep one, she described thinking about people breaking into her house, wondering what to do if this even occurred, and feeling afraid. Although multiple awareness is not uncommon, in this case it appeared to be due to either a misunderstanding of the task or an inability to focus and report her inner experience at a particular moment. Fifth, Karen appeared to have the belief that her inner experience had to be congruent with reality. For example, on the fourth beep, Karen was describing an inner seeing of her great-grandson. When asked for the colors in the inner seeing she said that she would go get the picture to show the interviewers. It is entirely possible that Karen was having the inner experience of the picture in her room, but this may also indicate that she was describing the picture rather than her inner experience. Sixth, it did not appear that Karen recorded information in her notebook that was relative to each beeped moment. She seemed to record generalizations about herself or what she was experiencing in general around the moment of the beep rather than at the moment of the beep. Finally, Karen was somewhat tangential during the interview process on the first day of sampling. She often seemed more interested in talking about things she was interested in, such as her family and the television shows she enjoys, rather than her inner experience at each beep.

In sum, this interview allowed the interviewers little insight into the nature of Karen's inner experience, if any inner experience exists. However, the first day of sampling is primarily used for training and often does not yield reliable reports of inner experience. Nevertheless, Karen did exhibit more difficulties than is common on the first day of sampling.

Four beeps were discussed on the second day of sampling. On this day Karen continued to have difficulty understanding the task and focusing on her experience at the moment of the beep. Her reports were also unreliable due to the use of generalizations and the ease with which she was led by the interviewers.

During Beep 2.1, Karen described inner experience that seemed to be vaguely around the moment of the beep, but was not able to focus on the beep. She described watching television and watching a news report about earthquakes, but could not describe exactly what was on the television at the time of the beep. Rather, she spoke in general about what was on television at and around the beep (i.e., earthquakes). This was similar to the first day of sampling when Karen spoke in generalizations about external reality (i.e., watching television about earthquakes) rather than inner experience.

At the beginning of Beep 2.2, Karen seemed unsure of what to describe and had to be prompted by her daughter to report her awareness at the beep. She initially stated that she was not thinking of anything at the moment of this beep. Shortly later she stated that she was wondering why the television show at this beep was so much different from the one during Beep 2.1. Ultimately, Karen reported that she could not remember what was happening at this beep.

At Beep 2.3 she was watching television, but could not recall which program was on television at the moment of the beep. She stated that she was confused as to why a different program was on and was aware of this at the moment of the beep. She could not describe how this confusion was experienced however. She also said she was confused about the images on the television changing too fast. Again, these reports seemed to be generalizations about external reality. Furthermore, it was difficult to tell whether Karen was actually confused at the moment of the beep or was experiencing confusion at the moment of the beep as she was often contradictory in her reports about this and was easily led.

At Beep 2.4, Karen said she was still sitting in her chair. She had trouble again describing the moment of the beep. She said that she was waiting for a television program at the beep and it was dinner time and she had a good dinner. Eventually Karen verified that she was watching television at the moment of the beep and wondering if the next program was coming on. She also stated that she was a little bothered after the interviewer suggested the possibility of being bothered. When asked if she experienced being bothered in her chest, she said she is not allowed to feel bothered in her chest because that may negatively affect her pace maker. She then said she was thinking about eating dinner at the moment of the beep. Karen's inconsistency during her reports suggests that she was not at all able to describe inner experience at the moment of this beep.

At Beep 2.5 Karen was watching a childrens' program but was not too focused on the program. She said she was wondering if she wanted to watch the program or change it. Due to Karen's difficulties with DES and the length of the interview, the interview was

terminated at this point without further questioning. Therefore, the report of this beep can not be taken to be reliable.

The procedure was changed on the third day because Karen had had substantial difficulties with the procedure on the previous two days. On this third day, the interviewer sat with Karen in her living room while she wore the beeper so that he could immediately interview her when the beep sounded. This reduced the length of retrospection required for Karen to remember what was in her experience at the moment of the beep. This procedure also allowed the interviewer to know what was occurring in the external environment at the moment of the beep (because the beep was delivered by an external speaker), allowing him to verify any comments that might be made about the external environment at the moment of the beep. Karen sat in her chair during the entire sampling day and either read or engaged in conversation with her daughter or the interviewer. Six samples were discussed on the third sampling day.

Although this reduction of retrospectiveness seemed to help somewhat, Karen's reports were still highly unreliable and her ability to focus on the moment of the beep also remained tenuous. Karen seemed more convincing about the content of her awareness in general as it occurred near the moment of the beep, but little else. She could not reliably answer questions regarding the specifics of the content or form of her experience, and continued to be easily persuaded as she was during other interview days. She also could not orient her self to the moment of the beep exactly.

When asking questions about form throughout Karen's interviews, she responded in a way that suggested that she did not understand the question. Almost every time she

would return to talking about the content of the beep or reality as it related to her inner experience.

Below are two examples of the six samples taken from day three that are representative of that day:

Beep 3.1 – At the moment of the beep, Karen was in the act of talking about people from Pennsylvania and their idiosyncratic language. Before asking about Karen’s inner experience, which is the usual DES procedure and had been the procedure on the first two sampling days, the interviewer asked Karen what she was doing when the beep sounded. This question allowed the interviewer to determine if Karen had the ability to accurately report her behavior at the moment of the beep (which was observed by the interviewer and therefore verifiable). Karen was able to respond correctly in general (discussing if people from Pennsylvania have a language of their own) but could not identify her exact words or where within those words the beep fell. Then the investigator inquired about Karen’s experience at the moment of the beep. Karen frequently changed her reports about her inner experience at the moment of the beep, but her reports always had something to do with Pennsylvania and/or people who live in Pennsylvania. She alternately agreed with many of the suggestions the interviewer made regarding her experience at the moment of the beep (how people in Pennsylvania dress, thinking about children in Pennsylvania, trying to explain to her daughter the different cultures in Pennsylvania). Karen could not focus on the exact moment of the beep, nor could she answer any questions related to form. Therefore, her reports of this experience did not seem trustworthy.

Beep 3.2 – Karen was reading. She reported that she was thinking about the wedding in Jerusalem she was reading about at the moment of the beep. When asked a question about the form of this experience, she stated that she was thinking about her daughter’s wedding. She then returned to saying that she was thinking about the wedding in the book. Next, she said she was thinking about both. These changes all occurred within a minute of one another and were largely influenced by details in the interviewer’s questions. The interviewer repeatedly tried to orient her to the moment of the beep. Karen stated that she could not orient herself to the exact moment, but could comment on what was in her awareness near the moment of the beep (within a few seconds). She also stated that she was comparing her daughter’s wedding to the one in the book near the book. This inconsistency makes her report of this sample unreliable.

Discussion

It seems clear from sampling with Karen for three days that she could not adequately complete the task. Her difficulties occurred on a variety of levels (i.e., difficulty focusing on the moment of the beep, focusing on external reality rather than inner experience, not being able to answer questions about form, etc.). The majority of these difficulties may be directly related to Karen’s cognitive difficulties, specifically with working memory and attention, as demonstrated by the MMSE. Although Karen improved somewhat when memory demands were reduced by interviewing her directly after the beep, she still was not able to adequately complete the task, suggesting cognitive deficits other than memory interfering with her ability to do the task. Below are some speculations regarding Karen’s inner experience and ability to perform the DES task:

1. Although it appears to be an unlikely possibility, Karen may not have understood the DES task. Although Karen had difficulty understanding the task at first, she seemed to understand it fairly well on the third day of sampling.

2. Karen may not have been able to narrow her focus to the moment of the beep, and thus could not give reliable reports. This appears to be a likely partial explanation for Karen's difficulties. She often directly reported that she could not report what was occurring in her inner experience at the moment of the beep, but instead what was near the moment of the beep. Her reports also fluctuated frequently, suggesting the possibility that she was reporting on a time frame significantly larger than a "moment."

3. Karen may not have inner experience. This is a significant possibility. Individuals who seem to have difficulty understanding the DES procedure and reporting inner experience often seem to not have inner experience. Karen's inability to discuss form and the fact that she was easily led by the interviewers is often possible evidence for a lack of inner experience.

4. Karen may lack inner experience in some way. It is possible that Karen has some inner experience, but that it lacks clarity and/or differentiation or is rarely present. This would likely make the DES procedure quite difficult. Again, the fact that Karen could not adequately discuss form and was easily led suggests that her inner experience may be lacking in some way.

CHAPTER 15

IMPAIRED PARTICIPANT "LILLY"

Lilly was a 92 year old woman who was diagnosed with AD in 2001 and has a Master's degree. The interviewer met her and her daughter at an assisted living facility in Ohio designed specifically for individuals with AD where Lilly lives. Lilly and her daughter were very willing to be engaged in the study.

After briefly explaining the DES procedure, both Lilly and her daughter signed the consent form (Lilly's daughter has power of attorney for Lilly). Lilly had significant difficulty signing the document as she is legally blind and exhibited some substantial short term memory impairment during the early stages of this initial meeting, such as forgetting the interviewer's name and the content of a very recent conversation.

Lilly was then given the MMSE. She received a score of 19, suggesting the presence moderate dementia. She had the most difficulty with time orientation, only knowing the season but not the year, date, day of the week, or month. She also had significant problems with delayed recall. When asked if she remembered the three words the interviewer had her repeat approximately one minute prior, she said that she did not even remember that the interviewer had her repeat three words. Lilly did very well with attention and calculation, spelling "world" backward with relative ease, although she later forgot that she had done so. Lilly could not write a sentence or copy a design, but this

may have been at least partially due to Lilly's vision impairment. Therefore, Lilly's MMSE score may slightly underestimate her cognitive ability.

Lilly then immediately underwent the DES process in the presence of the interviewer and her two daughters. While she wore the beeper, she conversed with her daughters while the interviewer waited nearby.

At the first beep, Lilly and her daughters were discussing a television commercial that one of their relatives was recently in. Lilly stated that she was paying attention to what her daughters were saying at the moment of the beep, but could not recall what they were saying. When asked what she was experiencing at the moment of the beep, Lilly did not think that she was experiencing anything, but was not certain.

After this beep, the interviewer asked Lilly to visually imagine her childhood house. After she stated that she was innerly seeing it, the interviewer asked Lilly to report what she was seeing in her picture. She said that the picture was not very clear, although it was not fuzzy. She could not describe exactly how it was not clear. She was seeing the front corner of the outside of the house so that she could see both the front and side of the house. There seemed to be two doors and two windows in her inner seeing. The house was "sort of green." At one point she said that she was seeing a garage of a faded rust color, but later did not indicate that this was in her inner seeing when asked. Later, Lilly's daughter volunteered that what Lilly was describing was not accurate, that it sounded like a conglomeration of houses: her childhood house, a house she lived at as an adult, and her sister's house. This is not evidence against the validity of Lilly's description as she very well could have combined these places in her inner seeing. However, she had many inconsistencies throughout the description which suggests that

she may have not been innerly seeing at all or if she was it was not very detailed or clear, or was transient.

The interviewer and Lilly's daughters heard the second beep before Lilly responded. It seemed to be sounding for about 5 seconds when it was brought to Lilly's attention. This is interesting in that Lilly exhibited no or very little hearing problems for the hour the interviewer spent with her. When the interviewer asked what she was experiencing right before he brought the fact that the beeper was sounding to her attention, she stated that she was thinking that she had forgotten she had the beeper on. The interviewer pointed out that this must have come after the beep. When asked what was in her experience just prior to the beep, Lilly stated that she did not know. Although Lilly's auditory processing appeared intact, Lilly did not seem to be processing the beep on this occasion, at least enough to elicit a response.

On day two, Lilly did not remember the interviewer, although they had spent approximately 2 hours together 5 days earlier. She also did not remember anything about the DES process. Nevertheless, Lilly was very willing to engage in the study after it was described again to her.

In order to minimize distractions, sampling occurred in Lilly's room. The interviewer sat with Lilly throughout the process. There were some minimal distractions as the door to Lilly's room remained open and some noise in the facility could be heard, but this noise was minor and did not seem to distract her. However, between the second and third beeps, a resident of the facility came into Lilly's room. The interviewer called this to a staff member's attention, but she said that it was normal and Lilly was not distracted by him, although he stayed in the room for the remainder of the session.

Prior to the first beep, the interviewer turned Lilly's beeper on and off to ensure that she could hear the beeper. Every time the beeper was turned on, Lilly stated that she could hear it. She also appeared to have fairly normal hearing during conversation. Nevertheless, Lilly did not respond at all to the first beep (beep 2.1). The second beep (beep 2.2) also did not elicit a response. It occurred while Lilly was talking to the interviewer, saying something like "Some kids (beep) at the Montessori School..." In both cases, the interviewer allowed the beeper to beep continuously for approximately 1 minute, but Lilly still did not respond.

Beep 2.3 also occurred while Lilly was talking (saying something like "It's good for the children."). When asked she stated that she was puzzled at the moment of the beep. When asked what she was puzzled about, she stated that she was puzzled about the questions that the interviewer was asking. This seems unlikely because the interviewer was not asking her any questions at the moment of the beep, although she could have been ruminating about the questions that the interviewer asks and the purpose of the study. When asked, Lilly stated that there were no words or images in this experience, that she was just puzzled. She later stated that she was wondering what the beep meant when it sounded, but this was clearly a reaction to the beep.

Lilly could not remember what she was experiencing for the fourth beep (beep 2.4). At this moment, Lilly was sitting quietly while the interviewer was answering a question posed by the gentleman in Lilly's room. It is notable that it took Lilly about 5 seconds to respond to this beep.

Discussion

Sampling with Lilly was suspended after the second day. It did not appear possible to learn anything about her inner experience using the DES method. However, the obstacles experienced with Lilly may have lent some insight into difficulties using DES on individuals with moderate dementia. First, on three out of six occasions Lilly did not respond to the beep at all. This is especially interesting because Lilly had good hearing and if she did have hearing problems they were relatively minor. It appeared that the processing of the beep became compromised in a manner that did not involve hearing directly. A lack of this ability is a major obstacle to engaging effectively in the DES procedure as processing and responding to the beep is perhaps the most basic ability needed to engage in DES. Second, severe memory problems made sampling with Lilly nearly impossible. The training process would be very difficult (if not impossible) as Lilly could not remember what the beeper was for, or that she even underwent the process previously. It is possible that some implicit learning took place, but even this is not enough to overcome her severe memory problems. It is likely that this would be a difficulty that would be hard to overcome with people at her stage of dementia. Third, Lilly also had difficulty remembering what was in her experience at the moment of the beep even though she was interviewed immediately after the beep. This again is a very basic ability that is needed to begin to engage in the DES process. In spite of all of Lilly's cognitive difficulties it is still quite possible that she lacks inner experience based on the results of some of the other participants in this study. However, this is a speculation given that Lilly was nowhere near producing reliable reports of inner experience.

CHAPTER 16

ACROSS PARTICIPANTS RESULTS AND DISCUSSION

The Ability of Older Individuals to Participate in DES

This study was designed to investigate the inner experience of older individuals with and without cognitive impairment. There have been no prior DES studies of older individuals and therefore there was no guarantee that any of the participants would be able to produce reports of momentary inner experience that the researchers would take to be reliable. In order to discover anything about an individual's inner experience via DES he or she must first have the cognitive, linguistic, and sensory abilities to understand the task, hear and respond to the beep, and describe momentary inner experience. Table 7 briefly summarizes each participant's MMSE score, diagnosis, and DES performance:

Table 7
Participants' ability to do DES

Participant	MMSE/Diagnosis	Ability to Perform DES?
Anna	30/None	Yes
Benjamin	30/None	Yes
Clara	30/None	Yes
Dolly	30/None	Yes
Ellen	30/None	Some
Fay	30/None	No
Gary	29/VaD	Yes
Henry	29/VaD	No
Irving	27/MCI	No
June	23/MCI	No
Karen	21/None ^a	No
Lilly	19/AD	No

^aAlthough Karen had no official diagnosis she had clear cognitive impairment and at least had MCI although there was the possibility of the presence of another age-related neurodegenerative disorder.

DES Performance and Diagnosis

As can be seen in Table 7, four of the six non-diagnosed participants (Anna, Benjamin, Clara, and Dolly) had no more than typical problems producing reliable reports of momentary inner experience. Benjamin and Clara were especially adept at DES. Benjamin was able to narrow his conception of “moment of the beep” to a very small period of time and was very detailed in his descriptions. Clara was able to produce reliable reports from the first day of sampling to the last. Anna and Dolly’s ability to perform the DES task successfully was fairly typical. Therefore it is clear that at least some older individuals can participate in DES adequately.

However, Ellen and Fay, two individuals who had no diagnosis of age-related cognitive impairment and no observable cognitive impairment (MMSE of 30) had substantial difficulty engaging successfully in DES. Although some younger individuals cannot engage successfully in DES it would be unlikely that two out of six would not be

able to do so. Ellen produced questionable although not uniformly unreliable reports during all six of her sampling days even though she did not have an age-related neurodegenerative diagnosis, scored a perfect 30 out of 30 on the MMSE, and did not exhibit any obvious cognitive, linguistic, or sensory impairments in casual conversation. She was frequently contradictory in her reports and had an especially difficult time describing the form of her experience. Her reports were often disorganized and she routinely became frustrated with the persistent questions of the interviewers. Ellen's DES difficulty could represent some underlying cognitive impairment that is common in normal aging. For example, her disorganization could represent problems with executive function, a common area of deficit in normal aging even for individuals who show no impairment on the MMSE (Royall et al., 2000).

Fay's reports were entirely unreliable throughout all sampling days even though she scored a perfect 30 on the MMSE and exhibited no apparent cognitive impairment. This pattern continued even when she was interviewed directly after the beep. Her reports exhibited substantial inconsistency, she seemingly could not narrow her focus to the moment of the beep, and she often reported external reality rather than inner experience when interviewed. These problems continued even when Fay was interviewed immediately after the beep (thus reducing potential problems with memory). Because Fay exhibited no noticeable cognitive problems outside of DES, a cognitive explanation for her difficulties is not easy, although it is possible that DES is sensitive to a cognitive impairment that is not readily observable via the MMSE or in casual conversation. It is also possible that the struggles of both Ellen and Fay are due to some aspect of their inner experience. This possibility is discussed in more detail below.

Only one of the six individuals with cognitive impairment was able to engage successfully in DES. Gary, a 70 year-old male with a diagnosis of VaD and a 29 on the MMSE had some substantial difficulties during the first 2 days of sampling but produced consistent and seemingly reliable reports starting on the third day of sampling. Thus the presence of an age-related neurodegenerative diagnosis does not categorically rule out the use of DES. However, the other five impaired individuals did not produce a single reliable report.

Henry, like Gary, had a 29 on the MMSE (suggesting very little or no cognitive impairment) and a diagnosis of VaD. However, unlike Gary, Henry could not produce any reliable reports on any of his samples. He frequently reported generalizations about himself and his inner experience rather than momentary inner experience, and his reports were easily influenced by the interviewers. His reports were nearly always either directly contradictory or inconsistent. He also could not seem to narrow his focus to the moment of the beep, frequently reporting what occurred a few seconds before and after the beep.

Thus two individuals, both with a diagnosis of VaD and both with a score of 29 on the MMSE, differed greatly in their ability to engage in DES adequately. This is perhaps not surprising because the cognitive effects of VaD are highly variable (Poore et al., 2006) and they are dependent on where in the brain the vascular event or events have occurred (Roman et al., 2004; Cummings & Benson, 1992). It is not known where Gary and Henry's cerebrovascular events had occurred. The variability between the adequacy of Gary's and Henry's reports could be due to cognitive impairment related to VaD, cognitive impairment not related to VaD, or some other factor that did not involve

cognitive impairment at all. For example, Henry may have had difficulty engaging in DES even prior to his cerebrovascular event.

Because diagnosis of VaD is often brought about by a specific event (i.e., a stroke), diagnosis often happens before pervasive cognitive impairment occurs. This potentially makes investigation of the inner experience of individuals with VaD more fruitful than with AD. Furthermore, although the cognitive symptoms of VaD are highly heterogeneous among individuals, there tends to be less memory impairment in VaD compared to AD, although there also tends to be more executive functioning deficiency in VaD compared to AD. It is possible that participation in DES is highly sensitive to problems with memory functioning but not as sensitive to problems with executive functioning, although this is highly speculative. Further use of DES with both diseases is necessary in order to come to a firm conclusion on these issues.

The two individuals with MCI (Irving and June) could not give adequate DES reports. Irving apparently never reported momentary inner experience and had substantial difficulty following instructions required in DES. Sometimes he did not respond to the beep at all. June also could not follow DES instructions and often had difficulty responding to the beep. Her difficulties with DES appeared more substantial than Irving's despite the fact that she could interact very well socially with only occasional signs of memory impairment. In responding to DES beeps, she often described external reality as opposed to inner experience, and frequently became frustrated with consistent attempts to probe inner experience. On one hand these results are not surprising, as individuals with MCI are susceptible to numerous cognitive impairments such as memory, executive function, and linguistic problems (Petersen, 2003) that would likely

have an adverse affect on DES. However, given June's lack of cognitive, linguistic, and social disturbance on the MMSE and in everyday conversation it is surprising that she had such significant difficulty with DES and was never close to producing a reliable report of inner experience. This again suggests that the ability to perform DES is highly sensitive to cognitive disturbance.

Although Karen was not diagnosed with an age-related neurodegenerative disorder she received the second lowest score on the MMSE (21) of all individuals in this study. This score suggests moderate cognitive impairment. Karen had particular difficulty with the attention and working memory sections of the MMSE, and her difficulties could be seen clinically, even though they had not been diagnosed. Because attention and working memory are important when engaging in the DES process, it is not surprising that Karen could not produce reliable DES reports. Karen's problems with DES occurred on a number of levels such as difficulty focusing on the moment of the beep, discussing external reality rather than her inner experience during interviews, and having particular difficulties with questions about form.

Therefore, the two individuals with MCI and the one individual with at least MCI could not produce a single reliable report of inner experience via DES. This is a very small sample, so it does not, of course, rule out the possibility that some individuals with MCI might be able to participate adequately in the DES process. These three individuals seemingly had enough verbal fluency, working memory, attention, and conceptual ability to perform the DES task but still could not produce a single reliable DES report. The likelihood that individuals with MCI are able to engage in DES meaningfully compared to individuals with AD is much greater as there are, by definition, fewer cognitive deficits

and a higher level of functioning in MCI compared to AD. Still, because none of these individuals produced a single reliable sample it is possible that very few individuals with MCI can perform the DES task successfully because even some older individuals with apparently no cognitive impairment had significant problems doing DES. Therefore, it is likely that only a small percentage of individuals with MCI could perform the DES task adequately.

Finally, Lilly had by far the most difficulty with DES. Lilly was diagnosed with AD in 2001 and received a score of 19 on the MMSE suggesting moderate dementia. Lilly's cognitive deficiencies made it impossible for her to learn the DES process as she often could not remember recent conversations. She also could not maintain any memories of what occurred at the moment of the beep even when interviewed immediately after the moment of the beep.

It is unwise to generalize from a single case, but Lilly had such substantial difficulty with DES that it suggests that individuals who are impaired enough to receive a diagnosis of AD may not be able to perform the DES task successfully. DES requires cognitive skills that are likely to have been depleted even before the earliest clinical stages of AD. For example, DES requires the use of episodic memory (i.e., remembering one's momentary experience from the near past), organization and inhibition (i.e., making distinctions between what was in inner experience at the moment of the beep rather than near the moment of the beep, what was actually in one's awareness rather than one's preconceptions about inner experience, and distinguishing between what was in one's inner experience and what was in one's environment that was not in inner experience), and language (i.e., being able to report adequately what was in one's inner experience at

the moment of the beep). All of these factors may have had a role in Lilly's difficulty with DES. However, Lilly's memory impairment was most noteworthy. For example, during the administration of the delayed recall portion of the MMSE where individuals are asked to recall three words that were read to the participant about a minute prior, Lilly did not remember that the interviewer read three words to her. This extreme degeneration of memory clearly interfered with the DES procedure as this individual could not remember the DES procedure and repeatedly inquired about the reason the interviewer was asking her questions.

It is significant that even though she had mild to moderate AD, Lilly received a diagnosis of AD approximately 7 years prior to engaging in DES. Perhaps if she engaged in DES shortly after diagnosis she would have been able to meaningfully participate in the procedure. Clearly more research with individuals diagnosed with AD is important to fully answer this question, specifically with individuals who are in the very early stages of the disease. Even though only one individual in this study had AD she was so far away from successfully engaging in DES that it seems possible that very few individuals with enough cognitive impairment to be diagnosed with AD could adequately engage in DES. Still, this conclusion is highly tentative as Lilly is the only individual with AD to ever try DES.

It is clear that there was a high amount of variability across participants in their ability to produce reliable reports of momentary inner experience. This variability is not surprising as there is substantial variability in cognitive abilities across older individuals and this variability increases with age (Christensen, 2001; Hedden & Gabrieli, 2004). This variability is also expected because individuals in this study had a wide range of

type and extent of cognitive impairment. Furthermore, DES requires some basic cognitive abilities that are commonly impaired in both normal aging and in individuals with age-related neurodegenerative disorders such as episodic memory, learning, and expressive language ability. Therefore, some difficulties in performing the DES procedure adequately are expected even in the unimpaired participants.

However, it should not be assumed that the variability in the production of reliable reports is entirely explained by variability in cognitive abilities across these participants. For example, Gary received a 29 on the MMSE and was diagnosed with VaD but seemed to be able to produce reliable reports of momentary inner experience by the third day of sampling. However, Ellen and Fay each scored a perfect 30 on the MMSE, did not have a diagnosis of a neurodegenerative disorder, and did not exhibit any cognitive impairment outside of DES. Nevertheless, Ellen could not consistently produce reliable reports of inner experience while Fay was entirely unable to produce reliable reports. The MMSE is somewhat of a crude instrument in terms of detecting cognitive impairment so it is certainly possible that Fay and Ellen have cognitive impairment, but they exhibited no signs of cognitive impairment other than their DES performance.

Likewise, Henry, who had the same MMSE score as Gary (29) and the same diagnosis (VaD), could not produce a single reliable report of inner experience. Both of these individuals displayed no cognitive impairment in casual conversation although both of their spouses observed some mild to moderate impairment in their husbands. Therefore, what separates older individuals who can perform the DES task successfully, who can do it with some difficulty, and who cannot seem to do it at all remains unclear. Some possibilities include subtle deficits in cognitive functions such as memory,

executive functioning, and language, sensory problems that make processing the beep difficult, and a degradation of some or all aspects of inner experience itself. There may be other possibilities, but further investigation is needed to determine this.

DES and MMSE score

It is also likely that DES is extremely sensitive to cognitive impairment. Although more research with older individuals needs to be done to make a definitive conclusion, it appears that the ability to perform the DES task successfully may go from one hundred percent to zero percent at some point around an MMSE score of 29 or 30. Therefore, the MMSE may be a useful screening tool in ruling out individuals who cannot perform the DES task successfully. The four individuals who could perform the DES task successfully with no more than normal difficulties had MMSE scores of 30. The one individual who experienced only slightly more difficulty had a score of 29 on the MMSE. Shiela produced some reliable reports and had an MMSE score of 30. The other six individuals produced no reliable samples. The MMSE scores of these individuals were 30, 29, 27, 23, 21, and 19. Therefore the four individuals with the lowest MMSE scores could not perform the DES task successfully and no one with a score lower than 29 could perform the DES task successfully. This suggests that only individuals who score in the high 20's or 30 on the MMSE can perform the DES task successfully while those in the mid-twenties and below may not be able to perform the DES task successfully.

DES and memory disturbance

Because memory deficits are known to be common in the population from which the participants in this study were drawn, whenever a participant had such substantial difficulty producing reliable reports via DES an attempt was made to minimize the DES

memory requirements by altering the standard DES procedure to interview participants immediately after each beep. These individuals included Fay, Henry, Irving, June, Karen, and Lilly. However, interviewing immediately after the beep produced no improvements in DES performance: not a single participant appeared to benefit from this alteration. This significantly reduces the probability that failure in prolonged long-term memory storage was a reason for these individuals' inability to engage in DES.

Failure or delay in responding

At times some participants (Irving, June, and Lilly) were delayed in responding to the beep or did not respond to the beep at all. Irving, June, and Lilly showed few or no signs of problems with hearing. Irving wore a hearing aid and demonstrated some hearing problems but they were mild. All of these participants, at times, had more difficulty than would be expected responding to the beep in relation to their level of hearing. One explanation for this is that there is some difficulty with central auditory processing (CAP).

CAP refers to one's ability to process auditory information independent of the ability to hear (Davignon & Leshowitz, 1986). CAP is largely controlled by auditory association areas in the cortex. CAP difficulties are present in elderly individuals at an increased rate of approximately 50 percent compared to non-elderly individuals (Strouse, Hall, & Burger, 1995). CAP typically decreases somewhat during the fifth and sixth decades, but often declines sharply in the seventh decade (Humes & Christopherson, 1991). Difficulties with CAP in older individuals and with individuals with AD are often cited as at least partial explanations for difficulties with auditory memory and auditory learning (Lund, 1997).

Older adults with mild to moderate cognitive deficiencies often show a slowed pre-conscious brain response to auditory information (Pekkonen et al., 1999). Older individuals, and even more so individuals with AD, often have deficiencies in communication between the cerebral hemispheres. This may cause auditory information from one ear to be processed inefficiently in the opposite hemisphere (Pekkonen et al., 1995). EEG responses to a tone that modulates from 875 to 1175 Hz are different even in middle adulthood compared to early adulthood (Poulsen, Picton, & Paus, 2007).

Difficulties with CAP and its underlying biological abnormalities could both help explain the problems that some individuals in the current study. Lilly and Irving both had incidences where they did not respond to the beep at all. June consistently had delays in her responses. It is certainly possible that these individuals have problems with CAP that translate to the successful processing of the beep despite relatively normal hearing, especially since they each exhibited some cognitive deficiencies.

Aging deficits in hearing are often frequency-specific. That is, age-related hearing loss begins with high frequencies, such as 2,000 hertz and higher (Helzner et al., 1995). In one large study with over 2,000 participants with a mean age of 77.5 years, 77 percent exhibited hearing loss with frequencies over 2,000 hertz (Helzner et al., 1995). Still, 60 percent of these individuals exhibited hearing loss between 500 and 2,000 hertz. However, the 500 to 2000 hertz frequencies were tested at 25 decibels, approximately the sound of a whisper or a quiet library. It is impossible to tell exactly where the volume of the beeper was set with each participant, although it was either at the maximum level or near the maximum level in those participants who had difficulty responding. Still, in each of these cases, the decibel level of the beep was at least 60, which is the level of

normal conversation and much louder than those tones used in the study above.

Although it is possible that those individuals who had difficulty responding to the beep had hearing loss that affected the 700 hertz frequency it is unlikely as hearing loss at such a frequency would likely be readily apparent in normal conversation.

Deficiencies in attention and inhibition could also help explain some of the problems that some participants had responding to the beeper. Substantial deficits with attention and inhibition are well documented in AD (see Perry & Hodges, 1999 for a review). Specifically, deficiencies in switching attention seem to be the first that are evident and the most substantial in AD (Norman & Shallice, 1987). Attention deficits can be seen in normal aging as well (Pignatti et al., 2005). Although only 1 participant in the study was actually diagnosed with AD, the others who had difficulty responding to the beep all experienced some cognitive impairment that could be a pre-cursor to AD or other form of dementia.

DES requires one to not only pay attention to the beep itself, but to switch attention from what was being attended to before the beep, to the beep, then to inner experience that was occurring before the beep. Although this may not explain situations in which participants did not respond at all, it certainly could explain instances in which response to the beep was slow. Furthermore, this slowness could help explain inaccuracies, inconsistencies, and other difficulties exhibited by many of the individuals with cognitive impairment in the current study.

A general slowing in cognitive processing is well documented in normal aging and significantly in AD. Some propose that many of the cognitive deficiencies associated with AD are due to a general slowing in processing speed (Baddeley et al., 2001).

Because DES requires instant, immediate retrospection, any slowing in cognition could make this process more difficult. If participants were experiencing a general slowing of cognitive processing, this could not only explain a delayed reaction to the beep, but also difficulty performing the task adequately.

Although there is some conflicting research, it appears that reaction time is also compromised in individuals with AD, VaD (Mendez, Cherrier, & Perryman, 1997), and normal elderly individuals, and is often viewed as a sign of a decrease in executive functioning (DiFabio et al., 2005). Muller, Richter, Weisbold, and Klingberg (1991) found that individuals with mild dementia showed a 23 percent increase in response time to visual stimuli (flashes) and a 34 percent increase in time to respond to auditory stimuli (clicks) compared to normal elderly controls. However, healthy controls did not show increases in RT in these two conditions compared to healthy younger controls, although they did have a 49 percent increase in RT in when asked to respond to complex visual stimuli (i.e., participants respond only when a four digit display showed all zeros). DES is a task that requires participants to react to the beep quickly. Therefore, a deficiency in reaction time in older individuals and individuals with mild AD could compromise the success of undergoing the DES process.

Learning difficulties are also common in AD, and to a lesser extent, normal aging. Specifically, auditory learning is compromised in normal aging, perhaps due to deficiencies in working memory (for a review, see Lund, 1997). Individuals who had difficulty in this study appeared to benefit little from repeated exposure to DES, suggesting that learning was not adequately taking place. However, this lack of learning could be due to a variety of things, such as inflexible pre-suppositions, the absence of

inner experience, and/or the lack of differentiated inner experience. Nevertheless, learning difficulties could also be a partial explanation for the difficulties these individuals experienced.

Summary

To summarize, the following things were learned about the ability of older individuals with and without cognitive impairment to perform DES:

1. Some older individuals are easily able to perform the DES task successfully.
2. There is substantial variability among older individuals with apparently intact cognitive functioning regarding ability to perform the DES task successfully. Many individuals in this group could perform the DES task successfully with no problems while some could not produce a single reliable report.
3. Some individuals with VaD can perform the DES task successfully while some apparently cannot. Because some individuals with VaD are able to perform the DES task successfully it may be fruitful to explore the inner experience of this population in the future via DES.
4. Individuals with MCI likely have significant difficulty engaging successfully in DES and none in this study could produce a single reliable report. It is likely that only a small percentage of individuals with MCI can perform the DES task successfully although more research is needed in this area.
5. Individuals with AD may not be able to perform the DES task successfully. The level of cognitive impairment that is needed for a diagnosis of AD may be too much to overcome to perform the DES task successfully but more investigation is needed to make a definitive statement.

6. The ability to perform the DES task successfully is related to MMSE score. It appears that only individuals who score in the high 20's and above on the MMSE can perform the DES task successfully, but this conclusion is tentative due to small sample size.

7. Eliminating a time delay between the beep and the interview has no beneficial effect on the reports of those who had difficulty doing DES, suggesting that memory impairment is not the only obstacle to this population in terms of engaging in DES successfully.

8. Based on older individuals' ability to perform the DES task successfully, DES may be useful as a very sensitive instrument to detect cognitive impairment; more research is needed in this area.

9. Some cognitively impaired individuals periodically have difficulty responding to the beep quickly or at all. There are many potential explanations of this. Further investigation is needed to make a conclusion as to why this might happen.

The Inner Experience of Older Individuals Who Could Perform the DES Task Successfully

This study had two goals: to explore the use of DES with older individuals (discussed above), and to explore the inner experience of older individuals with and without cognitive impairment, to which we now turn. We will approach this by considering first the characteristics of inner experience of those individuals who could perform the DES task and then speculating about the characteristics of inner experience of those who could not perform the DES task.

Six of the twelve participants produced some apparently reliable reports of inner experience. Table 8 gives the frequencies of forms of experience across these six older individuals as well as the frequencies found in a group of younger individuals:

Table 8
Percentage of characteristics across older and college-age individuals

Characteristic	Percentage in Older	Percentage in Younger ^a
Feeling	20	26
Feeling Fact of Body	2	<3
Inner Seeing	14	34
Imageless Seeing	1	<3
Inner Hearing	0	<3
Inner Speech	16	26
Just Doing	3	<3
Just Talking	1	<3
Laughing	1	<3
No Inner Experience	2	<3
Sensory Awareness	21	22
Unsymbolized Thinking	39	22
Unvocalized Inner Speech	4	<3
Worded Thinking	14	<3
Multiple Awareness	30	4 ^b
Number of samples	133	
Total number of characteristics ^c	209.5	
Characteristics per sample	1.58	

^aPercentages taken from Hurlburt and Heavey (2008)

^bValue comes from Hurlburt and Heavey (2008) but was not reported (personal communication)

^cTotal number of characteristics excludes categories that are not directly experienced (in this case, Feeling Fact of Body, Just Doing, Just Talking, Laughing, No Inner Experience, and Multiple Awareness), and counts uncertain instances as .5.

The following discussion of these characteristics must be regarded as highly speculative. There were very few participants in this study (six were able to participate in DES effectively), and this was by no means a random sample from the population of

older individuals. Nevertheless, it may be instructive to compare and contrast these individuals' experiences to those reported by Heavey and Hurlburt (2008).

Similarities between older and younger adults

Some of the older individuals in this study (Anna and Dolly, and to a lesser extent, Clara and Benjamin) apparently have inner experience very similar to that of younger individuals, including high clarity and differentiation of form and a wide range of form and content in inner experience. The five most common forms of inner experience that have been found in younger individuals (inner seeing, inner speech, unsymbolized thinking, feeling, and sensory awareness; Heavey & Hurlburt, 2008) were also the five most common in the current population (inner seeing and worded thinking were tied for fifth in frequency).

Unsymbolized thinking

However, there were differences between the inner experience of the older individuals in this study and the younger individuals in Heavey and Hurlburt's (2008) study. For example, unsymbolized thinking occurred in 39 percent of samples in this study compared to 22 percent in the college students in Heavey and Hurlburt (2008). Gary was the only individual of the six who could produce reliable reports who experienced unsymbolized thinking in less than 33 percent of his samples (8 percent) and less than the average of the younger individuals. Unsymbolized thinking was the most common form of experience in three of the six individuals who could produce reliable reports (Clara, Dolly, and Ellen). Therefore, a high rate of unsymbolized thinking may be more common in older individuals than in younger individuals.

Symbolic experience

There was a relatively low frequency of symbolic experience in the current study. As discussed above, the most common form of inner experience was by far unsymbolized thinking, and the two symbolized forms of inner experience, inner seeing and inner speech, occurred less frequently in this sample than in the Heavey and Hurlburt (2008) sample of young adults.

The frequency of inner seeing among our older adults was 14 percent, a much lower rate than in younger individuals (34 percent). Clara's 26 percent was the highest frequency in this study, less than the average of the younger individuals. Clara and Gary were the only people in this study to have inner seeings in more than 20 percent of their samples. Dolly and Benjamin had no experiences of inner seeing. This suggests that inner seeing may be somewhat uncommon in the majority of older individuals.

Furthermore, the visual symbols themselves—the things innerly seen—were, in the majority of the older-adult samples, less detailed than the symbols of younger adults: the older adults' inner seeings lacked detail, clarity, and/or color. Anna was the only participant that consistently had inner seeings that were clear and fully detailed on a consistent basis. Clara had clear and detailed inner seeings on nine occasions but they lacked color, all being either in black and white (eight of the nine inner seeings) or brown and white (one of the nine inner seeings). Ellen reported three inner seeings but had substantial difficulty describing details in two of them, leading to speculation that either these were not seeings at all or that they were seeings with the symbolic aspect substantially weakened. She was very unsure if there was an inner seeing at all in the third instance. Gary reported six inner seeings but only two of the reports were clear and convincing and only one of them was in color (the others being in black and white). The

other four occurred on the same day, all while Gary was doing a crossword puzzle and the inner seeings were all said to be of the crossword puzzle but lacked detail.

Older individuals in this study also had a substantially lower frequency (16 percent) of the other major form of symbolic experience (inner speech) compared to younger individuals (26 percent). Clara had the highest frequency of inner speech (30 percent). Gary and Benjamin did not have any occurrences of inner speech. However, Gary and Benjamin had verbal experiences that were not inner speech. Gary experienced worded thinking during 69 percent of his samples. Benjamin experienced unvocalized inner speech during 28 percent of his samples and worded thinking during five percent of his samples. Benjamin was the only individual to experience unvocalized inner speech. Clara and Ellen also experienced worded thinking on 11 and 7 percent of their samples, respectively. Worded thinking was experienced in 14 percent and unvocalized speech in four percent of the overall samples. Worded thinking and unvocalized inner speech were each present in less than three percent of samples in Heavey and Hurlburt's 2008 study of young adults.

It is notable that worded thinking and unvocalized inner speech are similar to the more common inner speech but are missing the inner perceptually direct access to the symbols that is usually present in inner speech. Worded thinking is essentially the presence of words in experience that are not spoken and do not have auditory qualities. Benjamin's unvocalized inner speech was very similar to inner speech except that it occurred very quickly and had no auditory qualities. Therefore, the relatively low frequency of inner speech and high frequencies of worded thinking and unvocalized inner speech represent the tendency of older individuals in this study to have verbal

experiences where the symbolic aspect, a typically present feature sometimes assumed to be ubiquitous, is partially or completely absent.

Thus both symbolic forms of inner experience (inner seeing and inner speech) were less common in this sample compared to younger individuals. When symbolic experience did occur in either form, it often lacked the inner perceptual details, clarity, and particular aspects that are common in younger adults. Inner seeings frequently lacked color. This was the case in the majority of Clara's and Gary's inner seeings. Irving also reported some black and white inner seeings although his reports were deemed unreliable. Inner words frequently lacked the perceptual characteristics of speech. This suggests that older individuals may not have as much fully detailed symbolic experience as younger individuals. Fully detailed symbolic experience (i.e., inner seeing and inner speech) occurred in 60 percent of Heavey and Hurlburt's (2008) college-aged sample but only 30 percent of this sample, or substantially less when one subtracts the questionable occurrences and the black and white inner seeings. It is possible that symbolic experience becomes less detailed as individuals move into old age but a similar study to the current study that is longitudinal in nature would be needed to verify this speculation.

Multiple awareness

Multiple awareness was much more common in this sample (30 percent) compared to Heavey and Hurlburt's (2008) younger sample (4 percent). Although all of the participants experienced multiple awareness in this study by far the most were experienced by Benjamin and Anna. Benjamin had multiple awareness in 79 percent of his samples while Anna had it in 54 percent of her samples. The two lowest frequencies

of multiple awareness were Clara and Dolly with nine and six percent, respectively. Thus the lowest percentage in this study was higher than the average rate of four percent in Heavey and Hurlburt's (2008) study of young adults.

The greater frequency of multiple awareness in this study might be related to the lack of details in symbolic experience also found in this sample. Both may represent a lack of focus of inner experience. It is possible that the scope of inner experience of older individuals is broader in a sense and therefore contains more things but less detail. This high amount of multiple awareness may also represent problems with executive functioning and inhibition as these problems are common in older individuals (Pignatti et al., 2005; Treitz, et al., 2007). For example, if older individuals lack inhibition more information may be present in their inner experience at a given moment. These are, of course, just speculations. More research regarding the high frequency of multiple awareness in older individuals would be worthwhile to aid in answering these questions.

Content

Clear content themes emerge only rarely in samples of young adults (Hurlburt & Heavey, 2006). By contrast, four of the older individuals in this study had consistent content-based themes in their inner experience or a lack of variability in the content of their inner experience. That is, by comparison to younger adults, the older adults seemed to have more repetitive or narrowly focused content. Clara had frequent samples that were negative, family-related, about death, and beeper-related. Ellen also had frequent content that was emotionally negative. Benjamin had a substantial number of samples where his inner experience was related to traffic. Gary often experienced recurring content within sampling days. He had two experiences involving being late on day three,

he was thinking about his wife's eye problems or a closely related issue on four of five samples on day four, and he had content related to crossword puzzles on four of six beeps on day five. This could suggest a lack of range of content in the inner experience of some older individuals or an obsessive quality to their inner experience. Further research would need to be done to make a stronger conclusion about this however.

Summary

Below is a summary of the findings and implications regarding the inner experience of individuals in this study who could produce reliable reports:

1. Some older individuals have "normal" inner experience that is clear, differentiated, and varied in form and content. The five most common forms of inner experience in the general population were the five most common in this study.

2. There was a very high frequency of unsymbolized thinking that nearly doubled the frequency of younger individuals in another study. The three most common forms of experience were unsymbolized thinking, sensory awareness, and feeling. These are all non-symbolic experiences and may represent a lack of symbolic experience in older individuals.

3. There was a low frequency of inner seeings. The inner seeings that were present typically lacked detail or some aspect that is typical of inner seeings, such as color, clarity, or detail.

4. There was a low frequency of inner speech while there was a high frequency of worded thinking and unvocalized inner speech. These two forms of experience are similar to inner speech but both lack auditory qualities.

5. The symbolic experiences that were present typically lacked a common aspect, lacked detail, or were unclear. Because there was a relatively small amount of symbolic experience in the first place this may represent a lack of fully-formed symbolic experience in older individuals.

6. Multiple awareness occurred at an extremely high rate. This may represent a lack of focus in experience or a problem with inhibition.

7. Some individuals had repeated themes in the content of their inner experience that possibly suggests a lack of range of content in inner experience or an obsessive quality to the inner experience of older individuals.

The Inner Experience of Older Individuals Who Could Not Perform the DES Task Successfully

Six individuals could not produce a single report of inner experience that the researchers judged to be reliable: Fay, Henry, Irving, June, Karen, and Lilly. Although these individuals could not produce reliable reports of inner experience, speculations can still be made about their inner experience, or lack thereof, based on their unique difficulties. These speculations must be regarded as highly tentative.

It is likely that none of these individuals had inner experience as that understood by DES. That is, they may have no inner speech, no inner seeing, no experienced feelings, and so on. This was particularly likely for Fay (she exhibited no apparent cognitive impairment and received a 30 out of 30 on the MMSE but was never even remotely close to producing a single reliable report of inner experience) and for Henry (he also exhibited no apparent cognitive impairment, although his spouse casually suggested that he has had

a decrease in cognitive functioning, and his MMSE score of 29 suggested no or slight cognitive impairment). Even if Fay and/or Henry did have some level of cognitive impairment it would not fully explain their inability to produce a single reliable report. One explanation is that these two individuals had no inner experience: they could not possibly produce a reliable report of inner experience because there was nothing to report. Supporting this possibility is the fact that both of these individuals frequently discussed external reality when asked about their inner experience.

Irving and June may also not have had inner experience or lacked some important aspect of inner experience such as clarity, detail, and/or differentiation. Both of these individuals had more difficulty with DES than might be expected given their cognitive impairment. Irving had a score of 27 on the MMSE which suggests mild cognitive impairment. This is consistent with casual observation of Irving. It seems that his cognitive impairment might have led him to have some difficulty with DES, but it does not seem that his cognitive impairment alone was sufficient to render him unable to produce at least some reliable report of inner experience. Thus it may be likely that Irving had no inner experience or that his inner experience was somehow substantially lacking. June had a lower score on the MMSE (score of 23) and exhibited some memory impairment at times, but often exhibited no cognitive impairment for extended periods of conversation. However, June was not at all close to giving a single reliable report and often spoke of external reality rather than inner experience. Thus, like Irving, the gap between June's cognitive abilities and her ability to perform the DES task successfully is likely due to a lack of inner experience or lack of some important aspect of inner experience. This speculation is not only based on the gap between Irving's and June's

cognitive impairment and their ability to perform the DES task successfully but also the fact that many individuals in this study with very little or no cognitive impairment seemed to have either no inner experience or lack an important part of inner experience. Therefore, it would appear likely that individuals with more cognitive impairment would have even less fully formed inner experience. Still, this is speculative given that neither of these individuals could produce any reliable reports of inner experience.

Karen and Lilly were the most cognitively impaired individuals in this study as judged by the MMSE. Karen received a 21 on the MMSE and exhibited significantly more impairment in casual conversation than Irving or June. Likewise, Lilly had a 19 on the MMSE and appeared severely impaired cognitively. Cognitive explanations for the difficulties of these two individuals are more viable than with the others but can be used potentially as the sole explanation only for Lilly. Lilly had so much cognitive impairment that it would not have mattered if she had inner experience or not, she probably would not have been able to perform the DES task successfully. Karen may have had enough cognitive impairment that she could not perform the DES task successfully regardless of her inner experience. Still, these two individuals may not have inner experience or may have been missing common aspects of inner experience and it is perhaps most likely that they did not have the cognitive ability or the inner experience to complete the task. A lack of inner experience with these two individuals appears to be likely as even some older individuals whose cognitive functioning is intact have shown a lack of inner experience in this study. However, because reports of inner experience could not be given by these individuals this is speculative and is discussed further below.

Even though problems with inner experience are a likely explanation for the problems of many of these individuals to perform the DES task successfully, there are numerous potential cognitive factors that may have impeded the ability of some individuals in this study to perform the DES task successfully. One of these is a disturbance in memory. A certain level of memory ability is required to perform the DES task successfully. One needs, at the very least, to be able to remember the instructions as well as keep one's inner experience in memory from the time of the beep to the time of the interview.

Memory difficulties interfered with Lilly's ability to perform the DES task successfully as she could not even remember the purpose of the beeper or the interviewer. Karen also exhibited some memory impairment, both on the MMSE (she missed all working memory items) and in casual conversation. However, it was not nearly as severe as Lilly's and did not appear to be severe enough to entirely destroy her ability to perform the DES task successfully, although it is possible. June and Irving also had some memory difficulties in casual conversation but they did not seem to have difficulty remembering things related to DES. Henry missed 1 point on the delayed recall section of the MMSE but otherwise did not evidence memory impairment. Henry's spouse reported that he did have some cognitive impairment, although it was not clear if this was memory-related or not. Fay had no evidence of memory impairment. Therefore, it appears that memory had a large effect on Lilly's ability to perform DES and may have played a smaller role in the ability of the others mentioned above.

However, one piece of evidence against a prolonged storage impairment as a primary cause of these individuals' difficulties with DES is that shortening the time between the interview and the sample had no beneficial effects whatsoever. If difficulties with

prolonged storage was a primary reason for the problems with DES than reducing the duration of the storage in this manner should have produced better results. This shortening of time would not necessarily help if the primary difficulty is with working memory or encoding.

Another factor that could have contributed to the difficulties experienced by these individuals is that they may have had some dysfunction in the realm of executive functioning. Substantial deficits with attention and inhibition are well documented in AD and these two abilities are part of executive functioning (see Perry & Hodges, 1999 for a review). Specifically, deficiencies in switching attention seem to be the first that are evident and the most substantial in AD (Norman & Shallice, 1987). Attention deficits can be seen in normal aging as well (Pignatti et al., 2005). Although only 1 participant in the study is actually diagnosed with AD, the others who had difficulty all experienced some cognitive impairment that could be a pre-cursor to AD or other form of dementia. DES requires one to pay attention not only to the beep itself, but to switch attention from what was being attended to before the beep, to the beep, then to inner experience that was occurring before the beep. Although this may not explain situations in which participants did not respond at all, it could explain instances in which response to the beep was slow.

Many of the individuals in this study also had difficulty narrowing their focus to the moment of the beep. For example, Karen frequently reported things that were near the moment of the beep, but not at the moment of the beep. She also missed all MMSE questions directly related to attention. Fay did not exhibit cognitive impairment but often discussed things that occurred near the beep rather than things that occurred at the moment of the beep. This was also a problem for Henry. Irving and June appeared to

have more significant problems than the others in this area. It is not clear if this was a problem for Lilly as she could not even learn the task of DES. Therefore, problems with executive functioning evidenced by an inability to narrow one's conception of the moment of the beep appear to be a possible partial explanation for difficulties experienced by all 6 participants, but most significantly Karen, Fay, and Henry.

A general slowing in cognitive processing is well documented in normal aging and significantly in AD. Some propose that many of the cognitive deficiencies associated with AD are due to a general slowing in processing speed (Baddeley, et al., 2001). Because DES requires instant, immediate retrospection, any slowing in cognition could make this process more difficult. If participants are experiencing a general slowing of cognitive processing, this could not only explain a delayed reaction to the beep, but also difficulty performing the task adequately.

Although there is some conflicting research, it appears that reaction time is also compromised in individuals with AD, VaD (Mendez et al., 1997), and normal elderly individuals and is often viewed as a sign of a decrease in executive functioning (DiFabio, Zampieri, Henke, Olson, Rickheim, & Russell, 2005). Muller et al. (1991) found that individuals with mild dementia showed a 23 percent increase in response time to visual stimuli (flashes) and a 34 percent increase to respond to auditory stimuli (clicks) compared to normal elderly controls. However, healthy controls did not show increases in RT in these two conditions compared to healthy younger controls, although they did have a 49 percent increase in RT in when asked to respond to complex visual stimuli (i.e., participants respond only when a 4-digit display showed all zeros). DES is a task that requires participants to react to the beep in a similar manner that is required in auditory

reaction time tasks. That is, when testing reaction time, individuals are often asked to respond as quickly as possible to a sound, often a beep or tone. In DES, participants are also required to respond to a beep as quickly as possible, although the response is quite different (instant introspection). A deficiency in reaction time in older individuals and individuals with mild AD could compromise the success of undergoing the DES process. Irving and June exhibited slow reaction times to the beep and therefore cognitive slowing and reaction time could have played a part in their difficulties. However, this does not seem to explain their difficulties entirely.

Difficulty learning is also common in AD, and to a lesser extent, normal aging. Specifically, auditory learning is compromised in normal aging, perhaps due to deficiencies in working memory (for a review, see Lund, 1997). Individuals who had difficulty in this study appeared to benefit little from repeated exposure to DES, suggesting that learning may not have been adequately taking place. Some individuals did not seem to understand DES and therefore could not produce reliable reports, possibly because of an inability to learn DES. Lilly had the most difficulty learning DES although it is not clear if this was due to problems with memory, learning, some other cognitive factor, a lack of inner experience, or some or all of these factors. Unlike the other individuals, Lilly's inability to perform the DES task successfully and learn DES could be explained entirely by her cognitive deficiencies as they were substantial. However, it is also possible that Lilly had no or little inner experience and that this could have further impaired Lilly's ability to perform the DES task successfully and it is likely that she had neither the ability to learn or the inner experience to perform the DES task successfully .

Difficulty learning is also a possible partial explanation for Irving's difficulties. At first, Irving believed that he was supposed to try to think of something for the beep. After it was explained to him that this was not the case his reports did not change very much. It did not appear that he was reporting inner experience but was either making up stories or reporting memories. June also largely misunderstood the task at first and was often confused about the purpose of the beeper and the beep and may have not understood what is meant by "inner experience." Irving and June's difficulties could be due to a problem with learning although both appeared to have enough cognitive ability to understand the task, and so therefore a lack of inner experience is more likely. There was very little evidence for Henry, Karen, and Fay not understanding DES, so although it is a possible partial explanation for some participants it could only potentially fully explain Lilly's problems with DES and cannot fully explain the difficulties of any of the other individuals.

There is also a possibility that some participants had relatively normal inner experience but simply had trouble communicating it due to linguistic disturbances. Some mild linguistic disturbances are often present in individuals who age normally and are more common in older individuals with neurodegenerative disorders. However, no individuals in this study, aside from possibly Lilly, exhibited noticeable linguistic impairments outside of DES so this appears to be an unlikely explanation.

A final possibility is that individuals had difficulty processing the beep due to problems with central auditory processing (CAP), discussed previously. CAP refers to one's ability to process auditory information independent of the ability to hear (Davignon

& Leshowitz, 1986). CAP difficulties are common in older individuals (Strouse et al., 1995), especially in the seventh decade of life (Humes & Christopherson, 1991).

Difficulties with CAP could help explain the problems that some individuals in the current study, specifically Lilly, Irving, and June, had responding to the beep. Lilly and Irving both had incidences where they did not respond to the beep at all. June consistently had delays in her responses. It is certainly possible that these individuals have problems with CAP that translate to the successful processing of the beep despite relatively normal hearing, especially since they each exhibit some cognitive deficiencies.

Therefore, there are many cognitive, linguistic, and sensory problems that could have contributed to these individuals' difficulties with DES. However, the only case in which cognitive explanations could possibly entirely explain an individual's inability to perform DES is Lilly. There is a small possibility that Karen's difficulties with DES could be given an entirely cognitive explanation but this is unlikely given the fact that she was not close to producing a reliable report. The inability of the other four individuals to perform the DES task successfully far exceeded their cognitive impairments. Therefore, based on this information and the results from participants who could produce reliable reports, it seems that a lack of inner experience (or some aspect of inner experience such as clarity, detail, and/or differentiation) is a key factor in the difficulties experienced in all six cases.

The following is a summary of possibilities explaining the inability of six individuals in this study to produce a single reliable report of inner experience.

1. These six individuals may have no inner experience, thus making it impossible to produce reports of inner experience. This is a strong possibility for all six of these individuals and is perhaps most apparent in the cases of Fay and Henry.

2. There is a lack of clarity, detail, and/or differentiation in the experience of these individuals. Again, this is a strong possibility in all six individuals but more obviously in Fay and Henry. These problems were present in Ellen's inner experience and therefore there is some evidence from one individual who could produce some reliable reports.

3. Memory impairments could have interfered with some individuals. Lilly had obvious memory-based impairments that were moderate to severe. This seemed to affect her ability to perform the DES task successfully but a lack of inner experience is also a likely cause of her difficulties with DES. Memory problems were not clear in the other 5 participants although they may have complicated doing DES, especially for Karen.

4. Problems related to executive functioning may have played a role in difficulty producing reliable reports. This is a fairly strong possibility with Karen but does not entirely explain the difficulties experienced by any of the individuals.

5. General cognitive slowing and a slowing of reaction time could have interfered with reliable reports and with individuals' ability to respond to the beep quickly. This may have been a factor for Irving and June but does not explain their difficulties entirely.

6. An inability to learn DES and a lack of understanding of DES is a possible partial explanation for the difficulties experienced by Lilly, Irving, and June.

7. Normal experience but an inability to communicate experience is a possible partial explanation that only appears applicable to Lilly.

8. Problems with CAP could partially account for the difficulties experienced by Lilly, Irving, and June.

9. None of these cognitive problems could entirely explain the difficulties experienced by any of the individuals with the exception of Lilly. It appears likely that a lack of inner experience or some important aspect of inner experience was present in all of these individuals.

Although only one of these individuals had AD these findings can be related to the initial speculations made based on the first-person accounts of individuals with AD. The first-person accounts of individuals with AD suggest that individuals with AD have symbolic experience, unusual sensory experiences that involve strong colors or sensations, and a high frequency of emotional experiences. These hypotheses were not supported, although at least some older individuals do have symbolic experience even though it appears to be less frequent in this population. It is not surprising that the findings do not support these speculations as the observations upon which the speculations are based were not geared towards looking specifically at inner experience and were not systematically gathered.

Diagnostic and Treatment Implications

Researchers, caregivers, and affected individuals have all emphasized the importance of gaining a better understanding of age-related neurodegenerative disorders as this could aid in interacting more effectively with individuals with these disorders (Gurbrium, 2000). The importance of detecting AD in its earliest stages has become even more important in recent years due to the development of interventions that are best begun in

the earliest stages of AD (Wetter et al., 2005; Desai & Grossberg, 2005; Gomez-Isla & Hyman, 2003; Petersen & Morris, 2003; Cummings, 2003; Mohr, Dastoor, & Claus, 1999; Frodl et al., 2002; Morris & Becker, 2004b; Parasuraman, 2004; Leifer, 2003). The inability of impaired individuals in this study to produce reliable reports of momentary inner experience via DES suggests that DES is often a very sensitive measure of age-related cognitive impairment, much more sensitive, for example, than the MMSE. Many individuals that show very little or no impairment via the MMSE or clinical observation could not produce a single reliable report via DES. It appears that by the time the MMSE score drops from 30 to 29 or so, the ability to perform DES drops from about 100 percent to zero percent. This is perhaps not surprising as there is substantial literature showing that individuals often experience subtle age-related neurological and cognitive changes well before tests such as the MMSE can detect them (Kawas et al., 2003; Snowden et al., 1996). This suggests that DES might provide a sensitive diagnosis of cognitive impairment for this population before standard instruments such as the MMSE can detect subtle age-related cognitive changes.

It is possible that DES is not only sensitive to subtle age-related changes in experience that are related to cognitive impairment, but it may also differentiate between individuals who will and will not eventually develop an age-related neurodegenerative disorder. Because differences in the MMSE can often differentiate between individuals who will and will not develop AD up to 6 years before diagnosis (Small et al., 2000) it is possible that DES can detect this difference even earlier than the MMSE.

DES may also eventually be used to differentiate between AD and VaD as it is often difficult to differentiate diagnostically between AD and VaD (Braaten et al., 2006).

However, one of the two individuals with VaD could perform the DES task successfully whereas the one individual with AD was not at all able to perform the DES task successfully. It is possible that individuals with VaD can often perform the DES task successfully whereas those with AD can rarely or never perform the DES task successfully due to subtle differences between the diseases. This would be diagnostically useful as it could help distinguish between the two diseases when a differential diagnosis is needed. Likewise, the inner experience of individuals with VaD may be different from those with AD. For example, the inner experience of individuals with VaD could be substantially disorganized as executive functioning is important to intellectual and behavioral organization and this may not be as apparent in those with AD. Such a difference would also be diagnostically useful.

To investigate further the diagnostic validity of DES and the above diagnostic possibilities, it would be worthwhile to engage individuals in a longitudinal study where they undertake DES intermittently over a period of several years as they transition into older age. It is possible that DES could identify subtleties in momentary inner experience and/or the ability of individuals to report their momentary inner experience that may be more sensitive than cognitive measures such as the MMSE. For example, Clara had inner seeings that were black and white but exhibited no cognitive impairment. It is possible that this lack of color represents degeneration in her inner experience that foreshadows a decrease in cognitive functioning. But it is also possible that her inner experience has been black and white throughout her life, and also possible that her experience is actually in color but she learned to talk about it as if it were black and white. Likewise, Fay and Ellen both had substantial difficulty reliably reporting their inner experience in spite of

perfect scores on the MMSE. It is possible that this difficulty could predict future cognitive impairment. If so, DES could have diagnostic utility with older individuals in terms of predicting cognitive impairment. A longitudinal study could go a long way in either verifying or refuting the diagnostic utility of DES in this area.

Treatment implications for older individuals with cognitive impairment based on the results of this single study are very limited. Because five of the six individuals with cognitive impairment could not perform the DES task successfully little could be learned about their inner experience. At this point only speculations can be made. One speculation is that the presence of symbolic experience decreases as individuals age. Therefore, older individuals might benefit from exercises involving induced visualization or inner speaking to help maintain symbolic speech to protect against the effects of aging. Also, it is possible that a lack of experience or undifferentiated experience led to difficulties producing reports of inner experience. If this was the case, it may be possible to produce a method to help individuals maintain clear experience. However, the benefits of such treatments are extremely speculative.

Limitations of the Current Study

The current study was not longitudinal and was therefore not able to track changes in inner experience over time. It is difficult to determine if some features of inner experience in this study were due to the aging process or were always present in these individuals. For example, it is possible that Clara has always had inner seeings that are in black and white and that the absence of color was always present and is not due to aging. Furthermore, it is difficult to determine if problems completing the DES task for some

individuals (such as Fay and Ellen) are due to age or if the problems would have been present if the individual was sampled decades earlier.

The current study used a very small and non-random sample. DES is a highly labor intensive procedure, partially due to its iterative nature; DES usually has small sample sizes. The procedure was even more labor intensive than typical DES studies due to the fact that for parts of the procedure for half of the participants the interviewer was with the participant for several hours while the participant wore the beeper.

Because DES is largely a qualitative method that investigates inner experience it is difficult to represent the findings that DES produces in quantitatively and statistically meaningful ways. The only way that samples of inner experience can be given quantitative and statistical meaning is to code experiences based on form and content and then to calculate the frequencies of the form and content of experience. Further statistical analysis, such as investigating significance levels, can be done only with larger samples. For example, in this study only one member of the impaired group could produce reliable reports. Therefore, an analysis of a statistically significant relationship between frequencies of form or content of experiences between the impaired and unimpaired group is impossible.

Although a lack of theoretical grounding has traditionally been a hallmark of DES, there is still the limitation that the current study did not advance any specific theory. Many DES researchers believe that a lack of theoretical grounding is a strength of DES as it helps reduce potential presuppositions that could adversely affect the accuracy and value-free nature of the DES interview. Also, the current study was exploratory in nature and did not seek to investigate a specific theory about aging or cognitive degeneration.

Still, theoretically grounded research with this population using DES in the future could be beneficial.

Another potential limitation of the study is that there was a wide range of cognitive dysfunction in the sample, both in terms of quantity and quality of cognitive dysfunction, and there was not a clear delineation between the impaired group and unimpaired group. Although this has the advantage of allowing a glimpse at a broad spectrum on individuals it makes it difficult to make a comparison regarding the inner experience of two more cognitively homogeneous groups. However, even if there were diagnostically homogeneous groups in this study (i.e., an AD group, a VaD group, etc.), these diagnoses are highly heterogeneous themselves and therefore the meaningfulness of comparisons between and among groups might still be tenuous.

Likewise, individuals in this study were not eliminated based on the presence of other psychological disorders. Although this provides a more realistic sample it does present the possibility that some of the findings of the study could be due to other psychological problems rather than simply normal aging, MCI, VaD, or AD. Although none of the individuals in the study reported any psychological problems that were not related to age this question was not specifically addressed.

Finally, only one individual in the impaired group (Gary) could produce reliable reports of momentary inner experience. This makes it extremely difficult to discover the nature of inner experience of older individuals with cognitive impairment. However, even though these individuals often produced unreliable reports, the nature of their difficulty allowed some speculation about the nature of their inner experience, such as lacking inner experience or having largely undifferentiated inner experience.

Suggestions for Future Research

Perhaps the most important suggestion for future research is that a longitudinal study that tracks the inner experience of young individuals as they transition into old age might be very informative. A longitudinal design would answer an important question: were abnormalities in reporting inner experience and inner experience itself found in this study due to age-related cognitive dysfunction or due to prior characteristics? Although numerous discoveries were made regarding the inner experience and the ability to report inner experience of individuals in this study, it is impossible to determine if these discoveries are due to the age of the individuals in the study. If the inner experience and reporting ability of individuals could be tracked through time as individuals move into their older years the effects of age on inner experience and reporting could be clearly discerned. This would be very important as information regarding the development of inner experience as a function of age could be very useful in the understanding of the special needs of older individuals and could inform both treatment and diagnosis.

It is probably useful for future studies in this area to attempt to focus on participants with MMSE scores of 30. It seems that individuals below 20 or even in the low or mid 20's on the MMSE cannot engage meaningfully in DES, but more research should be done before a definitive statement is made on this issue. Nevertheless, the current study suggests that once MMSE scores enter the low or mid 20's, DES may be too difficult for the participant.

It might also be useful to focus on individuals with VaD and MCI instead of individuals with AD. Although a definitive statement cannot be made regarding the exclusion of individuals diagnosed with AD it appears that focusing on individuals with

VaD and MCI may be much more fruitful. Individuals with VaD are often diagnosed much earlier in the process of their disease due to the clear presence of a cerebrovascular event. Because individuals with AD are often diagnosed after significant cognitive impairment has already taken place, individuals with AD may have difficulty engaging meaningfully in the DES process. Individuals with MCI are not as impaired cognitively as individuals with AD and thus may be a better target for future research.

Also, altering methodology via the suggestions made earlier could also be useful and could limit some of the difficulties in methodology experienced throughout this study. For example, utilizing cognitive tests such as the MMSE to predict performance with DES and eliminating individuals who will clearly be unsuccessful with DES based on cognitive tests could help increase the efficiency of future studies. Also, simplifying instructions for some individuals, especially those with cognitive impairment, may be useful as an aid to initially decrease anxiety. Some participants appeared anxious and overwhelmed when given the standard DES instructions and some individuals may have dropped out of the study after the introduction but before the first sampling day for this reason. Still, those who were given a significantly simplified explanation of DES (Lilly, June, and Irving) could not perform the DES task successfully at all. Therefore, it may be the case that the simplicity of the introduction to the DES task does not significantly affect performance on DES, although more research is needed to make a firm conclusion about this. Altering questions to make them more closed-ended may also increase comfort in the early stages of DES training in some individuals, especially those with cognitive impairment. This was apparent with Karen and Irving, although closed-ended questions did not seem to produce any more accurate reports than open-ended questions.

Finally, if individuals have hearing aids, it may be necessary to use external speakers rather than the headset that is typically used. Although this did not allow any of the individuals in this study to produce reliable reports it eliminates the possibility that difficulties are entirely due to hearing problems. This also may be beneficial if the interviewer is with the participant as the interviewer can verify any reports of external behavior that the participant may give as the interviewer can hear the beep clearly as well. It is actually sometimes useful to directly ask about external behavior at the moment of the beep in this situation as it could help establish the participant's ability to narrow their focus to the moment of the beep.

It is important to note, however, that none of the alterations improved the actual quality and reliability of the reports. Because many of the participants in the study had impairments in memory it seemed logical that interviewing these individuals immediately after the beep would produce better results than a delay of several hours. However, this was not the case. It did not appear that any of the participants who were interviewed immediately after the beep benefited meaningfully from the reduction in time between beeps and interviews.

The DES methodology was manipulated in a variety of ways to try to obtain reliable reports of inner experience but ultimately none of them worked toward this end although some of them may have made the participants more comfortable. This suggests that if an individual cannot produce reliable reports via standard DES procedure then alterations, including limiting the delay between the beep and the report, will not significantly help. Still, this is only a tentative conclusion and more research with this population is needed to make any sort of definitive statement about this issue.

Finally, it appears that further investigation with this population using DES is worthwhile. The current study has raised numerous questions that are not only interesting but potentially important to understanding the nature of cognitive degeneration in older individuals that would aid in diagnosis, and perhaps even the treatment of older individuals with cognitive impairment. Further investigation into this population could help confirm or disconfirm findings and speculations made based on this study and could continue to produce unique, interesting, and ultimately important findings.

APPENDIX A

SUMMARIES OF SAMPLES

Letters denoting forms of experience contained in each sample follow the summaries and are as follows:

- F – Feeling
- FFOB – Feeling Fact of Body
- I – Inner Seeing
- IH – Inner Hearing
- IS – Inner Speech
- JD – Just Doing
- SA – Sensory Awareness
- U – Unsymbolized Thinking
- WT – Worded Thinking
- M – Multiple Awareness
- ? – denotes uncertainty about form with accompanying explanation

Any form code that is in parentheses was not counted in the overall analysis, typically due to lack of reliability in the participant's report.

Anna's Samples

Samples from day one were not included in the analysis due to the substantial unreliability that is normal on the first day of sampling but they are included here.

Beep 1.1 – Anna was at her computer, reading a blog that somehow referred to Rosie O'Donnell. Anna initially stated that at the moment of the beep she was “remembering remembering” that Steve (her comedy mentor) once told Anna that Rosie O'Donnell was nice to him when he was a beginning comedian at a club in Boston. Anna later backed off the statement that she was “remembering remembering”, that she likes to say that when she gets old she doesn't remember, but that she merely remembers remembering, but that that wasn't really true of this event: she was actually remembering what Steve and said. Anna also stated that she was thinking about various characteristics that have been attributed to Rosie; that she is crazy, rude, and fat. Anna also said that Donald Trump was somehow in her awareness at the moment of the beep (only after suggested by one of the interviewers), but could not describe how. Anna also described that at the

moment of the beep she was feeling angry in reaction to these reported negative characteristics of Rosie O'Donnell. This anger was experienced as a tightness near her diaphragm. Anna at times said that all of the above experiences were present simultaneously, and at other times said that they were sequential, but very close together and difficult to tease apart. As is common on the first sampling day, Anna was often inconsistent in her descriptions of her experience at the moment of the beep; she would sometimes change what she had originally reported or add descriptions of experiences when suggested as possibilities by the interviewers. It is likely that some parts of Anna's descriptions were present at the moment of the beep, and some were not, but it is impossible to discern at this early stage of sampling with Anna. She did not appear to have visual or verbal experience at this beep and may have been having some unsymbolized and/or emotional experience at this moment, but since this is the first sample, the interviewers cannot be entirely certain of this.

Beep 1.2 - Anna was watching Six Feet Under on TV, but had withdrawn from the show in favor of a "potpourri" of thoughts about fidelity. This process had begun a few moments before the beep and had involved thoughts about fidelity, infidelity, how we take words and make them into rules and laws, why fidelity is important, and how fidelity/infidelity had played out in her own life. By the moment of the beep, she had "formulated" the word "fidelity"; the word seemed to be specifically present to her but was not spoken, heard, or said. There was, besides the formulated word, a "bloom" of thoughts, many simultaneous thoughts or ideas all related to the concept of fidelity/infidelity. The process was not emotional; it was more cognitive/curious. This was Anna's first sampling day, and much or all of that description is of questionable accuracy.

Beep 1.3 – Anna was watching television and her dog and cat had just jumped on her lap. The animals caused her to shift her attention from the television to the animals. At the moment of the beep, Anna was mostly seeing the animals. There may have been numerous other things in her awareness as well: the startled looks on the animals' faces, the startledness of the animals being in the same place even though they hate each other, Anna's own startledness at the animals jumping on her lap, the feeling of the animals on her, how strange it was to have two animals that hate each other on her lap at the same time, isn't it cute, and knowing that she would have fur all over her, but Anna was primarily just looking at the animals. Anna's descriptions at this beep are typical of the first sampling day. They were inconsistent and often seemed to be influenced by the suggestions of the interviewers. It is possible that Anna was experiencing a variety of things at this moment, but it is also common that participants report having a variety of experiences at the moment of the beep the first sampling day, and this variety decreases as training continues.

Beep 2.1 – Anna was sitting. She had recently turned off the television. She was having no inner experience at the moment of the beep.

No Inner Experience

Beep 2.2 – Anna was sitting at the computer while a song by a female singer was playing. At the moment of the beep, Anna was feeling sad, experienced primarily as a lump in her throat and also probably as a feeling of heat behind her eyes and cold on her forehead. She was not certain about these two aspects of the experience, but said that she was 70 percent sure that they were there. The sadness was about being old, about the things that she had done when she was younger (as at the time when this particular song might have been popular). Also, although Anna wasn't paying particular attention to the music that was playing, she was somehow aware of the music and this music may have brought on the experience of sadness.

Beep 2.2 – Anna was sitting at the computer while a song was playing. At the moment of the beep, Anna was feeling sad, experienced primarily as a lump in her throat and also probably as a feeling of heat behind her eyes and cold on her forehead. She was not certain about these two aspects of the experience, but said that she was 70 percent sure that they were there. The sadness was about being old, about the things that she had done when she was younger (as at the time when this particular song might have been popular) Also, although Anna wasn't paying particular attention to the music that was playing she was somehow aware of the music and this music may have brought on the experience of sadness.

F – sadness, conceptual (recognition) and physical (lump, heat, and cold)

Beep 2.3 - Anna was watching a television report about a man who held teenage girls captive in a cave and repeatedly raped them; just before the beep he was being interviewed and didn't seem to think that he had done anything particularly wrong. At the moment of the beep, Anna was reacting incredulously (disbelieving shock). This reaction probably included gasping, simultaneously leaning back, and rolling her eyes, but it was not clear if Anna was experiencing those reactions either physically or mentally at the moment of the beep. She was incredulous/shocked, and the bodily reaction was ongoing, but whether the bodily reaction was experienced at that moment is not clear.

F – incredulous/shocked (physically and/or mentally)

Beep 2.4 – Anna was online and was completing writing an email. She was hitting the “send” button at or near the moment of the beep. Anna initially reported that at the moment of the beep, Anna knew that the beep was coming. This was a conceptual knowledge that the beep was about to sound. She recognized the oddness of knowing the beep was coming before it actually came; possibly, she said, she has such experiences frequently but forgets them when they don't come true. RH wondered whether it was possible that she had some neural reaction to the beep that caused the thought process before she actually apprehended the beep. Anna was equally happy with that explanation.

U? (presence uncertain) - knowing beep is coming

Beep 2.5 – Anna was at the computer and had just finished typing an email, but had not sent it yet. This email involved requesting payment from a long-time client who owed her money. At the moment of the beep, Anna was frustrated/pissed-off about not getting

paid on time. This frustration/pissed-off experience was very strong and clear. It was experienced partly as many undifferentiated ideas flooding her mind. It was also experienced as heat in the area of her breastbone. This heat was about the size of an opened hand and was internal, under the surface of the skin. The mental part of the frustration was more present in her awareness than the heat. Anna was also afraid of losing him as a client and did not want to word her email too strongly, wanting to be cautious. This feeling of fear/caution seemed to somehow come from the feeling of frustration and was mostly or entirely a mental process.

F – frustration, mental (ideas) and physical (heat)

F – fear/caution

M

Beep 3.1 - Anna was tiredly walking down the hall dragging her feet noisily on the carpet. She was thinking, if put into words, something quite like, “Pick up your feet—it sounds like an old lady.” However, there are no words, images, or other symbols experienced in that thinking. Despite the lack of words, the sense of the thought was very explicit: “pick up your feet” is a more accurate rendition of the experienced thought than would be “I should pick up my feet”; and “it sounds like an old lady” is more accurate than “I sound like an old lady.” Anna was also looking down at a pile of clothes and thinking that she should put her dirty clothes there. Also, Anna was tired at the moment of the beep. This tiredness was primarily experienced as heaviness of the eyelids and dryness in the eyes, although these sensations do not fully describe the experience of tiredness. Anna was not particularly paying attention to the feeling of tiredness, but it was still in her awareness. That slight awareness is similar to the experience of the Melissa Etheridge song in Beep 2.2.

U – pick up feet

U – clothes

SA – tiredness

M

Beep 3.2 – The following account should be taken with substantial skepticism. The earpiece to the beeper fell out of Anna’s ear some time before this beep and her partner Linda had to notify her that the beeper was sounding. This is likely to significantly increase the difficulty of accurately apprehending experience at the moment of the beep. Anna was fairly convincing regarding her experience at this moment, but it is very unlikely that she is describing her experience at the exact moment of the beep since she had to be notified that it was going off by Linda. It is possible that the following is a description of Anna’s experience at the moment of Linda’s notification, but this is likely much less precise than the moment of the beep.

Anna was laying on the bed talking with her partner Linda. Linda was talking about getting a pilot’s license. At the moment of the beep, Anna was thrilled. This was a very strong emotion, experienced primarily as eyes widening, inhaling, and a fluttering feeling in the stomach. Goosebumps on her arms occurred immediately after these sensations, and the beep (or Linda’s notification that the beep was sounding) occurred very close to when the goosebumps began. This thrilled experience comprised the majority of Anna’s

awareness (90 percent according to Anna). The remaining part was comprised of disappointment/self-pity—that she herself was too old to get a pilot’s license. This disappointment/self-pity may have included the experiencing of a muffledness at this moment. This muffledness was almost like having cotton around her ears and involved a withdrawing from the conversation. Anna was not paying close attention to this aspect of her experience at the moment of the beep. Since the last two parts of this experience were such small parts of Anna’s experience, since they were both mentioned near the very end of the interview on this beep, and since Anna was not reacting to the beep itself (or at least it does not seem she was reacting to the beep itself), a very high level of skepticism is appropriate regarding these particular aspects of her experience is appropriate.

No Form/Not Included in Analysis

Beep 3.3 – Anna was lying on the bed and talking to her partner Sarah about the progress that Sarah’s academic department has made. At the moment of the beep, Anna was feeling proud of Sarah for helping the program progress so much. This pride was experienced physically as a release of tension that is somehow similar to sighing, although actual sighing was not taking place at this moment. The feeling of pride may have included a feeling of pride in herself for being partnered with a woman who was achieving such an accomplishment; it was not clear whether Anna actually recalled feeling that at the moment of the beep, or was presuming that it was there.

F – pride (physical)

Beep 3.4 – Anna was talking with Sarah. Sarah had said shortly before the beep that Anna hadn’t changed very much since they met. Anna was in the process of saying “I wasn’t the P.T.A. lady when I met you”, meaning that she had changed a lot prior to meeting Sarah, and was laughing at that thought. At the moment of the beep, Anna was recalling how she has changed over her life. This recollection consisted of the inner seeing of numerous freeze-frame pictures of herself (Anna estimated about 50 of them) that were experienced in extremely rapid succession like fast time-lapse photography. Anna could describe some of the inner seeings. One inner seeing was of an actual photograph of her when she was about 19 years old taken from the side and wearing a full-length white polka dot on blue dress. One of the last inner seeings was of Anna as the P.T.A. lady that she was before she met Sarah. The inner seeings often showed Anna having a facial expression that was indicative of her emotional state at that phase of her life. For example, one showed a very fearful expression as she was generally being very anxious at that stage of her life. The inner seeings also showed Anna as she was at that particular time of life, with variations in a number of aspects of her physical appearance. Many of the inner seeings were of Anna’s face from an extremely close range that showed Anna’s face from just above her eyes to about her chin. There was also a knowing that her children were there related to some of the pictures. There may have been other knowings around or during the experience of the inner seeings, but this is highly speculative as it wasn’t discussed in detail. It wasn’t clear if the inner seeings proceeded in chronological order or not. It should be noted that Anna did not mention this freeze-frames until well into the conversation about this beep and that when she first mentioned them she used many subjunctifiers. However, after this initial uncertainty,

Anna was very confident about the existence and nature of these freeze-frames. Anna was also aware of her laughter. The laughter blended in with the recollection of change.

I – many inner seeings

M

Beep 4.1 – Anna was playing a card game at the computer. Earlier that day, she was playing Canasta with some friends. One of her friends (Jan) made a mistake and repeatedly criticized herself and her Canasta partner for it. At the moment of the beep, part of Anna’s experience was a mixture feelings and thoughts related to the incident that were somewhat homogeneous in that they were all mixed together to form a mostly uniform experience. The predominant part of this experience was Anna’s questioning of whether or not she was too tough on Jan. The word “tough” or “too tough?” was present to Anna visually and was experienced as a grayish/pinkish/beigeish color that had jaggedy edges, was not overwhelmingly large, was flat, was pliable, and was clear. Anna was very specific about the jaggedy edges of the experience; when drawn, she commented that the drawing was too jaddedy and that the jags weren’t sharp enough. Anna knew that the visual experience meant the word “tough” or “too tough?” at the moment of the beep. There also may have been a cognitive component to this experience where Anna was questioning if she was too tough on Jan. Also at the moment of the beep, Anna was experiencing doubt/indecision about whether she did the right thing in confronting Jan. This was experienced as an “icky”, sour, almost nauseous feeling in the upper chest and throat region. She was also simultaneously thinking cognitively that she did the right thing by confronting Jan. Also at the moment of the beep, but not as predominant, was the thought that Jan was a jerk. This thought was not in words. There may also have been the experience of simultaneously loving Jan but thinking she’s annoying as well, but this was not entirely clear.

I – tough

F – indecision/icky

U – jerk

M

Beep 4.2 – Anna had finished writing her description of beep 4.1. She had just sighed and turned her attention back to the computer with relief. At the moment of the beep, Anna was experiencing relief/accomplishment at getting all of her experiences down in the notebook for beep 4.1. This was experienced as the release of the ideas/experiences of beep 4.1 (see below) and/or the words associated with the ideas/experiences of beep 4.1. from herself into the external world. The ideas/words were somehow visually present but not explicitly seen. There also may have been an experience of getting ready to not think, but it is not certain the extent to which (if at all) or how this was present at the moment of the beep.

F (w/ visual component) – relief

U? (presence uncertain) – getting ready not to think

M? (presence of U uncertain)

Beep 4.3 – Anna was watching Dateline on television and was eating a salad. At the moment of the beep, Anna was chuckling at something someone had said on Dateline,

was feeling queasy from eating the salad too fast, and was experiencing a twinge in her left knee. Anna was primarily focused on the television. It is not clear the extent to which Anna was experiencing the chuckling at the moment of the beep or if she was simply chuckling and not aware of it. The queasy feeling also had a sense of fullness to it. The twinge in the knee was experienced as a mild-moderate, brief, sharp, electrical shock in the joint.

Laughing

SA – queasy/full

SA – twinge

M

Beep 4.4 – Anna was playing poker on the computer. She was thinking about going to California next week. At the moment of the beep, Anna was cognitively wondering if she could arrange going to California with the interviewers so to not break DES arrangements. She was also experiencing a feeling of mild anxiety about possibly breaking DES arrangements. The anxiety was very mild and was experienced both physically and mentally. The physical experience was located in the upper chest, neck, and head, was well below the skin, and was similar to the heat of blushing, but not exactly. There was a rising to this experience, as it originated in the upper chest and rose to the head. The mental component of the anxiety was not explicit, but somehow affected Anna cognitively, although Anna was not entirely sure about this component of the anxiety.

U – wondering about arrangements

F – anxiety

Beep 5.1 – Anna was preparing dinner. She was in the process of looking at different foods that would make up dinner. At the moment of the beep, Anna was thinking that she would put the turkey in first, then the yams, then make the salad. This process came in sequential order, but was extremely close together. There were no words or inner seeings in this experience. Anna then realized that she may not have bought onions. This realization was experienced as a sharp intake of air, like a gasp, and a slightly negative feeling. Anna then innerly said to herself “Did I buy onions?” This was experienced as if she was saying it out loud. The beep came right after Anna had finished innerly saying “Did I buy onions?” but the entire process occurred extremely quickly, and was therefore very close or at the moment of the beep.

U – order of cooking

F – onion gasp

IS – onions

Beep 5.2 – Anna was setting the timer on her oven. She was in the process of using the oven keypad to get the appropriate time (1 hour and 30 minutes). At the moment of the beep, she was tapping the keypad 30 times in quick succession to get the minute part of the display to 30 and was very close to 30. Anna was focused on this process. She was feeling the physical sensation of tapping the key pad on the end of her finger, seeing her fingers tap on the keypad, hearing her fingernails make a clicking noise on the keypad, and seeing the timer display change as she pressed the numbers on the keypad.

SA– sensation of tapping

SA– seeing finger tap

SA– hearing finger tap

SA– seeing time change

M

Beep 5.3 – Anna was at the computer playing poker. Anna’s friends/family were in the next room laughing. At the moment of the beep, Anna was primarily trying to decide if she would give her friend Barbara a haircut before dinner or after dinner. Although there were no words in this experience, the question “before or after?” is the best way to describe the experience. Anna had already thought about and/or understood that haircut and dinner part of the situation prior to the beep, and was now posing the question before or after to herself. Anna was also hearing the laughter of her friends/family. There was something nostalgic and pleasant about hearing the laughter that tinged her experience of hearing it. Anna was also idly seeing the numbers of the cards on the computer screen, although it is not clear if these numbers were in Anna’s experience or not.

U – before or after?

F?/SA?(form uncertain)– nostalgic hearing

M

Beep 5.4 – Anna was cutting her friend Jane’s hair and was simultaneously having a conversation with her. Anna was talking, but she had no idea what she was saying—the words were apparently just rolling out of her on autopilot, as were the actions of cutting the hair. Rather than pay attention to either of those activities, at the moment of the beep, Anna was innerly seeing a vegetable chopper that she owns. The inner seeing was very sharp and was floating with no background like a hologram or a projected image. The lid of the imagined chopper was down, she could see the transparent plastic bottom and the top part of the chopper. Anna was somehow aware of the chopper from different angles, but was not actually seeing it from different angles at the moment of the beep. Anna’s interest in this seeing was in the mechanics of how the chopper works rather than in how the chopper looks.

I – chopper

Beep 5.5 – Anna was tossing a salad and talking with her friends. One of her friends had just asked Anna if she grew the vegetables for the dinner in her backyard. Just prior to the moment of the beep Anna had sarcastically said “I hand picked all the veggies” and everyone was laughing, including Anna. At the moment of the beep, Anna was aware of the colors in the salad, an instance of sensory awareness. She was also experiencing a very slight pleasure at the way the colors in the salad looked. Anna may have experienced this pleasure partially as a vibration in her vision, but she was very unsure when talking about this aspect of her experience. Also in Anna’s awareness was both the experience of her own laughter and the laughter of her friends.

SA – colors in salad

F (w/ possible visual component)– pleasure

JD?/SA? (form uncertain) – laughing

M

Beep 6.1 – Anna was at the computer watching a jackpot wheel spin. She had just finished ordering a prescription on the phone. At the moment of the beep, Anna was in the process of thinking that she had just gotten the prescription filled and that she could check it off her list of things to do. Anna was innerly saying to herself in her own voice “check it off the list” with the understanding that the “it” was getting her prescription filled. Anna was also experiencing the lingering taste of coffee in her mouth from a sip she had about 15 seconds prior to the beep. She was also hearing the girls (Linda and Rosalynn?) shout back and forth between the upstairs floor and the ground floor.

IS – check it off the list

SA – taste of coffee

SA – hearing shouting

M

Beep 6.2 – Anna was at the computer playing poker on the second floor of her house. Anna’s partner Linda was down stairs talking to Anna and doing the dishes. Linda was talking about alternative personalities and this was somehow related to Linda currently being in therapy. At the moment of the beep, Anna was feeling apprehension which she was experiencing as a fluttering feeling in her chest and throat that was just below the skin. She was also hearing Linda talk and hearing the sound of the dishes that Linda was doing. She also may have been aware of a 2 that had just come up on the screen while she was playing video poker.

F – apprehension

SA – voice,

SA – dishes

SA ? (presence uncertain) – 2

M

Beep 6.3 – Anna was on the computer. At the moment of the beep, Anna was in the process of planning. She was thinking that if she left her house at 12:30 that she would have time to drop them (the daughter and perhaps the other daughter or a friend) off at Buffalo Exchange going to UNLV. Anna was thinking in her own voice “If I leave by 12:30, I can drop ‘em off before.” Anna understood that she was dropping them off at the Buffalo Exchange before going to UNLV and did not verbalize that part of the thought. She was also feeling her finger tapping the mouse button.

IS – If I leave...

U – Buffalo Exchange/UNLV

SA – mouse

M

Beep 6.4 – Anna was at the computer working on an article she is writing. She was reading a part of the article where she had written about a helicopter-carrying ship. At the moment of the beep she was re-reading “which would divide and slide open and allow a helicopter pad to be raised to deck level.” At the moment of the beep, Anna was innerly seeing the scene she was re-reading. She was innerly seeing a colorful scene including the deck of the ship splitting and the helicopter pad rising. There was no helicopter on the pad. Anna was also in the process of gradually changing the

perspective from which she was seeing the image. The perspective started from above and then went below the deck, as if she had gone through the deck of the ship. The image under the deck was of the elevator. There was also a light green light under the deck. From this perspective she was primarily interested in how the elevator worked. Also at the moment of the beep, Anna was thinking about what was in Harold's imagination (Harold is a character in the book). There were no words in this thought, but rather the understanding of the concept. Anna was also seeing an after image of the last few words she was reading. They appeared as if they were coming toward her off of the computer screen and were fading away.

I – boat w/ helicopter pad

U – Noah's imagination

I – afterimage of words

M

Beep 6.5 – Anna was having difficulty getting the lid on a to-go cup of coffee. At the moment of the beep, Anna was innerly speaking in her own voice “Damn to go cup, lid doesn't fit.” She was also feeling the pressure on her hand as she was trying to screw the lid on the cup.

IS – damn to go cup

SA – hand pressure

Beep 6.6 – Anna was sitting in the garage waiting for the girls (again, I'm not sure exactly who the girls are), who she was going to take with her in the car. At the moment of the beep, Anna was innerly saying in an angry tone “those girls had plenty of warning.” She was also feeling exasperation that she was experiencing as tightness in her upper chest. There may also have been a sense of being taken for granted, being unappreciated, and that she was so good while they were so bad although it is not clear how or if this was in her experience. She may also have been aware of the heat in the garage.

IS – plenty of warning

F – exasperation

F?/U? (form and presence uncertain)– granted/unappreciated/so good vs. so bad

SA? (presence uncertain) – heat

Benjamin's Samples

Samples from day one were not coded due to typical unreliability of reports on the first day.

Beep 1.1 – Benjamin was cleaning a birdbath in his yard. A sparrow had begun tweeting a second or two before the beep and this tweeting continued through the beep. The sparrow was very close to Benjamin, within a few feet of him. At the moment of the beep, Benjamin was recognizing that the sparrow was close to him. This was just a

recognition with no apparent symbols. Benjamin was also hearing the sparrow tweet at the moment of the beep.

(?) – recognition of closeness of sparrow

(SA) - hearing sparrow

Beep 1.2 – Benjamin was in his yard talking to his sister Max and his neighbor Linda. They were talking about the maximum time that could exist between beeps as it had not sounded for a long period of time. Benjamin had just said before the beep that he thought that it had been over the maximum amount of time since the beep sounded. He then looked at Linda who had a puzzled look on her face. At the moment of the beep, Benjamin was looking at Linda and may have been expecting her to say something via interpretation of her expression. He was not entirely certain if this was occurring at the beep or slightly before the beep. Benjamin was also aware of the puzzled look on Linda's face at the moment of the beep.

(?) – expectation of other speaking; noticing puzzled look

Beep 1.3 – Benjamin was coloring a white stripe of glue that he used to fix his birdbath to match the color of the rest of the birdbath. Before the beep, Benjamin had realized that the crayon he was using might not last. He then thought something similar to “You know this wax crayon might not last on here. Well then I'll have to try something different like paint.” This thought was in words and the beep definitely came at some point during the second sentence, mostly likely at the beginning part of the second sentence but Benjamin was not entirely certain about this. He was also not certain of the exact wording of the experience. The experience had all of the qualities of external speech except that it probably occurred faster than external speech, but again, Benjamin was not entirely certain.

It is also likely that this experience did not have vocalized qualities based on later sampling with Benjamin.

(Unvocalized Inner Speech?) (form uncertain)– birdbath coloring

Beep 2.1 – Benjamin was in his house playing Sudoku on a hand held electronic device. He was having some difficulty with the game, but had just figured out many of the numbers. At or very near the beep, Benjamin had five overlapping experiences. First, Benjamin was innerly saying “I got it now,” referring to figuring out the numbers on Sudoku. This was experienced internally as if he was externally speaking, but the words came significantly faster and did not have qualities such as volume and pitch. Second, just after this inner saying had begun, Benjamin became aware of his sister Laura speaking on a phone in another room in the house. Right at the beep, Benjamin was hearing Laura speak, but was not comprehending what she was saying. Third, a motorcycle was approaching on the street in front of Benjamin's house. Benjamin was hearing the sound of the motorcycle at the moment of the beep. Fourth, Benjamin was aware of the smell of chicken being cooked. Finally, Benjamin was faintly aware of the sound of traffic passing by his house. The sound was a whooshing sound.

Unvocalized Inner Speech – I got it now

SA – hearing Venus

SA - hearing motorcycle

SA - smelling chicken

SA - hearing traffic

M

Beep 2.2 – Benjamin was listening to classical music on the radio but was not aware of the music at the moment of the beep. Benjamin was mulling over who the composer of the music he was, trying to think of many possibilities. At the moment of the beep, Benjamin was thinking that it was Rossini. The word “Rossini” was definitely present at the moment of the beep, but it had no auditory or visual qualities. It also was not experienced as being spoken, but was simply present in Benjamin’s awareness. There also may have been a wondering what the title of the piece was that was connected to the Rossini experience, but Benjamin was not entirely certain. Benjamin was also aware of someone yelling somewhere in front of his house. The Rossini experience began slightly before the yelling, but both appeared to be present at the moment of the beep.

Worded Thinking - Rossini

U? (presence uncertain) – title of song

SA – screaming

M

Beep 2.3 – Benjamin had just finished writing his response to 2.2. Just moments before the moment of the beep, he had heard an unrecognizable sound like that of an engine. Just a split second just before the moment of the beep, Benjamin had innerly said, “Is that a vehicle?” This was similar to previous beeps in that it was just like external speech except that it was faster, but it was before the beep. It is also very likely that this experience did not have vocal qualities such as volume, pitch, and inflection.

Simultaneously, Benjamin heard a car horn, which was still sounding at the moment of the beep and was in Benjamin’s awareness at the moment of the beep. At the moment of the beep, Benjamin was innerly saying “Is that on South Street?” Again, this was just like external speech except that it was faster and did not have vocalized qualities. The beep seemed to come immediately after he finished “street.” Benjamin also believed that he was smelling dinner and had knowledge that dinner was soon, but this may have been just before and after the beep with the sound of the car horn temporarily eliminating these two experiences from awareness. The knowledge that dinner was coming soon was not in words. If these two things were present at the moment of the beep they were at a very low level.

Unvocalized Inner Speech – Is that on South Street?

SA – car horn

SA? (presence uncertain) – smell of dinner

U? (presence uncertain)– knowledge of dinner being

M

Beep 3.1 – Benjamin was in his library writing a note. He was stuck and was trying to find words that he wanted to use. At the moment of the beep, Benjamin was trying to find a way to say something similar to achievement or accomplishment. He was looking for a way to try to accurately communicate this. There were no actual words present in

his awareness. Benjamin also may have been hearing the swooshing sound of nearby traffic but he was not certain.

U – searching for words

SA? (presence uncertain) – swooshing of traffic

M? (presence of SA uncertain)

Beep 3.2 – Benjamin was still in his library writing and was still having some difficulty. At the moment of the beep, Benjamin may have been innerly saying “Not so easy.” This experience was just like external speech, but occurred very fast, almost instantaneously and did not have vocalized qualities such as volume or pitch. However, Benjamin was not entirely certain that this experience was present at the moment of the beep and believes that he may have created it upon thinking about what he was experiencing at the moment of the beep. Benjamin was also hearing the sound of footsteps walking on a nearby stairway. Benjamin was also hearing the whooshing of the traffic. This was present, but was not as strong in his awareness as the sound of the footsteps.

SA – hearing footsteps

SA – hearing traffic

Unvocalized Inner Speech? (presence uncertain) – not so easy

M

Beep 3.3 – Benjamin was discussing with his sister Tracy the battery power left in a clock in his garage. Benjamin was saying “The second hand is twitching. I guess there’s not enough power to advance it.” The beep came between the words “power” and “to.” Benjamin was not particularly aware of anything at this beep.

Just Talking

Beep 3.4 – Benjamin had just finished writing the summary to beep 3.3. He was outside near his garage. He had just asked Tracy if she had found the battery to replace the old one in the clock. She said “Mmm, hmm.” The beep came between the “mmm” and the “hmm” and Benjamin was hearing this. However, primarily in Benjamin’s awareness at the moment of the beep was the fact that the sunlight was bright. The sunlight itself was not in awareness, but the fact that it was bright was. Benjamin was also hearing one or more sparrows tweeting and the sound of traffic nearby.

U – brightness

SA – hearing “mmm.hmm”

SA – hearing sparrows

SA – hearing traffic

M

Beep 3.5 – Benjamin had just walked to the front of his house near the street. A car turned from a nearby intersection onto the street in front of his house. The driver was a girl who faintly smiled at him. Just before the moment of the beep Benjamin thought “Don’t think I know her.” This was immediately followed by “Can’t stay here, too loud” which occurred at the moment of the beep. This experience was in reference to the volume of the traffic. Both thoughts were like external speech but occurred much faster and had no vocalized qualities. Benjamin was also hearing the traffic.

Unvocalized Inner Speech – can't stay here

SA – hearing traffic

M

Beep 4.1 – Benjamin was paging through a National Geographic in his house. He stopped at a page with an article about honeybees. Also on the page was an advertisement that had a map of the United States with pictures of various fruit and/or vegetables in different states representing what was grown in that state. At the moment of the beep, Benjamin somehow knew that he was going to read the article about the bees. This experience was not in words and images, but was just knowledge. Benjamin was also hearing a male voice on the television, but was not comprehending what he was saying or hearing any individual words. He was also hearing his sister Tracy talking. He also was not comprehending what she was saying or hearing any words in particular. Benjamin was also hearing a truck pass on the street in front of his house. Benjamin was also looking at the map when the beep sounded. Specifically, he was looking at the state of Washington which had a cherry and an apple in it. Benjamin was not sure if the state of Washington and/or the cherry and the apple were in his awareness, but he thought that it was possible.

U – knowledge of reading

SA – hearing man on television

SA – hearing sister Tracy

SA – hearing truck

SA? (presence uncertain) – seeing Washington and/or apple and cherry

M

Beep 4.3 – Benjamin had just finished writing his response to 4.2. At the moment of the beep, he was quickly going over it to make sure that there were no major errors. He was not comprehending what he was reading. He was also hearing his sister Stephanie talking on the phone. He was not comprehending what she was saying or hearing any words in particular.

SA – hearing sister Max

Beep 4.5 – Benjamin was walking through his kitchen to go outside. At the moment of the beep, Benjamin was innerly saying, “Gonna go sit on the glider.” The words occurred very fast, almost instantaneously. It was as if Benjamin was speaking the words and the words were definitely present. However, there were no vocalized qualities to the experience. The words had no volume, no pitch, and either no or flat inflection. The experience was apparently “spoken but not auditory.” Benjamin also may have been hearing his sister Stephanie laugh at the moment of the beep, but the laughing may have ended just before the moment of the beep.

Unvocalized Inner Speech - gonna go sit on the glider

SA? (presence uncertain) – hearing Stephanie laugh

M? (presence of SA uncertain)

Beep 5.1 – Benjamin was sitting outside on his glider. He was reviewing notes written by an acquaintance who is in ill health. At the moment of the beep, Benjamin was

thinking about the health of this man. There were no words or images accompanying this thought. This thought was not strong in Benjamin's awareness, but it was definitely present. Benjamin was also faintly aware of the sound of sparrows tweeting. There may have been more than one, but Benjamin was not certain. He was simply hearing the sparrow(s).

U – health of man

SA – hearing sparrows

M

Beep 5.2 – Benjamin was still on the glider reading notes. His sister had found a small figurine of a sad looking dog. She gave it to Benjamin to look at. At the moment of the beep, Benjamin was chuckling, but this was not in his awareness. He was hearing the sound of sparrows and one car whooshing by in front of his house. This was barely in his awareness, but Benjamin believed that it was indeed in awareness.

SA – hearing sparrows

SA – hearing car

M

Beep 5.3 – Benjamin was walking through his living room. Benjamin stated that he was telling his sisters Max and Venus that the interviewer had told him to disregard beeps that occur when he is writing notes for the previous beep, then there was a two second pause, the beep sounded, “and that was it.” The interviewer asked him if there was anything in his awareness at the moment of this beep. He paused for a few seconds, and then said that he was aware of the presence of Max and Venus. The interviewer, being skeptical due to the pause, asked Benjamin if this was in his notes and he said no. The interviewer asked Benjamin why this was not in his notes if he was aware of it at the moment of the beep. This caused Benjamin to be more skeptical of this being in his awareness.

No Inner Experience

Beep 5.4 - Benjamin was in his house writing about a genealogy report. Benjamin had written the sentence “Set one part of the record straight.” He was contemplating changing this to “To help to set the record straight.” At the moment of the beep, Benjamin had made the tentative decision to go with “to help to set the record straight” but this decision was not final yet. There were no words present in this experience. Benjamin was also hearing his sister Judy laughing and a car accelerating.

U – to help to set the record straight

SA – hearing laughing

SA – hearing car

M

Beep 6.1 – Benjamin was standing in his garage cleaning a knife. At the moment of the beep, was looking at the knife and was aware of it. This was the primary part of his awareness. Benjamin was also aware of feeling chilly, mostly in his hands, but throughout his body. Benjamin was also hearing the sound of a motor.

SA – knife

SA – chilly

SA – hearing motor

M

Beep 6.2 – Benjamin was in his garage. He was thinking about cleaning the earpiece of the beeper. He was considering possible ways to clean it. At the moment of the beep, Benjamin was thinking about water and alcohol as a means of cleaning the earpiece. This experience was not in words. Benjamin was also noticing the colors outside as he viewed them through the garage window. He was noticing mostly green, but also pink, white, and yellow.

SA – colors outside

M

Beep 6.3 – Benjamin was listening to the radio. A Schumann symphony had just begun. Just prior to the moment of the beep, Benjamin thought “Good, nice music.” This experience was in words, as if he was speaking them, but had no vocalized qualities such as volume, inflection, and pitch. It also occurred almost instantaneously. Although this experience occurred just prior to the moment of the beep, it was somehow still present at the moment of the beep. At the moment of the beep, Benjamin was also aware of the taste of a lemon drop in his mouth. He was also hearing the symphony. He may have also been aware of the sound of the television, but Benjamin believed that this was unlikely.

Unvocalized Inner Speech – good, nice music

SA – taste of lemon drop

SA – hearing symphony

SA? (**presence uncertain**)– hearing television

M

Beep 6.4 – Benjamin was thinking about the lemon drop in his mouth. At the moment of the beep, he was wondering if he was really aware of the sweetness of the lemon drop. Benjamin was also hearing the sound of a car that had just past by and the Schumann symphony still playing. Benjamin was not 100% certain that he was hearing the Schumann symphony, but he was fairly certain.

U – wondering about sweetness

SA – hearing car

SA? (**presence uncertain**) – hearing symphony

M

Clara's Samples

Although beeps from day one were counted in the analysis, they should be taken with some additional skepticism as Clara was not initially familiar with the DES process. Participants often require at least a day to become acclimated to DES and produce reliable reports of momentary inner experience.

Beep 1.1 – At the moment of the beep, Clara was waiting for the beep of the beeper to go off. She was wondering if it was going to go off and what it was going to sound like. This was a thought process or a mental event that contained no words or images.

U - waiting for the beep; wondering what the beep would sound like

Beep 1.2 – Clara was lying in bed and was wondering about the internal mechanism that causes the beeper to go off and how the beeper works in general. At the moment of the beep, Clara was innerly seeing the beeper. She saw the beeper with the clip on it and appeared largely as the beeper appears in reality. This seeing was in black and white, with the beeper being a light gray.

I – image of beeper

Beep 1.3 – Clara prefaced this beep by saying that it “will give you problems.” She was trying to decide what headstone she wants for her husband’s and her grave. At the moment of the beep, Clara was innerly seeing a headstone. It was a double headstone that was rectangular in shape. Her husband’s name and the date of his death were on one side of the headstone, although by the time of the interview Clara had forgotten which side it was on. The inner seeing was in black and white and the headstone was a grayish-black marble.

I – headstone

Beep 1.4 – At the moment of the beep, Clara was innerly seeing a room at a Las Vegas casino where family members recently stayed. She was seeing the room as if she was standing in the doorway. There were three windows, a television, and a bathroom in the room she was seeing. This was experienced in black and white.

I – room at the Wynn

Beep 1.5 – Clara was expecting three relatives. At the moment of the beep, she was innerly seeing all of them. All of the family members were facing her. Her sister-in-law was in a wheel chair and was being pushed by her sister-in-law’s son. This seeing included only these individuals and had no environmental surrounding. It was also in black and white.

I – family members

Beep 1.6 – Clara was knitting and had made a mistake. At the moment of the beep, she was having an inner seeing of herself ripping the blanket she was knitting. The inner seeing was in motion and she was seeing her hands rip the blanket just as she would see it if she was actually ripping the blanket. This experience was in black and white.

I – ripping blanket

Beep 2.1 – At the moment of the beep, Clara was drinking coffee and was aware of waiting for the beeper to sound and wondering if it would sound. This was a mental process that did not contain any words, images, or symbols, nor did it contain any emotional or physical experience.

U – waiting for beeper to go off

Beep 2.2 – Clara was knitting. She was thinking “Why am I knitting this baby blanket, it’s stupid.” The beep sounded on the word “stupid”. This sentence was spoken in Clara’s own inner voice and had qualities resembling external speech. This phrase was experienced as having a critical tone and contained a feeling of stupidity. This feeling was not separable from the phrase, but was contained within the phrase.
IS – the phrase ending in “stupid”

Beep 2.3 – Clara was calculating how many balls of yarn she needed for knitting. She was using a pencil and paper to do the calculation. At the moment of the beep, Clara was writing the number “5” on her paper, which was the solution to her calculation.
JD – writing “5”

Beep 2.5 – Clara’s friend Joan had sent her a picture of Wayne, Clara’s recently deceased husband. Clara was in the process of writing a thank you note to Joan, and paused while she considered what to write. At the moment of the beep, Clara was somehow visualizing Wayne’s face as it had been shortly before he died. However, there was no actual face being innerly seen, although it was understood to be a seeing phenomenon. There was also a feeling of sadness that was connected to this visual experience; this sadness was somehow experienced in her head. She was also thinking/feeling irritated at Joan for sending the picture—an irritation that, if expressed in words (which it was not) might be something like, why did she send it, she should mind her own business, I don’t want a picture like this, butt out! This negative thinking/feeling, contrasted with her general sense that she should say thank you for sending the present, had brought the letter writing to a temporary halt.

Imageless Seeing – visual experience of husband’s face without image

F – sadness

F – irritation

M

Beep 2.6 – Clara was sitting in her apartment and looking out the window. She had moved to Las Vegas approximately within the past year. At the moment of the beep, she was wondering why she was not adjusting to living there better than she has been. This was experienced as an unworded thought process that was accompanied with the definite presence of the word “adjusting,” although no spoken words or images of the word were actually experienced.

U?/WT? (form uncertain)– wondering about not adjusting

Beep 3.1 – Clara had just picked up the mail and was looking at it. She was looking at the word “Kim” in the return address. At the moment of the beep, she was innerly saying the word “Kim” in her own voice. This word was a single word and not part of a sentence. Also at the moment of the beep, Clara was wondering why Kim had sent a card and was surprised that she sent the card. This experienced thinking did not contain symbols.

IS – Lois

U – wondering/surprise

Beep 3.2 – Clara was thinking about a conversation she had had with her daughter and grandson at a restaurant the night before. At the moment of the beep, she was thinking about the conversation the night before in general. Clara was focused on the conversation as a whole, not on some specific part of it. This experience contained no images or words. At the same moment, Clara was also thinking of the word “Sara.” The phone was ringing, and Clara was thinking the name of the person she suspected was calling. Although Clara is sure that this word was in her experience, it was not spoken, heard, or seen.

U – dinner conversation

Worded Thinking – Donna

M

Beep 3.3 – Clara was going to have a friend over for dinner and was mentally going through a menu of things she might cook. At the moment of the beep, she was thinking about what she was going to cook. She was thinking about cooking stir fry with shrimp, with the focus of her awareness on the shrimp. She is not sure if this focus was occurring exactly at the beep or very near the beep. This experience contained no words or images.

U – stir fry/shrimp

Beep 3.4 – Clara was experiencing pain and numbness in her hand due to arthritis. At the moment of the beep, she was aware of the fingers of her right hand being in a curled position and a numbness throughout each of the fingers. She was also frustrated by the pain which was an intense emotional experience. Clara stated that she felt like she wanted to cry, although the literal experience of wanting to cry was not in her awareness. She was not sure if this part of the experience was in her head or contained in her body.

SA – pain in fingers

F – frustrated by pain

Beep 3.5 – Clara was sitting in her front yard watching traffic and thinking about an experience she had had the previous week. She had been at the DMV, and because she had a walker, she had been instructed to go to the beginning of the long line of people. At the moment of the beep, she was innerly seeing a long line of people. This line was on her right and the people were facing largely away from her at a diagonal, left to right. There was no background. This seeing was clear and detailed, but in black and white.

I – line at DMV

Beep 3.6 – It was almost lunch time and Clara was wondering what she was going to have for lunch. At the moment of the beep, she was thinking about food. She knew that she was going to have to have something to eat, but was not sure what. She was also trying to determine what she was going to have. There were no images or words in this experience.

U – food

Beep 4.1 – Clara was in the kitchen cooking. At the moment of the beep, she was innerly speaking the sentence “Why am I having to cook today?” The beep was simultaneous

with the word “cook”. This inner speaking had the qualities of speech and was said in a somewhat neutral tone, although it was an interrogative statement.

IS – cooking

Beep 4.2 – Clara was in the kitchen. At the moment of the beep she was innerly saying “Now I have to do the dishes.” The beep came between the words “to” and “do.” Clara was also aware of feeling compelled to do the dishes. However, this feeling did not seem to be separate from the words and did not exist independently from the words.

IS – dishes

F? (presence uncertain) – dishes

Beep 4.3 – Clara was standing in her living room. At the moment of the beep, she was thinking about whether to clean the bathroom or to dust the living room. This was a wondering about the next course of action she would take that contained no words, images, or symbols. It was a “mental thought.”

U – clean or dust

Beep 4.4 – Clara was looking at towels in her bathroom. At the moment of the beep, she was wondering what towels to put out. This was a wondering that was similar to the wondering that occurred in Beep 3.6 (wondering what to have for lunch). This was an interrogative mental process with no words.

U – towels

Beep 4.5 – Clara was standing in the living room after she had finished cleaning. At the moment of the beep, Clara was innerly saying to herself “Why am I so slow getting things done now. Is it part of old age or having less to do?” Clara was sure that words were present, but she was not sure whether or not these words were experienced vocally. Either the words were present and were heard vocally or the words were present without any vocal qualities. Clara was also sensing an emotion of frustration. This frustration was a mental process and was not independent of the verbal experience.

IS?/WT? (form uncertain) – slow

F– frustration

Beep 4.6 – Clara was walking into the bedroom and was looking at clothes with the intent to change. At the moment of the beep, Clara was innerly saying “I better change clothes”. Clara was not sure where in the sentence the beep came.

IS – clothes

Beep 5.1 – Clara was in her bedroom getting dressed. At the moment of the beep, she was thinking about going outside to sit because it was so nice out. She was aware of the desire to sit outside, the fact that it was nice out, and the link between the two. This was a mental process with no words or images.

U – going outside

Beep 5.2 – Clara was sitting outside knitting. She was innerly speaking in her own voice “Flowers, leaves, and green grass in March.” The beep came on the word “grass.” She

was also innerly seeing a small group of flowers standing in a dirt bed. She was not certain what kind of flowers they were, but they were small and similar to pansies and viewed from a perspective that was within a few feet. The inner seeing was in black and white.

IS – grass

I – flowers

M

Beep 5.3 – Clara was outside knitting. She was innerly speaking in her own voice “Why am I living alone? Some of the relatives think it’s strange that I can do it.” The beep occurred on the word “alone.” She was also aware of being angry at the moment of the beep. This anger was a mental process with no symbols or physical sensation. The inner speaking was more prominent in her awareness than the anger. Clara estimated a ratio of 85 to 15 between the inner speaking and the anger.

IS – alone

F – anger

Beep 5.4 – Clara was outside knitting. She was innerly speaking in her own voice “Should I go to the high school reunion or shouldn’t I? Who will be there?” The beep came on the words “high school”.

IS – high school

Beep 5.5 – Clara was outside knitting. She had saw a television news program earlier in the day regarding the sodium content of different Chinese dishes. She was mentally comparing the sodium content of the different Chinese dishes she and her relatives ate the previous day. At the moment of the beep, Clara was innerly seeing the letters “Na”. These letters were meant to stand for sodium. The “N” was capitalized and larger than the “a” which was lower case. The letters were dark on a light background. This experience was similar to the flowers inner seeing in beep 5.2, but different in the sense that it was experienced as a more natural process. The letters were thin as if written by a pen. She was not aware of the comparison or anything other than the letters at the moment of the beep.

I – Na

Beep 5.6 – Clara was outside knitting. The previous day she had gotten copies of pictures of her brothers. These copies contained four pictures on approximately an 8x11 inch sheet. At the moment of the beep, Clara was innerly seeing this sheet that was very similar to how it exists in reality. This experience was very clear. Clara could make out the details in each of the four pictures (such as who was in each picture, the positions of the people, and some of the surrounding details). This experience was in brown and white (as the reproductions were in real life). Also at the moment of the beep, she was also innerly speaking in her own voice “The picture of my brothers were reproduced and they came out better than the originals.” Clara was not sure if this was the exact phrase she was innerly speaking, but she was certain that the beep came on the word “reproduced.”

I – pictures

IS – reproduced

Beep 6.1 – Clara was thinking about the shootings that occurred at Virginia Tech earlier that day. At the moment of the beep, she was thinking, “How useless it was. (pause) The poor parents.” The beep came during “the poor parents.” These words were in her awareness, although they weren’t spoken, heard or seen. The entire phrase occurred all at once. That is, the phrase “the poor parents” appeared simultaneously, not in a sequence where “the” came first, “poor” second, and “parents” third.

Worded Thinking – the poor parents

Beep 6.2 – Clara was staring at a picture of her and her husband. At the moment of the beep, she was not aware of any inner experience other than the seeing of the picture. She stated that she had been staring at the picture for approximately 20 minutes, as if she had been locked on to the picture. Clara found this weird and surprising; she believed she had never done this before. She attributed it to the shock of the Virginia Tech killings.

JD – staring at picture

Beep 6.3 – Clara was thinking about the shootings that occurred at Virginia Tech earlier that day. At the moment of the beep, Clara was thinking “all those people that were killed.” This experience was similar to that of 6.1. There were words in her awareness, although they weren’t actually heard or seen. They also occurred simultaneously, not in sequential order like they would if the words would be spoken aloud.

WT – people killed

Beep 6.4 – Clara had just finished a phone call. At the moment of the beep, she was wondering whether or not she should go out with Mary (the friend who just called). This was a cognitive process that most likely contained no words or images; Clara did allow the possibility that there were words involved, but she could not be sure.

U – go out or not

Beep 6.5 – Clara was thinking of how she could talk a family member into letting her have her car for the weekend while the daughter was out of town. At the moment of the beep, Clara was innerly speaking “Can I talk Lisa into letting me have the car this weekend when they go out of state?” The beep came near the word “car.” Clara was producing this speech internally in what was experienced as her own voice.

IS – car

Beep 6.6 – Clara received a call from her grand-daughter prior to the beep. At the moment of the beep, she was wondering how her grand-daughter was going to fly out of New York back to Iowa because there was bad weather in New York. She was also experiencing worry at the moment of the beep, although she was not sure how she was experiencing this worry. The wondering and the worry occupied approximately equal parts of her awareness.

U – flight

F – worry

M

Dolly's Samples

Although beeps from day one were counted in the analysis, they should be taken with some additional skepticism as Dolly was not initially familiar with the DES process. Participants often require at least a day to become acclimated to DES and produce reliable reports of momentary inner experience.

Beep 1.1 – Dolly was on her computer, working on designing a brochure. At the moment of the beep, she was feeling frustrated: she did not like the design even though she had been working on it for a long time, and would have to change it again. This frustration was experienced as a pressure that pushed inward in the middle of her torso below her heart. This was a somewhat intense emotional experience.

F – pressure in torso

Beep 1.2 – Dolly was using color blocks on a piece of paper to work on her brochure. At the moment of the beep, she was thinking why making the brochure was so hard today and was experiencing frustration. She did not think there were words associated with this experience but was not entirely sure. This was more of a mental experience than a physical feeling.

U?/F?(form uncertain) – frustration/feeling of difficulty

Beep 1.3 – Dolly was turning her arm to look at her watch. At the moment of the beep, she was thinking that she needed to take a break. This experience was not in words. Dolly was also feeling frustrated near the beep, but was not sure if she was experiencing frustration at the moment of the beep.

U – take a break

F?(presence uncertain) – frustration

Beep 1.4 – Dolly was on the phone with a friend. At the moment of the beep, the friend was talking about her relationship. Dolly was mostly withdrawn from the conversation, tracking just enough of it to know when it would be her turn to respond. At the moment of the beep Dolly was wondering why her friend is still in the relationship that she always complains about. Dolly was not certain if there were words in this experience, but she thinks there were not words. This was a clear experience of which she was certain.

U – relationship

Beep 1.5 – Dolly was writing an email; typing but not paying any attention at all to what she was typing. At the moment of the beep, she was thinking that she was ready to give up for the day. Dolly believes this was a cognitive event, but was not entirely sure. The experience was very clear.

U - give up

Beep 1.6 – Dolly was on the computer and had just glanced at the layout of her brochure on the table. At the moment of the beep, she was experiencing satisfaction at her brochure.

U?/F? (form uncertain) – satisfaction

Beep 2.1 – Dolly was sitting outside drinking coffee. At the moment of the beep, she was innerly saying “I enjoy the outside quiet.” This inner speaking had the same characteristics as external speech. The beep sounded right after the word “quiet.” Dolly was also enjoying the external quiet as well as the internal quiet at the moment of the beep, but it was difficult to say how this enjoyment took place. She also said she was experiencing inner quiet even though she was speaking to herself; even so, she understood this inner speaking to be somehow quieter than her inner chatter had been earlier.

IS – quiet

F – enjoyment

M

Beep 2.2 – Dolly had just finished reading the phrase “to enjoy the humorous moments in life.” After reading this, Dolly said out loud “Yes, if I find humor in problems they won’t seem so bad.” The beep came between the words “problems” and “they.” This speaking occupied a substantial portion of her experience. Also at the moment of the beep, Dolly was experiencing some kind of mental realization, like an “a-ha” moment, that if expressed in words would be something like: Right! I do take things too seriously! This realization was experienced in her head, from the top of her head to the middle of her chest, and was more of a mental experience than a physical experience. The description of this “a-ha” experience seemed to be being done via reconstruction rather than a direct memory of the experience, and therefore we are more skeptical of this feature of her experience than others.

F?/U? (form uncertain) – a-ha experience

Beep 2.3 – Dolly was standing at her sink, holding a pot, and looking out the window. None of that was in her experience at the moment of the beep. At the moment of the beep, she was having an inner conversation with herself, innerly saying “Do I want another cup of coffee?” and answering, “No, not really.” The beep occurred just after the word “really.”

IS – coffee

Beep 2.4 – Dolly was outside meditating. At the moment of the beep, she was having no inner experience. [In general, she said that part of the purpose of this meditation is to quiet the mind.]

No Inner Experience- meditating

Beep 2.5 – Dolly was walking around the house attempting to determine what she should do. She was innerly saying “I have so much to do, where should I start? Unload the car.” The beep came between the word “unload” and the word “the.” Her eyes were aimed at the stacks of papers and boxes that awaited her actions, but those objects were not in her attention at the moment of the beep.

IS – unload the car

Beep 2.6 – Dolly was trimming the rose bushes just outside of her house. Although she was engaged in the act of pruning, being careful to get things right and not get stuck by a thorn, etc., that action was not in her experience. At the moment of the beep, she was looking at the line of rose bushes and enjoying their beauty. This was largely a visual experience.

SA – rose bushes

Beep 3.1 – Dolly was making a to-do list and was about half way finished. At the moment of the beep, Dolly was thinking that she had a lot to do before she left. Dolly stated initially was a verbal thought that contained words, but the words were not heard or spoken. But subsequent discussion led the interviewers to believe that that statement may have reflected Dolly’s presuppositions, and that the thought was more likely unsymbolized. There also may have been things “rattling around” in Dolly’s mind, and as she wrote them on her list, they exited her mind, but she was not sure if this was in her awareness at the moment of the beep. When surveying her situation in responding to the beep, Dolly recognized herself as feeling overwhelmed, reflected in an increased heart rate and breathing changes, but this was not in her awareness at the moment of the beep.

U– a lot to do

FFOB – overwhelmed

Beep 3.2 – Dolly was sitting at the computer doing research on video cameras she was considering buying. She was looking at different models of cameras on her computer screen. At the moment of the beep, Dolly was wondering what camera to buy. This was a mental process that contained no words or images. She was also aware of what was on the computer screen.

U – wondering

Beep 3.4 – Dolly was at the computer writing an email to her sister. At the moment of the beep, Dolly was in the act of typing. She was tightly focused on typing and was not sure what was in her inner experience at the moment of the beep if anything. She may have been thinking of the word she was typing but was not sure.

JD – typing

Beep 3.5 – Dolly had just walked into the kitchen. At the moment of the beep, she was thinking “What should I fix for lunch?” This experience was as if Dolly was internally speaking in her own voice. The beep came somewhere in the vicinity of the word “fix.”

IS – lunch

Beep 3.6 – Dolly was writing a check. At the moment of the beep, she was thinking about all the bills she would have to pay the next month while she would be traveling. At the moment of the beep she was making a distinction between bills that had to be paid at the end of the month and bills that had to be paid at the beginning of the month, but it was not clear how and if this distinction was present in her awareness. There were no words or images in this experience. When surveying her situation in response to the beep, Dolly could recognize anxiety in her body. But that was not present in her awareness at the moment of the beep.

U – bills
FFOB – anxiety

Ellen's Samples

Ellen's samples from day one were not included in the analysis due to unreliability but are presented here.

Beep 1.1 – Ellen was visiting a group home and was speaking with a man that has a terminal illness. The man was talking and somewhere near the beep, he was choking on his food. Ellen reported that near the moment of the beep she was wondering how much it costs to stay in the group home and was wondering what his room was like. She also stated that she was also worried about his choking, but she was not sure if this was at the moment of the beep. Ellen was also not sure if she was having a “deeper” thought at the moment of the beep. She was also not sure if the merger between Daimler Benz and Chrysler had been trashed.

Difficulty Appending Experience

(U?/F?) (form and presence uncertain) - wondering, worrying, merger

Beep 1.2 – Ellen was speaking with the same man. He had been talking about his grandchildren and how recently they visited. She reported that near the moment of the beep she was concerned and sad. Ellen reported that she may have first thought that his grandchildren do not visit him often and that this led to the experience of concern and sadness, but she was very uncertain about this. She initially described this experience as an image, although she said that there was nothing visual present in her awareness. Dr. Kevorkian may also have been in her awareness at or near the moment of the beep, but this was not described further.

Difficulty Appending Experience

(F?/U?/I?/Imageless Seeing?) (form and presence uncertain) – concern and sadness

Beep 1.3 – Ellen was still speaking with the same man. He had mentioned that his quality of life was low and that he would rather die sooner than later. She reported that near the moment of the beep she was accepting this idea. She believed that this acceptance was an acceptance of the logic of the man's statement. As with other beeps, Ellen had difficulty distinguishing the form of this acceptance. She believed that it was most likely that the experience was either emotional in nature or was a thought process that did not contain words.

Difficulty Appending Experience

(F?/U?) (form uncertain)– acceptance

Beep 1.4 – Ellen was driving and listening to the Dr. Laura radio program. She had realized that Dr. Laura had misunderstood the caller. She believed that near the moment of the beep she was experiencing annoyance regarding Dr. Laura's misunderstanding but was not entirely certain.

Difficulty Apprehending Experience
(F?) (presence uncertain) – annoyance

Beep 1.5 – Ellen reported that near the moment of the beep she was thinking, will they (the experimenters) ask me what happened just before the beep. She was not sure if this experience came before the beep or if it was a reaction to the beep. She was also not sure of the form of the experience.

Difficulty Apprehending Experience
(Form Unknown) - what will experimenters ask?

Beep 1.6 - Ellen was about to go to the veterinarian. She reported that near the moment of the beep she was thinking that she should call before going to make sure they had the pills she needed. Ellen was not questioned about this beep, but reported it at the end of the sampling interview.

(Form Unknown) – needing to call veterinarian (insufficient interview)

Beep 2.1 – Ellen was listening to the news on the radio. The radio had just announced a potential terrorist plot in London. At the moment of the beep, Ellen was thinking “They picked London again.” Ellen thinks that the beep came after the word “again,” but she was not entirely sure. At first, Ellen seemed quite certain that this experience contained words but that it had no auditory component (i.e., she was not internally speaking the above phrase or innerly hearing it). With regard to questions of form, Ellen repeatedly said that her thought was a reaction to the news on the radio. After further questioning, Ellen was certain that she was innerly speaking the above phrase. The interviewer repeatedly stressed that it was possible to have words with or without auditory qualities, but by the end of the discussion, she was certain that she was innerly speaking and did not know why she said she was not at the beginning. Nevertheless, Ellen’s uncertainty and inconsistency is grounds for substantial skepticism regarding both the nature and presence of this experience.

Difficulty Apprehending Experience
IS?(form uncertain) – London

Beep 2.2 – Ellen was taking apart an old pair of running shoes and noticed that there was a heel pad in only the left shoe. At the moment of the beep, Ellen was wondering if the having the heel pad in only one shoe had a negative effect. There may have been a mild worrying or concern associated with this experience, although she was not certain. This was a “mental thing” that contained no words, images, or emotional components.

Difficulty Apprehending Experience

U – heel pad

U?/F? (form and presence uncertain) - worry/concern

Beep 2.3 – Ellen was sorting through a number of papers related to a car she had purchased. She was searching for a particular piece of paper and was looking at a sales slip. It was difficult to pinpoint Ellen’s experience at the moment of the beep. At first she stated that she was worried and that there was tension in her upper body, but she could not state where. She then thought that this worry was in her head, experienced as

tightness behind her eyes. She later said that she may have been somehow experiencing tension, but this was not in her awareness at the moment of the beep. She stated at this point that what was in her awareness was that it was not self-evident that this was the paper that she needed, that she was frustrated with herself and concerned that she would have to continue searching. She reported that there were no words or images in this experience. At this point, Ellen was very frustrated by the questioning process. Therefore, questioning about this beep was stopped. A clear understanding of Ellen's experience at this beep could not be discerned.

Difficulty Apprehending Experience

F?/U? (form uncertain)– sale's slip (tension, frustration, concern)

Beep 2.4 – Ellen was trying to recollect the place where she took some courses many years ago. She was trying to find the telephone number of her friend who might know and was looking at a list of telephone numbers. At the moment of the beep, Ellen was experiencing three things simultaneously. First, she was asking or wondering if her friend would know. This was a “mental process” with no words, images or emotions. Equally as prominent in her awareness was the asking or wondering if her friend was there. This also had no words, images, or emotional content and was a “mental process”. She was also asking “Should I use the cell number?” This experience was a bit less prominent than the other two. Ellen was 80-90 percent sure that this experience was in words. At first she said that the words were not in her own voice, but shortly later said that they were. She was not sure why she initially said they were not in her own voice.

Difficulty Apprehending Experience

U – will the friend know?

U – is the friend there?

IS? (form uncertain) – should I use the cell number?

M

Beep 3.1 – Ellen was at a funeral service and was sitting behind Margaret, a woman Ellen knows. At the moment of the beep, Ellen was visualizing Margaret sobbing. This inner seeing was of Margaret the way Ellen had seen Margaret a few days earlier. Margaret was seen from about the chest up; that was the portion of Margaret that Ellen had actually seen earlier, since Margaret had been sitting behind a table. The imaged Margaret was facing Ellen and seemed to be located about five feet away from her. This was a still picture. There was some color to the picture (Margaret's hair was blonde) but Ellen was not confident in the presence of other colors. Other specific details could not be described. At the moment of the beep, Ellen also knew why Margaret did not say any words at the funeral (because it was too emotional for Margaret). This knowledge did not contain any words or images.

Difficulty Apprehending Experience?

I – woman sobbing

U – knowledge

Beep 3.2 – Ellen was standing inside a funeral home talking to Paula. Ellen had just finished saying something to Paula and noticed that the woman was no longer “connecting” with her. Ellen stated that at the moment of the beep she knew that the

woman was not interested in talking to her, was thinking that she was overdoing it as usual, was feeling self-conscious, and was experiencing tightness in her throat or mouth. Ellen also reported that she may have been aware of the fact that other people were near, but because she was very unsure about whether this was in her awareness or not at the moment of the beep, it does not seem like a reliable report. Ellen also stated that the experience that the woman was no longer interested in her was both a feeling and a thought. She had substantial difficulty describing the form of this experience and often went back and forth in her explanations. Therefore, Ellen's report on the form aspect of this experience is not very believable. Ellen stated she then thought that she was overdoing this (i.e., talking too much), but again was not sure if this was in her awareness at the moment of the beep, and therefore should be met with skepticism. The form of this experience was also not explained, but it was a familiar self-judgment. She stated that she then experienced tightness in her throat or mouth and the feeling of self-consciousness. These experiences may have come in the above sequential order. They were all reactions that seemed familiar. In general, Ellen had difficulty focusing in on the moment of the beep. She also changed her answers quite frequently and often made contradictory statements regarding her experience at this beep. Therefore it is difficult to discern what, if any, of Ellen's description was actually in her awareness at the moment of the beep.

Difficulty Apprehending Experience

U?/F?/SA? (form uncertain) – entire experience

M? (not sure if one or many experiences)

Beep 3.3 – Ellen was backing out of a parking space in a parking lot. Another car was going to pass her, driving toward her from her right. She was looking at this car. Ellen initially stated that at the moment of the beep, she was determining if she should wait or pull out, but she wavered in her certainty as to the existence of this experience at the moment of the beep. She also said that she was judging or criticizing herself, telling herself to just make a decision as to whether to pull out or not and to quit dawdling. She stated that this self-judging was automatic and that there were no words in any of these experiences. The only aspects of this beep that Ellen seemed confident in were the actual external events occurring at the beep and that there were no words in her experience at this beep. Ellen went back and forth in her descriptions of what was in her awareness at the moment of the beep. This raises skepticism about any and all of the specific contents reported at the moment of this beep.

Difficulty Apprehending Experience

U? (form uncertain) - pulling out decision

U? (form uncertain) - self-criticism

Beep 4.1 – Ellen was watching a quiz program on the television. There was a question with choices for the answer presented on the screen. Ellen was looking at the choices on the screen. One of the answers was “L’il”. At the moment of the beep, Ellen was recognizing that “L’il” was the correct answer. This recognition was not in words, but was a thought process. There was also an ongoing angst or generalized anxiety that made her jumpy. It seemed mostly mental/emotional, mostly in her head. As far as Ellen could

tell, she was not directly experiencing this at the moment of the beep, but it was nonetheless occurring somehow.

Difficulty Apprehending Experience

U – L'il

F? (presence uncertain) – angst

M? – (not sure if F is present)

Beep 4.2 – Ellen was shopping and was looking at a white jacket. At the moment of the beep she was comparing the weight of the fabric in the jacket to the weight of the fabric in a pair of pants that she already owned that might go with the jacket. There was a knowledge that the jacket was heavier than the pants and that they would not go well together. At first, Ellen stated that she was innerly seeing the two items; later she said that there was nothing visual about the experience; later still, she said the experience had a visual component even though she was not innerly seeing anything. She did not seem to have access to how the comparison was being made, and yet she was in the act of comparing, as if everything (color, weight, jacket, pants) was somehow implied in some organic whole.

Difficulty Apprehending Experience

Imageless Seeing?/I?/U? (form uncertain) – jacket/pants comparison

Beep 4.3 – Ellen was standing in the kitchen. At the moment of the beep, Ellen was having three experiences. First, Ellen was wondering if she got five beeps already. There were no words in this experience; it was a thought process. Second, she was wondering if the beeper was working. Again, this was a thought with no words. Third, she was hearing an almost inaudible sound and was wondering if it was coming from the beeper. Ellen was not sure if these experiences occurred simultaneously or if they were in very close sequential order. These experiences were distinctly different but tightly connected in that they were all about the same subject. There did not appear to be anything wrong with the beeper, it simply had appeared to have a longer than normal delay between beeps.

Difficulty Apprehending Experience? (not certain of sequential nature)

U – five beeps

U – is beeper working

U – inaudible sound

M? (not sure if overlapping or not)

Beep 5.1 – Ellen was on the phone to Cox cable. She was looking at and specifically seeing the clock, which read 4:50. At the moment of the beep, she was acknowledging the fact that if Cox is open until five, then she will not make it! She was somehow assessing how long it would take to drive there, somehow recognizing that she would take I95, but there was nothing specific in her awareness about this. There were no words or images in this experience. She was also annoyed that she wasn't going to make it, but the annoyance was not apparently being experienced directly. The annoyance was part of the acknowledgment that she wouldn't make it and was the reason for the exclamation point that was somehow known to part of that thinking even though the thinking was not in words.

U – not going to make it

Beep 5.2 – Ellen was reading the New York Times. She was about to rip the first column of page 1 so she could show it to Louise, a friend Ellen knows through a class they take together. At the moment of the beep, there was some internal pressure to start the ripping process. Also at the same time, Ellen was remembering Louise’s telling her that she was not going to be in class Friday. Ellen was remembering the gist of what Louise had said—that she would be leaving for Europe on Tuesday—but there were no symbols in this experience; it was a recalling without words or images. Ellen was also thinking that she had better cut the newspaper with scissors. There were also no symbols associated with this experience.

U – pressure to rip

U – Mary Ann

U – scissors

M

Beep 5.3 – Ellen was watching the McNeil report on television. A senator was on the television talking about leaving Iraq. He had made a comment regarding what other countries would think if we left Iraq to Al-Qaeda. At the moment of the beep, she was thinking that it was a ridiculous argument/stupid statement. She was being critical of the statement’s meaning. There were no words or images in this experience. There was also a feeling of agitation/irritation about this comment ongoing in her body (when assessed at the beep) but not in her experience at the moment of the beep.

U – stupid statement

FFOB - agitation/irritation

Beep 5.4 – Ellen was talking with her friend Louise on the phone. Ellen had asked what Louise was doing and Louise said she was watching M*A*S*H. At the moment of the beep, Ellen was recognizing that M*A*S*H was on now and that maybe she should change the channel to watch it. There were no words or images in this experience. Ellen was also feeling insecure that Louise did not really want to talk to her. This was an underlying concern that Ellen was aware of at the moment of the beep. Ellen was not sure if this was experienced in her body, and if so, where in her body it was experienced.

Difficulty Apprehending Experience? (not sure of if experienced in body or not)

U – change channel

F – insecurity

M

Beep 5.5 – Ellen’s dog was whining. At the moment of the beep, Ellen was feeling quite strongly irritated about the dog being spoiled. Ellen initially said that this irritation was throughout her body, but later said that it was more mental than physical. She was also trying to decide if she should get the dog a treat. There were no words or images in this experience. The irritation had begun before she considered getting the dog a treat, but both were present at the moment of the beep. Although the exact form of the irritation is uncertain it appeared that Ellen was somehow experiencing irritation at the moment of the beep.

Difficulty Apprehending Experience

F? (form uncertain)– irritation

U – treat

Beep 5.6 – Ellen was watching Jeopardy. The question involved a novelist from Minnesota. At the moment of the beep, Ellen was trying to think of the novelist from Minnesota. At first, Ellen said she was thinking the words “novelist from Minnesota,” but she had some difficulty describing the nature of this experience. At first she was not sure if she was hearing the words or saying the words internally; then she was not certain or even if the words were present at all; she later said that she was saying the words to herself. Due to Ellen’s difficulty accessing her experience additional skepticism is needed for this sample.

Difficulty Apprehending Experience

U?/IS?/IH? (form uncertain)- novelist from Minnesota

Beep 6.1 – Ellen was driving, but apparently little or no attention was devoted to this task. At the moment of the beep she was thinking, “I think I would call myself a liberal democrat.” At first, Ellen could not discern whether or not this thought was in words; perhaps “a liberal democrat” was in words but the rest of the thought was not. Eventually, Ellen believed that the entire sentence was present in words, but these words were not heard or spoken and all the words were in her awareness simultaneously rather than being spoken in a sequence. Although Ellen was certain of this by the end, her initial uncertainty leaves room for skepticism.

Difficulty Apprehending Experience

Worded Thinking?/IS? (form uncertain)– liberal democrat

Beep 6.2 – Ellen was listening to the McNeil report on the radio and looking at a tote bag. At the moment of the beep, Ellen was wondering if she dropped her eraser upstairs where she stores her tote bag. This wondering did not contain words. Ellen was also visualizing the spot where she leaves her tote bag. She was innerly seeing the bottom part of the corner of her bedroom wall and part of the floor. She may also have been innerly seeing the tote bag leaning against that wall, but was not sure. She saw something against the wall, but it was not very vivid. The entire inner seeing was dark and unclear. The thought seemed to have started before the inner seeing, and then continued so that both thought and inner seeing were present at the moment of the beep. This example is considered not clear because although Ellen is convincing that she was experiencing an inner seeing at the moment of the beep she had some uncertainty about one of the substantial details of the inner seeing (i.e., the presence of the tote bag).

Difficulty Apprehending Experience? (not sure if tote bag in inner seeing)

U – eraser

I - bottom corner of wall

Beep 6.3 – Ellen was having a conversation on the phone with her friend Jane. Jane had just said something regarding a 14.99 percent interest rate. At the moment of the beep, Ellen was thinking that 14.99 for a couple of hundred of dollars does not sound right.

There were no words in this experience. This experience was a process of inner calculation.

U – interest rate

Beep 6.5 – Ellen was talking on the phone with someone at Cox cable company. At the moment of the beep, Ellen was wondering where she had left her water bottle. She did not believe that there were words present in this wondering but was not entirely certain. Also, Ellen originally stated that at the moment of the beep she was wondering if Cox has a record of whether or not she returned the remote. The wondering about the Cox record experience did not contain any words or images. However, on further reflection Ellen decided that the wondering about the Cox record experience had ended just before the moment of the beep.

Difficulty Apprehending Experience

U? (presence uncertain) – water bottle

Beep 6.6 – Ellen was watching the Lehrer report on the television. The person on the television had said that John McCain had lost some people close to him on his campaign and referred to these people as a “band of brothers”. At the moment of the beep, Ellen was considering the words “band of brothers” and the idea that McCain had lost them. She was echoing the words “brothers left” internally, but she was not saying or hearing these words. Fay also may have been feeling empathic (“humanistic”) towards John McCain, and she may have been feeling some kind of reaction to her own brother’s having left her years ago, but it was not clear to Fay or to us whether or not this was actually in her awareness at the moment of the beep.

Difficulty Apprehending Experience

WT –brothers left

F? (presence uncertain) – empathy

M? (not sure if F is present)

Fay’s Samples

All of Fay’s beeps are worthy of substantial skepticism. It seems unlikely that any of Fay’s reports reflect her inner experience to a meaningful extent. Therefore, forms are not given at the end of each summary. Even in the few instances that a guess could be made regarding the form of Fay’s experience, her reports are still substantially unreliable so it would be misleading to give report such guesses.

Beep 1.1 – Fay reported that near the moment of the beep she was thinking about a church that she used to attend but is now closed. She also mentioned that she may have been envisioning that it was run down, but she was not at all certain about this. Other possibilities at this moment reported by Fay were thinking about a meeting she had the previous night, thinking about how to get to the church, and thinking about what the church might look like.

Beep 1.2 – Fay was sitting at breakfast reading Atlantic Magazine. At the moment of the beep, she was looking at a picture of Poncho Barnes, a female aviator that she initially believed was a movie star. There were many reported possibilities of the contents of Fay’s inner experience at or near the moment of this beep. These reported possibilities were an awareness of movie stars trying to look sultry, that sultriness has changed over the years, that these old pictures might be valuable, that Charles Lindberg did not like female pilots, noticing the cigarette being smoked in the picture, being critical of smoking, and being fascinated by the picture of someone looking sinful. Some of these possibilities were suggested by the interviewers that Fay confirmed as possibilities and some were created by Fay without suggestion by the interviewers.

Beep 1.3 (reported 5th as Fay accidentally skipped it earlier in the interview) – Near the moment of the beep, Fay reported that she was wondering why the beeper was not sounding. She may have also been thinking that it was not set right and/or that maybe something was wrong with the beeper.

Beep 1.4 – Fay was at a thrift store and was about to try on some shorts. Near the moment of the beep, Fay believed that she was hoping that the shorts would fit her and may have been wondering if the shorts would fit her.

Beep 1.5 – Fay was at her rental house. Near the moment of the beep she may have been experiencing frustration about having to re-paint parts of the house, thinking about having to re-do the paint, and/or thinking about putting water in the refrigerator to keep it cold.

Beep 1.6 – Near the moment of the beep Fay believed that she may have been thinking about putting the paint bucket and paint brush away and getting ready to leave. She also suggested that she may have been wishing she had started an hour earlier.

Beep 2.1 – Fay was at her rental property. She reported having three experiences at or near the moment of the beep. She frequently wavered regarding which of the three components was in her awareness. Fay reported that she was innerly seeing herself holding a broom and moving from the front door of her property toward a dust bin. This seeing reportedly contained movement. However, Fay was not sure of the viewpoint from which the seeing was being perceived, making the interviewers skeptical about whether an actual inner seeing was involved. Fay also reported that at or near the moment of the beep she was innerly seeing a property manager whom she had not hired. The inner seeing reportedly was of her face, from the front, in color with medium clarity. The face was expressionless. Finally, Fay stated that she was innerly seeing the property manger she had hired. This was reportedly a full-body image from the front.

Beep 2.2 – Fay was at her rental property. She noticed that there were stones on a walkway. Fay stated that at the moment of the beep she realized that she should sweep the stones and that this was one more thing that she needed to do. She could not describe the form of this experience other than stating that it was not in words (Fay suggested that she doesn’t think in words). It is notable that when asking Iris about the form of her

experience and giving her examples of possible forms during this beep, she stated “I don’t quite get all of these distinctions.”

Beep 2.3 – This beep was caused by Fay turning the beeper on and off. Fay stated that at or the moment of the beep she was remembering that one interviewer told her about running the headset cord under her shirt for added stability. Further details of this beep were not clear.

Beep 3.1 – Fay was watering plants at her rental property. At the moment of the beep, she was thinking about a conversation she had with Beth, a woman she knows, about the Alzheimer’s research project in which Fay is involved. Beth was telling Fay that Beth has symptoms of Alzheimer’s Disease. When Fay was asked about her awareness at the moment of the beep, Fay continually referred to numerous facts about the conversation. When given several options regarding the form of her experience at this beep, she said that she was visualizing the woman. This report requires some skepticism because 1. she did not mention visualizing the woman until the option was presented and 2. she continually referred to how Beth actually looks rather than the visualization she was reportedly having and 3. she used multiple subjunctifiers when describing this beep (I guess, probably, etc.). Fay eventually stated that she was visualizing the woman from the front. The woman was probably by herself and was wearing a black bathing suit. This was a head-to-toe image. Fay’s report of visualizing the black bathing suit is one example of how she often used external reality to describe her inner experience: she stated that she was visualizing her in a black bathing suit she usually sees the woman wearing a black bathing suit. Likewise, she stated that the beep was clear because “I’ve seen her quite a few times in the last year.” Fay also reported hearing the woman talk in the inner seeing. She could not report what exactly was taking place in the conversation at the moment of the beep. She was not hearing the woman speak word for word, but was rather recalling the gist of the conversation (the woman talking about her symptoms of Alzheimer’s Disease). Again, Fay’s description of this aspect of her experience was frequently subjunctified and often seemed to refer to the reality of the conversation rather than her experience of it.

Beep 3.2 – Fay was looking at a zucchini plant at her rental house. Fay’s experience at the moment of this beep was difficult to discern. She repeatedly intermingled background knowledge, realities of the external world, and often shifted her reports of what was occurring in her inner experience at the moment of the beep. Fay described having a feeling of anticipation/accomplishment regarding the large size of the zucchini at the moment of the beep that was more of a mental process than a physical sensation. She also reported visualizing the zucchini on the plant being ready to harvest. The leaves were “enormous” and there was another smaller zucchini on the plant. She also said that she was noticing that the bloom itself getting very large. She states that she may also be thinking of the zucchini growing.

Beep 3.3 – Fay was thinking about her conversation with her handyman. Again, when Fay was repeatedly asked about her experience at the moment of the beep, she would recount most if not all of her actual conversation with him rather than her actual inner

experience . She initially stated that at the moment of the beep she was remembering the conversation mostly by visualizing him. However, when questioned for the details of this experience, she did not or could not give any details of this visualized handyman, referring instead to how he actually looks (i.e., he has grey hair, is usually wearing blue jeans, etc.). The interviewers were left being highly skeptical of the existence of the visualization at the moment of the beep. She also stated that she may have been hearing him talk. She could not recall exactly what he was saying or if there were specific words present in her experience. She thinks she may have been aware of the gist of the conversation at this beep. Finally, Fay stated that it was possible that in “the recesses of her mind” she was thinking that he was not perfect, that he was better than some, and thinking of other handymen’s short comings but because she could not seem to describe what was prominent in her experience, much less what was in the recesses of her mind; and also because she had so much trouble sticking to her inner experience on this particular day (as well as others), it is difficult to know how or if at all these aspects were a part of her experience.

Beep 3.4 – A few days earlier, Fay and her husband had had a conversation about going to Victorville. Now, Fay was thinking about reasons why she had been against her husband’s planned trip to Victorville and how she had not wanted to go on the trip. In this instance again Fay repeatedly described the actual conversation with her husband and could not focus on a particular moment. Fay stated that at the moment of the beep she was thinking about various aspects of the conversation, mostly her reasons for not wanting to go. These reasons included it being too hot, staying in a crowded house, and the travel distance required, especially when only staying for the weekend. It was very difficult to discern which of these experiences, if any, were in her awareness at the moment of the beep. When asked about her inner experience, she repeatedly referred to the actual facts of the trip rather than her inner experience, suggesting that what she described as being in her inner experience may not have been in her experience at all at the moment of the beep. Fay also had substantial difficulty describing how she experienced these things.

Beep 3.5 – Fay was thinking about Samantha, a woman Fay knows, and Samantha’s unhappy marriage. While questioned about her inner experience at the moment of the beep, Fay consistently and repeatedly described the actual situation surrounding the marriage and apparently could not focus on one particular moment or aspect of her experience. She described various aspects of Samantha’s actual marriage rather than Fay’s inner experience. These things included Samantha’s unhappiness, the unhappiness of Samantha’s and her husband’s relatives, and Samantha’s incorrect pre-conceptions that her husband had a great deal of money. Because Fay could not seem to distinguish between her own experience and the facts of Samantha’s marriage, we are highly skeptical about Fay’s reports about her experience at this beep.

Beep 4.1 – Fay was reading an article in AARP magazine about the state of health insurance coverage in the United States. When asked “What was in your experience at the moment of the beep” numerous times and in a variety of ways, Fay often focused on external realities or inconsistent descriptions of what she was experiencing at or near the

beep. Initially when asked this question, she described the contents of the article. When asked again she described Medicare. When she was directed to her inner experience, she said she was thinking about her own health care coverage, thinking about uncovered people, thinking about the article, and thinking about someone who cannot afford health care coverage for his family. The description of her inner experience was very inconsistent and subjunctified, however, and should be met with skepticism.

Beep 4.2 – Fay was chopping tofu. She had recently had a conversation with Mary, a woman Fay knows, about Mary’s father and procedures to have elderly people who can no longer function on their own being declared incompetent. Again, Fay provided inconsistent, subjunctified descriptions of what was occurring in her experience at or near the beep, but could not answer detailed questions about her experience in the least. Fay first stated that she was thinking about procedures for getting elderly people declared incompetent, but could not answer any detailed questions about this experience (i.e., questions of form or what was specifically in her awareness at the moment of the beep). She then said she was thinking more about Mary’s father, but again could not describe this experience at all. She then said she was thinking about her own father’s situation in 1992. All were advanced as descriptions of what she was thinking about at the moment of the beep. The fact that all were distinctly different and were not apprehended as being simultaneous leads to the conclusion that none (or at least not all) were actually descriptions of her experience.

Beep 4.3 – Fay was reading an article in Newsweek about John F. Kennedy. The article debated whether he was a great president or a spoiled rich boy who was not a great president at all. When asked about her inner experience, Fay instead described the article itself and events in JFK’s presidency. She sometimes said things that could be understood to be descriptions of inner experience. For example, at one point she said that at the moment of the beep she was reading and understanding the article; later she said she that at the moment of the beep she was debating whether JFK was a great president or not; later she said that at the moment of the beep she was thinking that maybe the article was right—JFK was a spoiled rich boy. Largely though, she described the actual article or actual events in JFK’s presidency when asked about her experience at the moment of the beep.

Beep 4.4 – Fay was cooking. Fay offered a variety of descriptions of her experience at this beep: thinking about taking Subway sandwiches to church on Wednesday, thinking about turning tofu to get the sauce on all sides of the tofu, thinking about having had Subway sandwiches on the previous Sunday night, thinking about how Subway sandwiches are healthy and not greasy like Kentucky Fried Chicken or McDonald’s, and thinking about an incident at Subway on Sunday night when a man was kicked out for drinking alcohol. She could not zero in on any one of those as being *the* thought that was occurring at the moment of the beep, nor did she say that all were occurring simultaneously. When asked for details of any particular thought, Fay typically shifted to providing a new thought or unrelated detail. For example, Fay initially said that she was visualizing the alcohol-drinking incident at Subway. When asked about this visualization, she described how Subway actually looks. Fay did not appear to be

describing her experiencing at this beep, but rather the external reality of the Subway shop.

Beep 4.5 – Fay was playing Scrabble with her husband. She responded in a variety of ways when asked about her inner experience at this beep. The word “tap” was on the board and Fay was considering making the word “tape” and “gloved” off of this word. When asked about her experience, Fay explained game strategy—the importance of rack management, of “closing the board” when you are ahead, of “opening” it when you are behind, and of getting bingos. All were advanced as if she were describing her experience at the moment of the beep, which almost certainly was not the case.

Beep 4.6 – Fay was still playing Scrabble. At the moment of the beep, she was considering a play to make. She was considering putting a “q” on a double letter score and getting a double word score so that she could get 40 points for the “q”. She was checking various locations on the board for where she could put the “q” and recalled that there were at least two locations. Still, Fay could not answer specific questions regarding her inner experience at this moment.

Beep 5.1 – Despite the fact that we were present in Fay’s house, in the next room waiting for her to report that the beeper had sounded, it was difficult to determine what was in her experience at the moment of the beep because her accounts of her experience varied from one portion of her account to the next. As best I can understand it, Fay was thinking about two violation letters that she had signed earlier that morning in her role on a neighborhood committee. This thinking was described at various times in her account as being glad that the association chairman of the committee was back, that the assistant chairman is difficult to deal with, that the assistant chairman has her own agenda, that one of the letters would mean that the resident had to go to another committee, that one of the letters would simply be a notice, that one of the violators had a long history of violation, a file an inch thick, and so on. Fay’s account made it appear, as each one of those topics was being described, that that topic had been present in her awareness at the moment of the beep. However, there was no sense of multiplicity or overlap. When asked whether any of this, for example, the board chairman, was visual, she said “Yes, I can see him”; but when reminded that the object of this study is not to determine what she *can* see but what, if anything, she *was* seeing at the moment of the beep, she was unclear.

Beep 5.2 – Fay was playing Scrabble on her computer. She was looking at the screen and was about to put an “A” and a “K” next to a “Z” that was already down on the board. At the moment of the beep, Fay was thinking about playing the “A” and the “K” on the “Z”, was thinking that this was probably her best play and that it would probably maximize her points. Fay initially said that she was thinking about playing the “K” on the “Z” and the “A” on the “Z” but later said that she had already made the decision to play the “K” and the “A” on the “Z”.

K
ZA

Beep 5.3 – Fay was playing Scrabble on her computer and at the moment of the beep Fay apparently somehow thinking about the word “slotter.” Fay’s descriptions of this thought process were inconsistent, so it is impossible to know exactly what was in her awareness at the moment of the beep, but the general idea was wondering whether or not “slotter” was a word; that she would play it and find out whether or not the computer would reject it or not; that she could remember that the word had been played in some past Scrabble game, but she couldn’t remember the outcome of the protest. These sub-thoughts may have all been parts of the same thought process that were all present at the moment of the beep, or they may have been explicit thoughts that were in the vicinity of the beep but not simultaneous, or they may have been ways of describing her activity, none or which was actually present in her experience at the moment of the beep. We pressed her on those issues. For example, we asked twice if there were words in her experience at the moment of the beep and both times described external reality (i.e., the words on the Scrabble board and that she didn’t know if “slotter” was a word or not) instead of answering directly about her experience. Thus Fay’s reports of her experience seemed discursive or wandering; however, there did seem to be limits on how far that wandering could go. For example, Fay confidently and believably said that she was not, at the moment of the beep, thinking of other computer Scrabble systems and their ways of responding to incorrect words, but may have been thinking about that near the beep. This may be evidence that Fay has some reliable access to her experience at the moment of the beep. However, the investigators’ overall impression was that Fay did not, even when interviewed immediately after the beep, distinguish adequately between what was in experience at the moment of the beep and what were the characteristics of the situation surrounding her at the moment of the beep.

Beep 5.4 – Fay was playing Scrabble on her computer. She was thinking about playing the word “VENOM”. There were two different O’s on the board that she could play this word through. Both gave her a double word score, but one also put the “V” on a double letter score. At the moment of the beep, Fay may have been noticing that the “V” could go on a double letter score, but Fay was not confident or consistent in her reports of her experience at this beep. Fay at another point stated that the other option (the non-double letter score option) may have been in her awareness as well. After discussing the beep for some time, Fay stated that she may have been congratulating herself at the moment of the beep for finding the play using the double word score. She was inconsistent in her description of this self-congratulation. This experience was described alternately as a feeling of happiness, and an awareness that she is good and/or smart. This feeling was described as a mental process, but Fay could not describe the experience of this process further. Fay also did not describe this feeling until directly asked about emotion. She also said at one point that the feeling was more prominent in her awareness than the noticing of where to play the “V”, but typically described the noticing as prominent. This may be evidence for undifferentiated experience as she could not consistently state which experience was prominent at the moment of the beep. Fay was able to rule out some experiences that were occurring prior to the beep, suggesting some differentiation and an ability to focus on the moment of the beep.

Beep 5.5 – Fay was playing Scrabble at her computer. She was looking at a rack with all consonants. Fay was again inconsistent in her descriptions regarding her experience at the moment of the beep. She at one point during the interview that she was wondering what to do (i.e., whether she should play the rack or exchange her letters), but later said that she thinking of a series of specific plays she could make. She also stated at one point that she was thinking that she doesn't have many prospects with the board and tiles she had to work with. Fay stated that all of these experiences were in her experience simultaneously, but the inconsistency of her report and inability to describe these experiences in detail suggests that this may not have been the case.

Gary's Samples

Beep 0.1 was a practice beep and was not recorded in the analysis as it was used for training purposes only. Beeps from day one were also not scored or analyzed as Gary forgot to bring his notebook to the interview. Beeps from day two were not used as Gary was uncertain of the procedure and collected some of them two days prior to the interview. Therefore, only days three through six were used in the final analysis.

Beep 0.1 - Gary was just outside of the DES lab talking with one of the interviewers about where he and his wife could go while Gary was wearing the beeper. It was a sunny day and the discussion involved walking a short way across campus. At the moment of the beep, Gary was concerned about his wife getting sunburned. He was innerly seeing her, somehow from the front, side, and back at the same time, although this was not fully investigated. In the inner seeing she was in a green muumuu that she used to wear often. Gary said that she was wearing a hat in the inner seeing, but only agreed after one of the interviewer suggested this possibility. This suggests that the hat may not have been in his awareness at the moment of the beep. It was sunny in the inner seeing without much background. Gary was also thinking about being interested in being a participant in the study and hoping that he could help. Gary did not initially describe this experience as occurring in words, but when it was suggested he said that he was thinking in words something similar to "I'm interested in being a subject in this study and I hope to be of some benefit to the study." Because Gary did not suggest that this experience was in words until suggested by the interviewers, this report should be taken with high skepticism. Gary thought that he may have been innerly speaking the words, but that they weren't heard. This was not fully investigated, however, as this beep was meant to demonstrate the process and not frustrate the participant.

(I) – wife sunburned

(IS?) (presence uncertain) – being in study

Beep 1.1 - During this beep it appeared that Gary was arguing with his wife about the budget. Since neither of them work very much, they have to be careful about their budget. Gary was not able to report any inner experience at the moment of this beep. It may be that no inner experience was occurring at this beep, that inner experience was occurring but Gary could not remember without the aid of his notebook, or Gary did not

entirely understand the task, as is common on the first day of sampling. Gary admitted that he did not understand the depth of the task throughout the training exercise.

Beep 1.2 – For this beep Gary stated that he was riding in the car with his wife at one point and may have been feeling sad because he can no longer. He went on to explain that he attempts to be a backseat driver when riding with his wife. At one instant it appeared that while he was riding with his wife he was innerly seeing a street map of the way home. It was not clear if this was occurring at one of the beeps or not. Gary was asked to re-create this inner seeing. The re-created inner seeing was of unlabeled streets represented as black lines on a light background. Only the streets that Gary was traveling on were in the inner seeing. There was also a square that represented his house. Although the streets were unlabeled, he understood which street was which.

Beep 2.1 (two days prior to interview) – Gary was cleaning up dog poop in his back yard. At the moment of the beep, Gary was experiencing pain in his joints. This pain was present in about 6 of his joints. Gary was not sure which joints had the pain, but he referenced his shoulders, elbow, knees, and hips. Gary eventually said that his lower back had the most pain. This pain was a dull ache. Gary was also thinking about the ramifications of a TIA he had five days prior to the interview. He was thinking “How serious is this? Will this lead to complications?” These words, or words similar to them, seemed to be present to Gary at the moment of the beep. There was no voice associated with the words. They came much faster than if he were speaking them out loud, but still occurred in sequence.

(SA) – pain

(WT) – ramifications of TIA

Beep 2.2 (two days prior to interview) – Gary’s descriptions of the beep varied substantially. He was also frequently uncertain about the contents of his awareness at this moment. Gary was sitting at his desk doing paperwork for his elevator business. At the moment of the beep, Gary was somehow thinking of a particular business item he was working on, but was not sure which one. He was somehow trying to be accurate about his work, but it was not clear whether this accuracy was in his awareness at the moment of the beep. He was also wondering if his customer would question any potential problems with the item or if they would not worry about it and have a problem later.

Beep 2.3 – Gary was cleaning his car seats. At the moment of the beep, Gary was thinking something similar to “Is this really a stroke or TIA or is this going to go away and not come back or is it going to get worse?” As in beep 2.1, these words occurred very quickly and were not audible or spoken, but were somehow present to Gary. Gary was also paying attention to cleaning the car seat, which comprised about an equal part of his awareness as the thought.

(WT) – stroke

(JD) – cleaning

Beep 2.4 – At the moment of the beep, Gary was still wondering whether the incident Saturday was a TIA or a stroke. He did not think that he was thinking about this for the entire 20 minutes between beeps, but the beep caught him thinking about similar things.

Beep 3.1 – Gary was in his home reading the newspaper. He had just turned to a page with an article about a pastry chef with an accompanying picture and had just read the caption to the picture. At the moment of the beep, Gary was wondering if his daughter's roommate knew the pastry chef or if she worked with him. This thought was in words, but had no auditory qualities. Although specific words were present, Gary agreed that there were many ways that the experience could be described that were equally as accurate (i.e., has my roommate's daughter ever worked with or known the pastry chef, I wonder if my roommate's daughter has worked with or knows this pastry chef, etc.). The thought was experienced very quickly (less than a second) and was almost simultaneous with the beep (Gary could not discern whether it occurred a moment before, a moment after, or at the exact time of the beep).

WT - daughter's roommate and pastry chef

Beep 3.2 – Gary was in the kitchen getting ready to make a bowl of cereal. He was looking at various boxes of cereal. At the moment of the beep, Gary was trying to determine which type of cereal he was going to eat. This was a mental process that did not contain words or images.

U – deciding cereal

Beep 3.3 – Gary was getting ready to leave with his wife, but his wife was on the phone with the medication company. At the moment of the beep, Gary was thinking that they had to leave right now or they were going to be late. This experience was similar to 3.1 in that words were present but there was no auditory quality to them, the experience could be described equally well using a variety of words, and it occurred very quickly.

WT – late

Beep 3.4 – Gary was riding in the passenger seat of his car talking to a client on his cell phone. At the moment of the beep, Gary was talking, but this was not in his awareness as it was “automatic.” Gary was thinking “when are you going to be ready for our installation?” The “you” referred to the client he was talking with (Gary asked this exact question to his client a couple of seconds after the beep). This experience was similar to that in beeps 3.1 and 3.3 in that there were words present but no auditory qualities and that it happened very quickly. It was different in that those exact words best describe the experience. Gary also may have been innerly seeing two workers bending to lift an indiscernible object (most likely a rail or panel of some sort) that began to form just after the above experience (Gary is not sure when exactly the beep came in this sequence). The men were about five to six feet apart and viewed as if Gary was standing about five feet away from them. There was not much of a background and there were no edges to the inner seeing. The inner seeing was in black and white. There are two reasons for skepticism regarding this report however: 1. Gary did not mention the inner seeing until the possibility of an inner seeing was suggested. 2. Gary often answered questions about the details of the inner seeing by saying “They would be...” and “It would be...” as if he

was not describing an actual inner seeing, but an inner seeing like it would have appeared were he having an inner seeing at that moment.

WT – ready for installation

I? (presence uncertain) – two men lifting

M? (presence of I uncertain)

Beep 3.5 – Gary was in an elevator. At the moment of the beep, he was thinking “Oh darn, we’re late, I wish we could get started a little earlier.” This experience was similar to 3.1 and 3.3 (it contained words but there was no auditory quality to the words and it happened very quickly). The “Oh darn, we’re late” part of the experience contained those specific words, but the rest of the experience could be described just as accurately using variations in the wording. Gary may also have been experiencing mild irritation at the moment of the beep. This was a mental process. It was not clear if this was a separate experience from the experience above or if it was somehow contained within the experience above. Gary did not mention this aspect of his experience until the very end of the description and did so off-handedly, but believed it was present at the moment of the beep when questioned. This increases skepticism regarding this particular component of the beep.

WT - late

F? (presence uncertain)– irritation

M? (presence of F uncertain)

Beep 4.1 – Gary was eating breakfast. At the moment of the beep, he was thinking about his wife Alice’s eye problems, about the seriousness of her eye problems, the possible consequences of her eye problems, and was worried about their seriousness. This was experienced as one long sentence that went something like “I wonder how serious Alice’s eye problems will be and if she will be okay and what the doctor will say and what the consequences might be...”etc. This sentence occurred faster than external speech and although it did not have any auditory qualities, it did have characteristics of speech, such as pauses and inflections at appropriate places. He also reported that it was as if the words were being spoken but the auditory part of the speech was taken away, but later he reported that there may have been something visual about this experience, like the words were moving across his visual field from left to right one at a time, but there was no actual seeing of the words and it was not like reading. The interviewers were unable to resolve this seeming inconsistency. It was clear that there were words, and that these words were sequential, that the sequence was faster than would occur if spoken aloud, and that there was some inflection and rhythm to the words but how all that was conveyed was not clear. Gary also may have been experiencing some concern for his wife’s condition in addition to that expressed in the above experience, but this was not clear and if it were present it was very slight.

WT (w/ possible visual component) – eye problems

F? (presence uncertain) – concern

Beep 4.2 – Gary was gathering things that he needed to leave his house and was talking to Alice. At the moment of the beep, Gary was wondering if he had everything that he needed to leave, if Alice had everything she needed to leave, and was thinking about a

doctor to whom he owed money. These thoughts were similar to the experience in 4.1, in that they were in words, perhaps somewhat like speech but with no auditory component, and were faster than regular speech, but also perhaps somewhat visual. The experience was different from 4.1 in that the sentences seemed to interrupt each other, and the entire rate might have been a bit faster. For example, before Gary could complete thinking “Do I have everything I need?” another thought, such as, “Does Alice have what she needs?” would interrupt the first thought. Then a third, also worded, thought would interrupt the second before it had completed, and so on. The impression was of a jumble of thoughts, all incomplete.

WT (w/ possible visual component; series of thoughts) – needing things to leave/doctor

M

Beep 4.3 – This beep was skipped because it came while Gary was writing his response to beep 4.2

Beep 4.4 – Gary was in the doctor’s office waiting for Alice to be called. Alice was talking to him about her hospice nursing experience, and although he had a general sense of what she was saying, he was not paying any or at least much attention to her. At the moment of the beep, he was thinking a series of worded thoughts: “How serious is her Alice’s condition?” “What is the doctor going to say?” “What’s his diagnosis?” The characteristics of these thinkings were similar to 4.1: worded thoughts, perhaps speechy but perhaps visual, that followed one another, that were sequential, and that had some of the rhythm and inflection characteristics of speech. The sentences were shorter than the one long sentence as in 4.1; the sentences were complete (not jumbled as when they interrupted each other in 4.2). Gary also may have been experiencing some concern about the situation the was more than the experience above. The concern at this beep was greater than in 4.1. It was not physical and it is not entirely clear if it was present or not.

WT (w/ possible visual component; series of thoughts) – diagnosis

F? (presence uncertain)– concern

M? (presence of F uncertain)

Beep 4.5 – Alice had just come out of the doctor’s office back out into the waiting room. Just prior to the beep she had told him that the doctor said that she will need eye surgery before the end of the year. At the moment of the beep, Gary felt a cold chill on the outside of his body as if the temperature in the room had dropped. There was also a tingling sensation to the chill. The chill and tingling were present from his waist to the top of his head. This was an emotional reaction to Alice’s news that she would need surgery. Gary was also thinking a series of worded thoughts: “Oh, my gosh!” “What’s going to happen?” “I hope it turns out okay!” “Thank God we have the best doctor.” This experience was a series of worded thoughts similar to 4.1 and 4.3.

SA - chill

WT (w/ possible visual component; series of thoughts) – surgery-related issues

Beep 4.6 – Gary and Alice were having lunch at a restaurant and Gary was doing a crossword puzzle. Alice had just asked Gary whom he was going to vote for in the 2008

election. At the moment of the beep, Gary was thinking “I don’t know yet, I haven’t made up my mind.” This experience was somewhat simpler than those described above, so Gary could be more certain of the details. The quotation is the exact or close to exact words. Gary could also distinguish that he thought a comma between “yet” and “I” rather than a period because the pause was shorter than it would have been for a period. However, Gary still could not say whether these words were spoken or seen, even though he seemed to understand the question, to understand the importance of the distinction, even to be fascinated by it.

WT (w/ possible visual component) – voting

Beep 5.1 – Gary was eating breakfast and reading the newspaper. He was reading an article about possibly deleting the motto “In God We Trust” from U.S. currency. At the moment of the beep, Gary was thinking something very similar to “how are other people and religions going to react to this newspaper article?” This was experienced in a similar manner to previous beeps; there were words present, there was no auditory quality to the experience although the experience did have aspects of speech (such as the question mark at the end being implicit in the experience), the words were sequential, but a bit faster than if actually spoken. This aspect of Gary’s experience comprised about half of his awareness. The other half was the actual article that Gary was reading and comprehending.

WT – religions and newspaper article

Beep 5.2 – Gary was eating breakfast and just beginning a crossword puzzle. Gary was thinking of words that could go in the crossword puzzle, specifically in the “1 Across” and “1 Down” section. At the moment of the beep, Gary was imaginarily seeing words for both “1 Across” and “1 Down” superimposed on the actual blank crossword puzzle he was looking at. At the time of the expositional interview, he could not recall what the words were, but he seemed to indicate that he could have written them down had he known we wanted that kind of detail. The imaginarily seen words were in capital block letters as if he had written them. He was not focused on the entire puzzle, just the upper left corner where “1 Across” and “1 Down” were. Gary’s lack of detail (i.e., which words he was imagining) suggests that there should be some skepticism regarding the accuracy of Gary’s report at this beep.

I? (lack of detail) – crossword

Beep 5.3 – Gary was again working on a crossword puzzle. He had completed some of the puzzle, but was now going back and trying to fill in the blank spaces. At the moment of the beep, Gary was imagining a word superimposed on the crossword just like in 5.2, but this time he was in the middle of the puzzle and was only envisioning one word. He was not sure what the word was or if it was going across or down. Again, Gary’s lack of detail in describing this beep is grounds for some skepticism.

I? (lack of detail) – crossword

Beep 5.4 – Gary was outside of his house checking the landscaping and sprinkler system. He was checking for wet dirt where water had come out of the sprinkler, signifying that the sprinkler was working. The dirt was in fact wet in the appropriate areas. At the

moment of the beep, Gary felt relieved that the dirt was wet and the sprinkler system appeared to be working. This relief was experienced as a tingling on the surface of his upper torso that included his chest and his back. Also, somehow related to the relief, Gary was thinking that he was glad the sprinkler worked, that the crew seems to have done their job properly, and that they set up the system properly. This experience was similar to past experiences in which Gary was thinking in words that had no auditory quality.

F – relief

WT – glad sprinkler system works

Beep 5.5 – Gary was doing a crossword puzzle. At the moment of the beep, Gary was again trying to find a word that fit a space in the crossword similar to beep 5.3.

I? (lack of detail) - crossword

Beep 5.6 – Gary was doing a crossword puzzle. At the moment of the beep, Gary’s experience was very similar to 5.3, and 5.5.

I ? (lack of detail)– crossword

Beep 6.1 – Gary was at home eating breakfast. At the moment of the beep, Gary was having three simultaneous experiences. One of these experiences was wondering if people he knows are affected by the fires in southern California. This was experienced as innerly seeing a neighborhood that he knows and has been to in California, and this area was in flames. He was not sure what specific area he was innerly seeing, but the houses in the inner seeing were familiar and it was a specific place that he has been. The inner seeing was fairly clear, in color, and there was motion in the picture (i.e., the flames were moving). The second experience was that he was feeling bad for the people in the fire. This was an experience that clearly involved words, but there was no auditory quality to the words. These words were occurring a bit faster than speech and seemed to move from left to right somehow. There also may have been some visual quality to the words, but the exact nature of this visual quality was difficult to discern. (i.e., words present but not auditory, the words occurring faster than speech, etc.). The third experience was wondering if the beeper was going to go off while he was thinking about the fire. This was experienced as words, but with no auditory quality. The words were moving a bit faster than actual speech, the words may have been moving left to right somehow, and there may have been a visual quality to the experience, but Gary was not certain of this. This was also a thought process similar to previous beeps. All three of these experiences were equally present in his awareness.

I – fire

WT (w/ possible visual component) – feeling bad for people

WT(w/ possible visual component) – beeper sounding

M

Beep 6.2 – Gary was in a group meeting. Members of the group were talking about the World Series of baseball beginning later that day. Gary was thinking something very close to “Oh, I had forgotten that the World Series started today.” The exact words were present, but Gary could not quite remember exactly what they were. This experience was

similar to previous beeps in form. They were sequential and a little faster than speech. They also seemed to have a visual quality and were moving left to right, but it did not seem that Gary was actually seeing the words. They also seemed to come automatically to Gary, rather than being purposefully produced.

WT (w/ possible visual component) – World Series

Beep 6.3 – Gary was still attending the group. The group was talking about coin collections. At the moment of the beep, Gary was innerly seeing a coin book that he owns. There was little detail to this inner seeing, which was also out of focus. Gary could discern that the book was open and almost a white color. He could also see round disks that represented coins, which were a little darker than the book. There were about 45 coins. He could also see about five empty holes in the book that did not have coins. These holes were a bit darker than the book and coins. This inner seeing filled his visual field. Gary was also seeing words scroll across the middle of the inner seeing. The words were something very similar to “when am I going to get the rest of the quarters that are being issued this year?” These words were in focus. The words were similar to the words that scroll at the bottom of some television news channels, but were in the middle and were moving faster. The verbal part of this experience was similar to previous beeps (6.1, for example), in that the words did not have an auditory quality, moved faster than normal speech, and moved from left to right. However, whereas in 6.1 the worded part of Gary’s experience may have been vaguely visual, the worded part of this experience was clearly visual and the words were clearly seen moving from left to right.

I – coin book

WT? (form uncertain) – words scrolling

M

Henry’s Samples

Henry had such difficulty describing his momentary inner experience on day one that the beeps could not be written up in any meaningful way. Also, because Henry’s reports were very unreliable forms will not be speculated as it is unlikely that his reports represent his momentary inner experience.

Beep 2.1 – Henry was sitting in the passenger seat of his car (his wife was driving). The car was coming out of the garage and the door was closing near the moment of the beep. Near or at the moment of the beep, Henry may have been experiencing something between anxiety and eagerness in his body that he described as a “drive” or wanting to move. This involved his entire body and was due to his desire to get to his support group early. He also may have been experiencing happiness. At first he stated that his happiness was general (i.e., “I’m always happy.”), but also stated that he was experiencing happiness somehow (both bodily and mentally, after these possibilities were suggested by the interviewers) at the moment of the beep.

Beep 2.2 – Henry and his wife were pulling into the parking lot to attend the support group. Henry may not have remembered exactly when the beep came for this sample. He was not certain if the beep came when he was in the parking lot or on the street.

Beep 2.3 – Henry was in his support group discussing the Thanksgiving holiday and what people did for Thanksgiving last week. This discussion had just begun and Henry may have been talking. He may have been talking with the group leader about the cold season in San Francisco or about Thanksgiving. At or near the moment of the beep, Henry may have been experiencing relaxation, the conversation, and the group leader smiling.

Beep 2.4 – Henry was still in his support group. The group was reading a map of the United States and discussing where people lived/grew up and where they went for Thanksgiving. It is unclear exactly what Henry was doing at the moment of the beep (at first he said he was tracing his finger along Route 15 on the map, but later said his hands were folded at the moment of the beep). At the moment of the beep, Henry may have been experiencing a happy mood, but when asked he said that he is generally happy and did not talk about this experience specifically at the moment of the beep.

Beep 2.5 – Henry was talking to Todd, one of the interviewers, before the interview began, when the beep sounded through Henry's earphone. Henry, according to Todd's observation, may have been talking about Thanksgiving or what Todd was currently doing in school. During the subsequent interview, Henry stated that at this moment of the beep he was saying, "Todd, what are you doing in school?" and that the beep came between the words "Todd" and "what." However, although Henry asked Todd about school, Todd's recollection is that Henry did not ever ask "Todd, what are you doing in school?" Henry may have been aware of being in a happy mood at the moment of the beep, but he again discussed his general happy mood when asked rather than his experience at the moment of the beep. When Dr. Hurlburt, one of the interviewers inquired whether this mood was experienced bodily and/or mentally, Henry seemed to agree that it was bodily and mental, as if following Dr. Hurlburt's suggestion.

Beep 3.1 – Henry was relaxing in his dining room and was talking to his wife. The two of them needed to do errands in the near future. At the moment of the beep, Henry may have been saying "We better get started to go, Kate." He stated that the beep came just after he completed the sentence, but changed the exact wording of the sentence in his report. He also did not appear to have written this statement in his notes. He also may have been feeling some momentum in his body as he moves to get up out of his chair, but it was unclear if this was at the moment of the beep as Henry did not mention this until late in discussing this beep. Henry reported that there was nothing in his experience at this beep.

Beep 3.2 – Henry was sitting on a couch at a friend's house. He had just looked at his watch. At the moment of the beep he was feeling anxious/eager to leave. This was experienced as a feeling of movement or wanting to move. It was experienced bodily from the top of his head to his stomach area. There may have also been something

mental about this experience, but this was difficult to discern. He may have been starting to get up from the couch at the beep.

Beep 3.3 – Henry was at home eating lunch with his wife and they were discussing going out later that evening with friends. Initially, Henry reported that he was saying “What clothing are you going to wear?” out loud to his wife, stating that the beep had come between “you” and “going.” He later stated that he had specific clothing in mind that he was going to wear and that at the moment of the beep he was asking for approval from his wife about what *he* was going to wear that night. It was difficult to discern whether this was a change in his report about his experience (from being about his wife’s clothing to being about his own clothing) or whether the question about his wife’s clothing was actually a part of his consideration of what he should wear. We tried to differentiate those aspects without success. He also reported a desire to move that was similar to a previous beep. We asked to see Henry’s notes for this beep; they simply stated “eating lunch, getting ready for affair for today.”

Beep 4.1 – Henry was reading a newsletter from a group that he is involved with. He had just finished reading the last paragraph. Henry initially described many potential experiences that were occurring at the moment of the beep: thinking about charity work he has done, thinking about two members of the group that had died recently, remembering his shock upon one of the member’s deaths occurring very suddenly, and how he is alive but he could have just as easily died. When it was suggested that he could be thinking about the dead member in pictures, Henry agreed that he was having an inner seeing. However, by the end of the interview it seemed that Henry was simply reading and not having any experience at the moment of the beep, although he may have been experiencing some of the above experiences somewhere near the moment of the beep.

Beep 4.2 – Henry first stated that he was eating a carrot and discussing shopping with his wife. He then stated that he was eating a carrot and reading. At the moment of the beep, it seemed that Henry was just reading with comprehension.

Beep 4.3 – Henry was talking to his wife. At first, Henry said that was laughing at the moment of the beep and walking out of the bedroom. He later said that he was saying “okay dear” to his wife at the beep. It seemed that Henry was not having any inner experience at this beep.

Beep 4.4 – Henry was glancing through a brochure of Lee’s Liquors. He was looking at the prices of different gift baskets and comparing them to pictures of what was contained in the gift basket. At first, Henry stated that his eyes had just focused on a price, \$24.99, and his eyes had not yet moved to the corresponding item, a Bailey’s Irish Crème gift basket. He later said that at the moment of the beep he was laughing at how expensive Bailey’s Irish Crème was compared to what prices were like in the 60’s and 70’s for liquor. Those two descriptions are contradictory, because the one presumes that Henry knew what the price stood for and the other presumes that he does not know that. When asked how he was remembering, he explained his real life experience from that time

period. It seems that Henry was either having no experience at this moment or could not explain it adequately.

Beep 4.5 – Henry was reading through a magazine and looking for an article that would be interesting to read. Specifically, he was reading a caption about a Cardinal in Viet Nam. At the moment of the beep, Henry was apparently simply reading and comprehending.

Irving's Samples

Irving's samples were deemed to be unreliable. A very high level of skepticism should be used when reviewing his samples. Because they are unreliable, forms are not included at the end of each of his beep summaries.

Beep 1.1 – Irving was sitting in a chair in his apartment. At the moment of the beep, Irving may have been wondering what he was going to do this afternoon. At first he mentioned that he was thinking of the different activities that he might participate in, but later recanted saying that he was wondering in general what he was going to do. Furthermore, this was not a decision making process among different activities, but simply a general wondering. However, it is not entirely clear whether any particular activities were in his awareness or not at the moment of the beep. There were no symbols or emotion in this experience. It was reported as simply wondering but substantial skepticism is warranted for this sample.

Beep 1.2 – Irving had just glanced at the newspaper where he had read an article about the New York governor's sex scandal. He was not reading the newspaper at the moment of the beep. Irving stated that at the moment of the beep he was innerly seeing the governor making his public announcement that he was involved in the scandal and his wife was standing next to him. Although Irving believed that the governor was talking in his experience, he was not hearing any words (i.e., his mouth was moving but there was no sound being made in Irving's experience). This seeing was exactly the same as the announcement he had seen the previous evening on television, although it is not clear if Irving was seeing a television screen in his experience. Irving was confident in his description of the inner seeing and described many details. For example, the governor and his wife were viewed slightly to the side, the governor's wife was on the governor's right, he could see the governor from about the bottom of the neck up, he could see his wife from about the middle chest up. Irving could not tell what they were wearing, although the inner seeing was very clear. However, because of the variation in interviewing for this day and later evidence, this beep should be taken with substantial skepticism.

Beep 1.3 – This beep occurred seconds after the interview for 1.2 ended. The headphone had just fallen out of Irving's ear and he had just put it back in. Although Irving seemed

uncertain at first, he eventually stated that he was pretty certain that nothing was in his awareness at the moment of the beep.

Beep 1.4 – Irving was sitting in a chair in his apartment. The previous evening, Irving’s son and wife had visited him and mentioned that they were having a dinner for him soon and would invite many people. Irving reported that at the moment of the beep he was wondering who was going to be at his dinner. This wondering appeared to have no symbols. Also, within this same experience, Irving was somehow thinking of his son. It is not certain how his son was present in this experience, but Irving was fairly certain that his son was in this experience. Irving also may have been remembering his son and wife visiting the previous night, but he was not certain if this was in his experience and if it was it was much less prevalent than the wondering. Irving was slightly inconsistent during the interview for this beep, but once the discussion of what was before, after, and at the beep occurred, Irving became much more consistent. Nevertheless, Irving’s account was not very believable when considering the lack of rigor of the interview and evidence from later sampling days.

Beep 1.5 – Irving was reading a newspaper article about a local bridge that recent had large concrete pieces fall from it. It was not clear what was in Irving’s awareness at this beep. At first, he said “the first thing that comes to mind is that it’s a catastrophe.” He then discussed the actual condition of the bridge and the government’s lack of response. When asked again about the moment of the beep Irving asked what he had said previously. When the interviewer stated that he said that he may have been thinking that it was a catastrophe, Irving stated that he was not certain if that is what he was thinking and was not certain what his experience was at the moment of the beep. Irving was confident that he was thinking something and had somewhat withdrawn from the actual process of reading.

Beep 2.1 – Irving was sitting in a chair in his apartment thinking about a story a man told him at lunch about making an illegal turn in his car. Irving told the interviewer a long story about this conversation and initially stated that he was thinking about the incident with the man at the moment of the beep. He later stated that at the moment of the beep he was trying to stop thinking about the situation, that he was about to “turn it off” in his mind. Irving thought that he was aware of trying to stop thinking about the situation at the moment of the beep, but was not certain. Irving was fairly certain that he had to use effort to end the thought, but was not certain if this was exactly at the moment of the beep or not. He was also not certain if he was still thinking about the situation with the man he spoke with at lunch at the moment of the beep and was inconsistent on this point.

Beep 2.2 – When asked about the moment of the beep, Irving said that he was thinking about a vacation he took with his wife and children many years ago. He then proceeded to tell a very long story about the actual vacation. When asked again what exactly was in his awareness at the moment of the beep he said “more or less the first part of the trip.” When asked if he was thinking about a specific aspect of the first part of the trip at the moment of the beep he stated that he may have been thinking about the part of the trip when his son went across a particular state line (the interviewer is not sure which one,

although Irving knew which one it was). Irving stated that this was very close to the beep, but was not sure if it was exactly at the beep. He then said that he was thinking more about the excitement of his children during the trip at the moment of the beep. He stated that the excitement part of his experience and the state line part were close to one another and occurred close to the beep. Irving was fairly certain that he was not experiencing any symbols at the moment of the beep. Throughout this beep, Irving appeared to rely heavily on external reality. It was difficult to determine to what extent Irving was discussing the actual trip and to what extent he was discussing his inner experience.

Beep 2.3 – Irving was sitting in a chair in his apartment. At or around the beep, Irving was thinking about a woman who used to run the food service in his assisted living program. He then told a detailed story about the poor quality of food and a meeting he had with the woman. When Irving was asked how he was thinking about the woman at the moment of the beep, he stated that he did not understand how she could “go on like that taking advantage of us.” He then stated that, at the moment of the beep, he was thinking about the woman but was not certain exactly how he was thinking about her or the form of his experience at this beep.

Beep 2.4 – Irving was sitting in a chair in his apartment. Irving stated that he was thinking about his father when he had typhoid fever in the early 1920’s at the moment of the beep. He then told a detailed story about his family. At one point, Irving was repetitive, telling the interviewer twice within 3 minutes that he did not want to be a farmer because it would have been hard for his wife (this is Irving’s first incidence of repetitiveness so far). It was not clear exactly how he was thinking about his father at the moment of the beep, but it seems that he was thinking about his father somehow at the moment of the beep. Irving at one point stated that he was thinking about his mother as well, but later stated that this occurred after the beep.

Beep 3.1 – Irving did not respond to this beep.

Beep 3.2 - Irving stated that at the moment of the beep he was thinking about seeing Barack Obama’s minister on television the night before. Irving then went on to discuss the minister himself, what he was wearing, the effect it will have on Obama in the election, his concern about ending the war in Iraq, among other issues. When Irving was repeatedly asked what he was experiencing at the moment of the beep, he was very inconsistent, but always mentioned something in relation to the Obama’s minister or an issue surrounding him. Eventually, Irving stated that he was uncertain exactly what he was experiencing at the moment of the beep but that it had something to do with the minister.

Beep 3.3 - Irving stated that at the moment of the beep he was thinking about a trip he took with his father in 1933 and then explained various details of the trip. The interviewer attempted to make a distinction between what Irving was experiencing at the moment of the beep and the reality of the trip. Irving again was not certain exactly what he was experiencing at the moment of the beep, but that it had something to do with

getting ready to go on the trip. He was again unable to describe the form of his experience.

Beep 4.1 – Irving had recently read a newspaper article about a mother who discovered that her son had shot himself. Irving began the interview by discussing the incident itself and how it reflected on young adults these days. When re-directed to his inner experience at the moment of the beep Irving stated that he was innerly seeing the mother coming out of the house, although he could only say this when form options were suggested, including an inner seeing. He had some difficulty describing the details of the inner seeing when asked about the details in general. When asked specific questions (such as what angle, length of hair, what she was wearing, etc.) he was able to respond. He stated that he was seeing her from the side, that her hair was not long, that she was Caucasian, and that she may have been wearing a dress but was not entirely certain. Irving stated that the inner seeing was a little unclear and, although it was in color, the colors were muted. Irving also may have been shocked by the incident at the moment of the beep, but could not describe this experience further. Irving’s difficulty describing form, tendency to describe reality when asked questions about his inner experience, and lack of ability to answer some specific questions related to this beep are all grounds for skepticism. It appears likely that Irving was somehow thinking of the situation that he read about in the newspaper article, but the specifics of this experience are questionable.

Beep 4.2 – At the moment of the beep, Irving was recalling a scene from his childhood. He was innerly seeing himself at school trying to gain the attention of a teacher who was talking to another teacher. In the inner seeing Irving was reaching toward the teacher’s dress (or possibly a sweater), but she was ignoring him and continued talking to the other teacher. He could not see the other teacher in the inner seeing, but knew that she was there. He also could not hear the discussion in his experience. The inner seeing was fairly clear and in color. Irving appeared to be confusing the actual event with the inner seeing at time, causing reason for skepticism for this experience. For example, when asked about the teacher’s clothing in the inner seeing he stated that she was “wearing pretty nice clothing because this was in town.” When asked about what he was wearing in his experience he stated that “in all probability, I was wearing knickers” but was clearly referring to the actual situation (that he was probably wearing knickers because that is what he usually wore in that situation at that time period). He later stated that he did not think that he could see them in the inner seeing. It is very difficult to discern to what extent Irving was having this experience at the moment of the beep due to his alternation between descriptions of reality and inner experience. It is likely that he was experiencing the general content that he described at the moment of the beep, but the details are very uncertain. Irving also may have been experiencing wanting attention, as if he were re-living the actual experience. He could not describe this wanting of attention. When asked about the form of the experience of attention Irving either simply repeated the content of the experience or referred to the actual event.

Beep 4.3 – Irving again began this interview describing the actual experience he had as a child skating with his friends and building a fire on the ice. When directed to his inner experience at the moment of the beep he stated that he was innerly seeing his friends

starting the fire on the ice and himself standing nearby. Irving was given no prompts for form prior to describing this experience. There were about three boys in the inner seeing, but he was not certain. The fire was lit. There was color to the fire. Irving was not certain if the rest of the inner seeing was in black and white or if it simply had little color outside of the fire. The boys were mostly facing him in the inner seeing but he could not make out the details of their faces as the inner seeing was unclear. He could describe some details, such as everyone in the inner seeing were wearing skates, the other boys were fixing the fire, and he was standing upright nearby.

Beep 4.4 – Irving reported not attempting to think of anything in particular prior to this beep. At the moment of the beep Irving was reportedly thinking about a meeting that he had earlier in the day. The meeting was for residents of his assisted living program. Irving was innerly seeing a man (Steve) next to him asking a question about a model cottage in an adjacent facility. Steve was on the right side of the inner seeing while the man running the meeting was on the left side but in the distance. This was the same perspective that Irving had in reality. There were other people in the inner seeing that were attending the meeting but Irving could not describe any details about these people or how many there were. The inner seeing itself was fairly clear and it was either in black and white or had very little color. Irving may have also been hearing Steve talking in his experience. He was talking very loudly, but was difficult to understand (both in real life and in his experience). Irving was not certain of the exact words Steve was saying.

Beep 5.1 – Irving was remembering an incident that occurred with a friend (James) who recently died. Irving described James and the incident at length before he was re-oriented to the moment of the beep. This incident involved Irving visiting James in the hospital while James was asleep. Irving said his name a few times and James woke up and said “Irving” in a loud voice. Irving reported that at the moment of the beep he was innerly seeing James in the hospital bed. Irving stated that the inner seeing was clear with little color, although Ed’s face was quite red, as it was in reality. At or very near the moment of the beep Irving was experiencing James’ opening his eyes and saying “Irving.” Irving also may have been experiencing amazement at the moment of the beep, but could not describe the form of the amazement. When asked repeatedly, Irving either referred to the actual experience or repeated the content of the experience (i.e., “I was just amazed.”). Irving seemed to again be intertwining reality with his experience at the moment of the beep, but it is difficult to discern to what extent this was taking place.

Beep 5.2 – Irving was just given the MMSE. Irving had just said “I appreciate that I’m as good as I am” referring to his cognitive ability. The beep sounded slightly after he finished this sentence. Irving did not respond to the beep but rather kept having a conversation with the interviewer with small periods of silence in between talking (a few seconds). The beep continued to sound during the conversation and Irving did not respond. Eventually, Irving recognized the “chirp” of the beeper while he was talking about 4 minutes after the beeper initially sounded.

Beep 5.3 – Again, Irving did not respond to the beep while he was talking. When the beep sounded, Irving simply continued to talk with no pause in his talking. Eventually

Irving reported hearing the chirp sound. The interviewer did not hear the beep this time so it is uncertain how long it took for Irving to recognize the chirp. This seemed to be the same thing that happened during beep 5.2. However, the interviewer cannot determine how long the beeper was going off.

Beep 5.4 – Irving was telling a story about a sexton he knew when he was younger who liked to tell stories. This time, Irving immediately recognized the beep even though it sounded while he was talking. At the moment of the beep, Irving was reportedly innerly seeing the sexton standing outside of a church door on the steps. Irving stated that the inner seeing was clear and the sexton was only a few feet away from the perspective of the inner seeing and Irving could see most of his body. He was wearing trousers, but Irving could not describe them. Irving may have also seen himself in the inner seeing, but only reported this when specifically asked. Irving may have been standing a little to the left of the inner seeing while the sexton was talking. Irving could not hear what the sexton was saying in his experience. Irving frequently intertwined reality with his inner experience during this interview. For example, when directed toward his inner experience Irving seemed to describe it, then continue to discuss reality. Irving also said that the inner seeing was in the summer, but later said that this was an external fact and not necessarily part of his experience at the moment of the beep.

Beep 5.5 – This beep occurred immediately after the end of the interview for 5.4. Irving had just said “I can see him standing and talking.” There was a pause in the conversation when the beep sounded and Irving heard it and responded to it. Irving was just getting ready to tell the interviewer more about the sexton, but it was not clear if this was in Irving’s experience or not. Irving was not sure what, if anything, was in his awareness at this beep.

Beep 5.6 – For this beep, Irving simply sat in his chair, not engaging in conversation with the interviewer. Apparently, Irving had fallen asleep when the beep went off. After about 35 minutes (the beeper was set for a maximum of 30 minutes), the interviewer asked him if it went off. Irving woke up and said he did not hear it. The interviewer listened and the beeper was in “chirp” mode.

Beep 6.1 – Irving began this interview by discussing his son and his wife in general and how they own a house in Ocean City, New Jersey and how his family is currently in Ocean City, New Jersey. When questioned specifically about the moment of the beep, Irving stated that he was wondering what his son was doing today (the day of the interview). Specifically, he was wondering if he was running on the boardwalk or if he was repairing something. When questioned further, Irving stated that he was wondering at the beep if he was running, but later said that this came a little bit after the beep. Near the end of the interview, Irving stated that this experience came a little before the beep. Irving also stated that at the moment of the beep he was innerly seeing his son repairing something. This inner seeing was unclear and difficult to describe, although his son seems to have been holding a hammer (Irving later added a saw to the inner seeing). Finally, Irving stated that he was not sure which of the above was exactly at the moment

of the beep, saying that he did not think that he did very good with this beep and that what occurred at the beep “slips my mind.”

Beep 6.2 – Irving was sitting in his chair. After approximately 35 minutes, the interviewer asked Irving if the beep sounded (it was set for a maximum of 30 minutes). Irving said it had not. Irving was then asked if he was hearing little beeps (i.e., chirps) and he said no. The interviewer listened to the beeper and it was in chirp mode, signaling that Irving had missed the beep. Irving did not appear to be asleep during this beep, but was not watched closely.

June’s Samples

June could not meaningfully engage in DES. Please see the chapter on June for more information.

Karen’s Samples

Karen’s difficulty with the DES procedure was substantial enough to make individual beep summaries largely useless. Please see her individual chapter for more information.

Lilly’s Samples

Lilly could not give meaningful responses to her beeps. For more information, please see the chapter on Lilly.

APPENDIX B

SELECTED TRANSCRIPTS

Transcripts of excerpts from interviews with 5 participants are given below. Comments regarding the transcripts are in italics.

Fay

This transcript is taken from the final day of sampling with Fay. During this day, the interviewers waited in a bedroom at Fay's house while she wore the beeper so that she could be interviewed immediately after the beep. Even though this was the last day, this beep (5.3) is representative of Fay's interviews in that she is inconsistent and often discusses external reality rather than inner experience.

Fay began the interview by stating that at the moment of the beep she was playing computer Scrabble and thinking about whether "slotter" was a word or not.

Russ (interviewer): ...are you, uh, right at the moment trying to figure out whether it's a word?

Fay: Yeah, I was trying to think of whether it was a word...*(inaudible)*...or can I just play it? If it's not then the computer will challenge it and take it away. You can't override that. I've seen systems where I think you could but it seems like the current one you can't.

R: And s...and so right at the moment are you both thinking "I wonder it's a word" and thinking "I'll play it and find out"?

F: Yeah, that's what I was thinking.

R: Both of those things?

F: Right.

R: And, and, and does that seem like two separate thoughts or does that seem like two aspects of the same thought?

F: Well, it's two aspects of the same thought.

R: And are there any words involved with that, with that thinking?

F: Well, I was going to add it onto another word that was already on the board (*inaudible*).

Fay then briefly describes the actual playing of the word rather than her inner experience.

R: But, but I guess what I'm tryin' to figure out is, are you are saying to yourself, self, something like that, quote "I wonder whether that's a word" unquote, or...

F: Yeah, I wasn't quite sure whether it was a word or not. I think I may have played it or, or it coming up in the past and whether it was good, I can't recall.

Again, Fay's response does not address the question of inner experience at all. It appeared that when asked about words being present in her inner experience, she took it to be a question about the actual word she was playing in Scrabble.

R: And is that memory somehow present to you right at the moment of the beep?

F: Yeah, I was thinking about it, I was thinking I could play it but the system might reject it.

Fay is referring to the reality of the situation, not to the question of her experiencing memory at the moment of the beep.

R: And are, is there any...I'm, I'm gathering this is sort of a thought process, sort of thinking about I should play it and whether it's a word, I'll try it and see.

F: Yeah.

R: Is there a, anything else going on, like emotions or, mad at the system, or?

F: Well, I was kind of trying to remember whether, you know, it had been played in the past, I think it has, but whether it was good or not, I wasn't quite sure.

Fay then discussed how much she has been playing Scrabble recently and about local Scrabble events. R then asked how this remembering presented itself to her, but Fay simply returned to saying that she was trying to remember whether it was good or not. R then asked if she was trying to remember a specific time that it was played, and Fay said no, that she was trying to remember in general.

R then attempted to summarize:

R: So it seems like you're looking at the game on the screen.

F: Yeah.

R: And then there's a thought process which is going on which is about, "Well, I wonder whether slotter is a word, I, I know I've seen it played, I can't remember whether it's, whether it was good or not, I'll just go ahead and play it, the computer will kick me out, some, some, some systems will allow you to challenge it, some systems won't. All that stuff seems like it's somehow going on right at the moment of the beep, is that right?"

F: Well, I wasn't thinking so much about systems that would allow you to override (*inaudible*).

R: So that was not part of the moment of the beep?

F: No, I would say it was not, but I was thinking the system might challenge it, the system challenges (*inaudible*).

R: And, and that, and all of that stuff is somehow present in your thoughts?

F: Yes, I was thinking there was a distinct possibility it might get challenged off the board.

R: But I'm, but I'm gathering that there aren't, there aren't any words that convey that. For example, you're not saying to yourself "Well that's a distinct possibility" end quote, and yet you somehow know that it's a distinct possibility.

F: Well, I knew it was a possibility that might not hold up.

This is representative of Fay's seeming inability to describe the form of her experiences.

R: Okay.

F: And I could go to my Scrabble dictionary and look it up before I played it to see whether it was going to hold up. If you're playing an actual game, you know, with live opponents they're not going to let you do that. With a computer, you can refer to the dictionary before you play it.

This is indicative of Fay's very frequent tendency to discuss reality throughout interviews.

R: Okay. And, and so, so all these, all these things, is slotter a word, I think I'll play it, I'd like it over-ridden, I'm pretty sure, uh, pretty sure I've seen it before...do those things seem in anyway separate or does that all seem like part of the same thought process.

F: I think it was all part of the same thought process.

R: Okay.

F: I might play it and it might hold, and it might just go away, wipe it off the board.

Todd: And can you say if all of these things, that's part of the same process, are they all occurring all at once right at that moment or is it over a period of two, three seconds or?

F: It's pretty much simultaneous. I'm thinking it may not work, but I'll give it a shot.

At this point the interview ended for this beep.

This beep is fairly representative of Fay's samples, though there was much more consistency in this sample than in some others. Common characteristics of her interviews that are featured here are:

1. Seemingly undifferentiated experience, or no experience at all, evidenced by a lack of form and multiple simultaneous awareness that could not be teased apart.

2. The inability to discuss the form of experience. This may be due to the presence of undifferentiated experience or a lack of inner experience.

3. The tendency to discuss reality when attempting to discuss inner experience. This could also be symptomatic of undifferentiated experience or no experience at all.

It is not certain if Fay's difficulties with the interviewing process were due to undifferentiated experience, no experience at all, or some other factor either related to or unrelated to experience itself. However, given Fay's lack of cognitive impairment, it appears that these are the two most likely explanations.

Henry

This is a transcription from the beginning of beep 4.1 with Henry that is meant to represent his inconsistency and general difficulty with DES even on the fourth and final day of sampling. For this day, the interviewers waited outside while Henry wore the beeper. When the beeper sounded, Henry notified the interviewers and the interviewers immediately interviewed him.

For this sample, Henry had just finished reading the last paragraph of a letter from the Knights of Columbus at the moment of the beep. Henry had just been asked what was in his experience at the moment of the beep:

Henry: Interesting. It was, it was the final part of his, his letter to the, to the (group members) of what uh, Christmas would be coming to and the (*inaudible word*) that we have as Roman Catholics and what, you know, what we should do, and things of that nature.

R: Okay. And was all that stuff still in your mind...

H: Oh yeah.

R: In, in what way?

H: In what way? Because you remember certain things that happen during the course of the year. Like, uh, we lost a few brothers through death. They were very young. A few brothers who were quite sick.

R: And...

H: And, uh, there was a season of, uh, the first 6 months of the, of the (group) year when we, uh, were progressing very vigorously in the (*inaudible*) issues, charity work.

R: And were those things, the brothers that had died, and the charity work, were those things in your experience right at the moment of this beep...

H: Yes.

R: ...or is that just like background?

H: Oh, background, back...because they past on prior, prior. But the, uh, the charity work, of course, is always, is continuous...

R: Right.

H: is continuous, but the deaths of course were sudden. That's what happened.

The above is an example of common difficulties that Henry had throughout sampling. First, he was inconsistent with his answer, first saying that all of what he described was in his experience, then quickly changing to stating that it was background when given the option. Second, Henry discussed external fact (i.e., that charity work is on going but the deaths were sudden) rather than inner experience.

R then explained that in reality the charity work is ongoing, but that does not necessarily mean that it is in awareness at the moment of the beep. Henry stated that he was indeed thinking about the charity work as well as the death of the members of the group.

R: And how did that stuff come to you right at the moment of the beep?

H: Well, as I said, I was at the end of the para..., uh, of the, uh, letter, and, uh, as I was reading this, it was just like an impact, uh, just to bring back everything that we read, that I read, as in the last statement, it says "I hope you and your families have a wonderful and joyous Christmas." So it brings back everything of what has, has gone on in the first six

months. Charity work, yes. We worked a lot. I worked as much as I could, with my condition. And the unfortunate deaths of two, two of the brothers.

R: Okay. And so that, the charity work part.

H: Okay.

R: Did you, like, see a picture of the charity work, or just remember the...

H: No, just, just the memorization of what we do, because my wife and I are quite, uh, active in charity work. We work with women's resources, battered women. I work with, uh, stuff with the (organization) that we do.

R: And, and so, that's uh, that's a lot of stuff there.

H: I, yes, it's, yeah, it's very broad.

Henry still appears to be talking about reality rather than his inner experience, evidenced by his generalities, his providing of context, and his statement "it's very broad."

R: And so right at the moment of the beep, what of that was in, was in your awareness?

H: The death of my, of the two brother knights.

This is an example of Henry's high level of inconsistency. A few seconds ago, he had been stating that, at the moment of the beep, charity was in his awareness. Now, when asked again, he does not refer to the charity work, but rather to the deaths that he mentioned previously.

R: And, okay, in what, in what way was that in your awareness?

H: The shock. The shock of the youngest one who died.

This is the first time that Henry mentions experiencing shock.

Henry goes on to explain the circumstances surrounding the man's death, such as how long he was in the hospital and how he died.

R: What of that death was in your awareness right at the moment of the beep? So you could be, you could have been feeling about it, you could have been seeing him...

H: I felt, okay.

R: ...being sick, or you could have been...

H: I felt about it because I, I'm a former cancer patient twice. And here's a young man who passed away and I'm still kickin' and I guess it's not my time to die. That's, that was my theory, my philosophy.

R: And was that philosophy in your awareness right at the moment of the beep?

H: Oh yes. Yep.

Henry sounds extremely confident, but this is the first time he has mentioned any type of philosophy at all, and that philosophy is presented in an explication of context, not of experience.

R: In words? Not in words? In pictures? *(inaudible question)*

H: In pictures, in pictures.

R: In what way? What kind of pictures?

H: In what way? I could see the young man, who was, uh, was, in his coffin and I'm here, uh, you know, paying him the respect.

Again, this report is inconsistent with his previous reports and is representative of many of Henry's reports.

At this point, Henry stated that all or parts of the above came just after the beep as he was taking stock of what he was experiencing at the beep. At the moment of the beep, Henry stated that he was not having any experience and was just reading. Nevertheless, this exchange is representative of many of Henry's reports, and demonstrates the substantial inconsistencies of his reports and his propensity for discussing external reality rather than inner experience. It also demonstrates that Henry apparently did not understand what was meant by "the moment of the beep" even on the fourth day of sampling.

Irving

Portions of beep 5.1 are transcribed below. This interview represents one of Irving's most believable reports. However, question still remains to what extent it is an actual report of his inner experience at the moment of the beep versus how Irving experienced the situation in reality.

Irving was sitting in his chair in his living room when the beep sounded. Irving began the interview by saying that at the moment of the beep he was remembering an incident with his friend (James) whose funeral had been earlier in the day. Irving explained that about 2 years ago James had been in a car accident and had had to be moved to a full-

care facility across the street from Irving's residence. Irving continued to talk about James in general. The interviewer then directed Irving to the moment of the beep:

Todd: So what is in your awareness right when the beep goes off?

Irving: Right when it went off...

T: Yeah, right when it went off.

I: ...I was visiting him for the first time after that accident in full-care, which was then still off, across the road. *(A short, inaudible sentence)* And I hadn't seen him for so long and he was in care and I made an effort to go over and see him to see whether he could converse, or...and right when it went off is when I was asking him in a low voice, he was, his eyes were closed, and I said "James" a couple times and all at once he opened his eyes and saw who I was and recognized who he, wa..who I was and said "Irving," just like that. Whatever all his dangers were, I don't know. He'd been hospitalized most of the time since and he was, at this time, I was seeing him here at full-care.

The above is an example of one of Irving's most believable and focused responses to questioning. Usually, when Irving was asked in general about his experience at the moment of the beep he discussed external reality at length and would not remain focused on the moment of the beep. The fact that Irving referred to the beep in his response (i.e., "...and right when it went off.") showed a focus on the beep that was virtually never there during interviewing. Still, it appears that Irving may very well be describing what actually occurred in the past rather than his experience at the moment of the beep. In an attempt to discern if Irving was talking about inner experience or the actual event, the interviewer asked Irving if he thought that his experience/memory of the event at the moment of the beep was the same as it occurred in reality in the past. Irving said that it was, although it may be difficult to make this distinction as his memory of the event itself may not be accurate. Nevertheless, Irving's reports of his inner experience at the moment of the beep almost always seemed to reflect a memory of an actual event, making it difficult to determine if he was talking about inner experience at the moment of the beep that just happened to reflect reality or if he was talking about reality and picking a time where the beep occurred. The interviewer then tried to determine the exact point that the beep occurred in Irving's description. Irving stated that he was not sure, but he thought that it came right when James was saying "Irving." He later stated that he thought the beep occurred when James was opening his eyes, but again reverted to his statement that James was saying "Irving" at the moment of the beep. Still, this reflected a level of specificity and consistency in answering that he typically did not display, although it does not necessarily suggest that Irving is actually describing his inner experience at the moment of the beep. The interviewer then asked if Irving was innerly seeing James at the moment of the beep:

T: And are you visualizing him in your mind when the beep went off?

I: Yes.

T: And what are you seeing? Can you describe that to me, right when the beep went off?

I: I was standing looking at him. And I said several times his name. And, and then the, the beep went off when he, as he said "Irving," I was aston...astonished at that.

Irving is not answering the question at this point. He is not describing what he may be innerly seeing at the moment of the beep, but either how the actual situation unfolded or his memory of the situation.

T: So he's laying in, in bed, is that right?

I: Yes. He was laying in bed on his back...

T: And you're standing...So in your mind are you just seeing him or are you seeing him and yourself?

I: I'm seeing him more than myself.

T: Is it like you're seeing him from the perspective that you actually saw him, do you know what I mean?

I: Yes.

T: Is it a clear picture?

I: Very clear.

T: Very clear. In color, not in color?

I: What'd you say?

T: Is it in color?

I: Not anymore than his, his complexion was quite red. It wasn't normal.

Here, Irving is describing reality rather than his inner experience. He was asked if his inner seeing was in color, but instead described the actual complexion of his friend.

T: Mmm kay. But the actual image that you're seeing, it's not in black and white?

I: No.

T: It's in color, there's just not a lot of color in the picture, is that right?

I: Yes, yes. He was in the hospital for so long that...

Irving's response here gives two reasons for skepticism. First, it was somewhat of a leading question, and Irving seemed to be led. Irving did not say that there was an absence of color in the inner seeing, but when the interviewer suggested this Irving went along with the suggestion. Second, after answering the question, Irving returns to describing the actual situation rather than his experience or the supposed inner seeing.

T: Yeah.

I: ...his color wasn't natural.

T: He was red.

I: Yes.

The interviewer then returned to Irving's prior statement that he was astonished:

T: And you mentioned that you were astonished, I guess that he woke up and said your name.

I: Yes.

T: And that's how it happened when you actually saw him, you felt astonished, right?

I: Yes.

T: And are you feeling astonished at, when the beep goes off?

I: Yes, I was surprised.

T: Like just now, when the beep went off?

I: Yes.

It seems that Irving may be describing reality here rather than inner experience, although he seemed quite confident. Perhaps the biggest reason for skepticism is Irving's response "Yes, I was surprised." This response seems to suggest that Irving may have not been astonished at the moment of the beep as he did not say he was astonished, he said he was surprised. Furthermore, Irving answered in the past tense to a question that was in the present tense, suggesting that he may have been referring to the actual incident rather than his experience at the moment of the beep. If Irving would have answered "Yes, I am astonished" there may be less reason for skepticism. Also, it seems somewhat strange that Irving would be feeling astonished while remembering an event he had already experienced, although this is certainly possible, especially if he is immersed in mentally

re-living the event. However, the biggest reasons for being skeptical of Irving's amazement come when discussing the form of this experience:

T: Is it possible to say how you were experiencing the surprised or astonishment when the beep went off? So for example, for some people that might be a physical thing that they feel. For some it's just a mental...

I: I wasn't expecting it...

T: Okay.

I: ...a response like that. I didn't know whether he'd wake up and just go back to sleep or not, but I was surprised at his response.

Irving's response here seems to indicate the reason that he was astonished when the event actually occurred and does not at all answer the question about inner experience that was being asked.

T: And is that a physical surprise, like you're taking a, like a deep breath or something, or is it more of a mental surprise, if that makes any sense? It's a tough question, I know.

I: Well, I, I, I guess it was more shock at the response he gave and not expecting it. We did, we did not have much of a conversation at all because he did not respond. But when he opened his eyes he knew who I was.

Again, this is a reason for his actual surprise, not the way it was experienced at the moment of the beep. This may illustrate Irving's inability to discuss any kind of unsymbolized form, a problem present throughout sampling, although the interviewer may not have made the distinction clear enough for Irving. It is also an example of Irving's tendency to discuss reality rather than inner experience.

T: Mmm kay. Anything else at the moment of this beep that you were experiencing?

I: No, not, it wasn't so much because I did not stay 'cause we couldn't converse and he was going back to sleep.

T: Okay, but in your experience just 10 minutes ago when the beep went off, were you experiencing anything else?

I: No, I don't think so.

Again, in this exchange Irving is discussing reality when asked about his experience. This was common throughout sampling and brings rise to substantial skepticism regarding all of Irving's reports as this was arguably his seemingly most reliable report.

June

This transcription begins in the beginning of the interview for beep 3.2. June was initially asked about her experience at the moment of the beep about 15 to 30 seconds before the transcription begins. She is talking about her granddaughter being in Mexico. One important thing to notice is how fluent, or “normal” June’s conversation is, yet she is not able to discuss inner experience or the moment of the beep in any meaningful way whatsoever.

June: Her boyfriend, uh, father, oh, I don’t know, has some kind of connection with the government, you know, in Mexico. And so the mother and father and (Stacy) and her boyfriend were going down there for about ten days. He had, you know, some business to do, so the... she was looking forward to that. And I was just thinking about her down in Mexico, what she...

Here, June is discussing reality rather than inner experience, a very common occurrence throughout this transcription and nearly all other interviews with June.

Todd: And so, right...

J: ...what her reaction will be when she returns.

T: Okay. And so, right when that beep went off, right at the moment it first went off, what were you experiencing or thinking of, or...

J: Well, actually that’s what I was thinking about the whole time...

June is not discussing the moment of the beep, but is rather discussing what she thinks about in general, i.e., “...thinking about the whole time.” This is also a common occurrence throughout this and other interviews.

J: ...because I just had... just had that on my mind about (Stacy) going to Mexico with her, uh, future in-laws, and, uh, and her friend, and, uh..., I don’t know that’s about, well, what I was concentrating on...

This language suggests that June is about to talk about inner experience.

T: Mmm kay.

J: ...and what she...

T: And so was that before...

J: ...was going to experience, you know, in Mexico, ‘cause she’s never been down in that area...

June returns to discussing reality rather than inner experience.

J: ...and uh, you know, how the people, you know, the majority of them live and so forth. 'Course they're going to be getting into the, you know, into the cities...

T: Mmm, hmm.

J: ...and uh, (*inaudible*) they'll be staying with.

T: And so you were kind of, you were thinking about all that stuff before the beep? And at the beep?

J: Yeah, yeah, yeah.

June is emphatic in her affirmative responses to the interviewer's question, as she is at many points in the interview. It seems as if June is not understanding the specificity of the question, and is rather interpreting it as "Were you thinking about all that stuff at all?"

J: That's what I was sort of concentrating on. I don't know. That's just what came to my mind 'cause I had been thinking about her all morning...

Again, June is discussing generalizations, not the moment of the beep.

J: ...all I guess and, and uh, 'cause they were leaving this morning sometime...

Here, June returns to a discussion of reality

J: ...and, uh, I'll just be anxious for her to return, and, and hear her experiences down there.

T: Mmm kay. So...we were... right before the beeper went off we were talking kind of back and forth, right? And we were saying... we were talking about her being at (Ohio State) and (Andrew's) son being at (Columbus).

J: No, no.

T: No?

J: Irving doesn't have a son at (Columbus). I have a daugh...a granddaughter at (Columbus).

T: Okay. There was something with somebody he knows at (Columbus) I thought we were talking about.

J: They live in (Columbus).

T: Right.

J: They live in (Columbus).

T: Right, but they don't go to school there necessarily.

J: Oh no. No, no. His...his son...

T: Right.

J: ...who was the pilot...

T: Right.

J: ...yeah, they live in (Columbus).

T: So we were talking about that...

J: Yes.

T: ...and your granddaughter going to (Ohio State) and she's going to finish in a year.

J: Yeah.

T: And then I said something about, well, some of us never get out, and then you said that she would and she might be getting married after college.

J: Yeah, I have...

T: And then the beep went off, I think right after you said that.

J: Yeah, yes.

T: And so at that point, you were thinking about her in Mexico? Right when that beep went off?

J: Yes.

T: And is there anything in particular you were thinking about her in Mexico?

J: No, I was just thinking, what, you know, how she's going to, um, oh well, what's the word I want to use? You know, when she gets there, how those people live down there.

June did not say what she was thinking at the moment of the beep, and now adds a new external content component to the story, that she was thinking about how the people live in Mexico, which she had not mentioned before. Although it appears in this case that June may be attempting to describe her experience.

T: Uh, huh.

J: You know, the majority of them. Have you been to Mexico?

T: Umm, for about an hour, once.

J: Oh, well, you know, it's, un... unless you, you know, you get, I mean there are some lovely areas, don't misunderstand me.

T: Uh huh. But there's rough areas too.

J: But generally speaking, it's, it's sort of rough living.

T: Yeah.

J: And uh, and of course a lot of them have come into United States, you know, to get jobs and so forth.

It is as if the conversation is just continuing naturally with no regard for questions about inner experience or the moment of the beep.

T: Right. And so when the beep went off were you thinking about, you know, when she gets there and how the people live...

J: Yes.

She again gives an affirmative answer to a question about her experience at the moment of the beep, but there is reason to be skeptical about it because she adds a new component in her next response below.

T: ...down there.

J: Well, I'm just anxious. I was just thinking I'm anxious to speak to her when she returns...

This may be true, but it was not mentioned before. Therefore, it seems to have no connection to her inner experience at the moment of the beep.

J: ...you know, and get her, uh, feelings about the, about that area. And uh, I'm sure that they'll have a good time.

June returns to discussing reality.

J: And I, if, I don't really know, I forget where, what, where they were staying, you know, where they had her, her, sss... uh, boyfriend's, fff...uh, father had reservations somewhere where they were staying, you know, in a nice motel...

T: Mmm, hmm. Right.

J: ...or hotel. And uh...

T: And so were you kind of thinking about all of these things...

J: Yes! Yes, I mean, my mind...

June again responds emphatically and affirmatively.

T: Right...

J: ...was...

T: ...so...

J: ...I could just feel it going like this (*put hand beside head and makes circular motion as if her thoughts were "spinning"*), you, I was thinking about...

T: ...right.

J: ...Mexico, 'cause I've been there.

T: Right.

J: And, um, I'm just anxious to speak to her, you know...

T: Right.

J: ...and get her, um, feelings about Mexico.

T: Right. So her going, thinking about her going to Mexico, what she'll be experiencing, how the people live down there...

J: Yes, yes.

T: ...and that you're anxious to speak to her now. Were you thinking that all right when the beep goes off?

J: Yes.

T: All of that?

J: Yes.

It is possible that June could be thinking about various aspects of her granddaughter's trip to Mexico, but her inconsistency, inability to answer specific questions, tendency to discuss reality than inner experience, and her constantly adding new content to her experience make it fairly clear that this was not the case. Instead, June's answers reflect a lack of comprehension and/or disregard for any questions related to momentary inner experience .

T: Right at that moment?

J: Well really, that's all I had on my mind...

June returns to discussing generalization.

J: ...because I started to, I thought about it this morning and that just came to me about (Stacy) going down there.

T: Mmm, hmm.

J: And um, I'm just anxious to get her reaction to that country because I know she's never been down there, and um, I think it's, uh, quite an experience for them.

T: Okay.

J: To see how the other half lives.

T: Right, it is interesting, yeah.

J: Yes, it is. And uh...

June gives another strong, affirmative answer.

T: So those things, you were kind of thinking about a lot of these things not only before the beep went off, but all of it right when the beep went off?

J: Yes. Yes, yes, you know, I just sort of...

June gives another strong affirmative answer. Typically, this level of certainty is evidence that someone is accurately describing their inner experience. However, it is clear at this point that June's certainty represents something else entirely, most likely a lack of comprehension of the specificity and/or meaning of the question. It could also represent a mechanism designed to hide the fact that she does not know what she was experiencing at the moment of the beep, that she has no experience at the moment of the beep, or that it is simply easier to answer in a strong, affirmative manner.

T: Right.

J: ...you know...

T: And, and are you seeing pictures of Mexico or your granddaughter...

J: *(Drawn out and emphatic)* Yeesss. Yes.

T: ...in your, in your head...

J: Yes. Yes.

T: ...innerly seeing...

J: Absolutely. Absolutely. Yes. Yes.

June's affirmative responses are very quick, as if she is either so certain about her momentary inner experience that it takes no consideration to respond in such a manner, or that she is not fully comprehending the specificity and/or depth of the question.

T: And can you say what exactly you're seeing right when the beep went off or is that too difficult?

J: *(Squints eyes and puts hands to brow as if thinking hard or having a head ache)*

Suddenly, when a more specific question that requires more than a "yes" or "no" answer is presented, June has substantial difficulty.

J: Well...um, I think I was just thinking about talking to her when she returns. I think that was on my mind, you know, sitting down and having a long chat with her, uh, when she returns to tell me about her experiences.

T: Okay.

J: Of course I know they'll be swimming and that sort of thing too, you know...

June returns to discussing external things rather than her inner experience.

T: Sure.

J: ...but they're going to be, um, doing some traveling down there, and, and just to observe how those people, some of them live...very crudely. Oh, of course, then there are some beautiful homes too, you know, when you get into the cities but...it's certainly...

T: And so were...

J: It certainly isn't United States.

T: Mmm, hmm. And so were you thinking in words "Gosh, I really want to talk to her when she gets home" or seeing pictures or either of those...

J: Oh yes, oh yes, that's what I'm, you know, that's what I'm looking forward to, because I'm, she has a ca..., you know, always has a camera with her, and uh, so I'm anxious to see her pictures, and, and they're (*inaudible*) her experiences down there.

June seems to have misinterpreted the question. She apparently understood it as a question about actual photographs rather than inner experience, totally disregarding the first part of the question about worded experience.

T: Okay.

J: But I'm sure that they'll be doing, you know, a lot of sight seeing and...taking advantage of all the, uh, opportunities that are, that pop up...

T: Right. Mmm kay.

J: ...'cause I think it's a place she'd probably never return to. And she was taking time off from her job. You know, this is the one (that works with children).

T: Right.

J: And, um, so I don't think she'll probably ever return there.

T: Okay. (pause) Just checking my time. (pause) Okay. So I don't think I have any more questions necessarily.

J: (*gets picture of gran daughter*) This, this is the one that I'm talking about...

T: Right.

J: ... right there.

T: Okay.

J: Yeah, the oldest one.

T: Right. Mmm kay. (pause) So one distinction that's really hard to make that I want to try and make as much as possible, and you're doing a good, a very good job by the way, is exactly kind of what's right when that beep goes off and what's before the beep goes off.

The interviewer notices that the beep is sounding

T: Is it going off again?

J: Mmm, hmm. It's on now.

June did not independently respond to the beep. Although her hearing is fine, she did not notify the interviewer or otherwise perform the required task when the beep sounded. In fairness, the interviewer did not give June very much time to respond on her own, approximately one to three seconds.

T: Did it just start?

J: Yeah, it just started.

The next beep was then discussed, with very similar results. Therefore, it will not be transcribed. Hopefully, the following things are apparent from the above transcript:

- 1. June's conversational skills are relatively normal.*
- 2. June is not close to answering questions about momentary inner experience evidenced by:*
 - a. June's inability to answer anything beyond a yes/no question regarding momentary inner experience.*
 - b. June's inconsistent answers, typically in the form of adding content as the discussion continued.*
 - c. June's consistent discussion of reality rather than inner experience.*
 - d. June's consistent referral to general experience rather than specific experience.*

Karen

The following is an excerpt from sample 3.2 with Karen. This sample is perhaps the closest that Karen seemed to get to the moment of the beep. For this day, Karen was interviewed instantly after the beep.

At the moment of the beep, Karen was reading a book. Apparently, at the moment of the beep, she was reading about a scene in the book that was taking place at a wedding in Jerusalem. Karen was just asked what she was aware of at the moment of the beep:

Karen: Well, I'm thinking about some people that are getting married in...(points to book)

Todd: Okay.

K: ...in Jeru, in Jerusalem. They're Jewish people so that they have big, big weddings, you know? And when, uh, a father finds a, a husband or a young man for his daughter he's very happy because it's something that's unusual to find a...

T: Mmm, hmm.

K: ...a good husband, you know? In the meantime I was thinking about my daughter that, my other daughter that got married. She had a great big wedding.

This seems to signify that she was either thinking about the wedding from the book, her daughter's wedding, both, or neither at the moment of the beep.

T: And so right when that beep went off, or like the last kind of split second before it went off, can you say what was in, what you were thinking of right...

K: The wedding.

T: Okay. And you're thinking about the wedding, people getting married in Jerusalem

K: Mmm, hmm.

Karen signifies she is thinking about the wedding from the book, although the interviewer led her in that direction. The possibility that she was also thinking about her daughter's wedding has not been excluded however.

T: Okay. And is that, is that related to the book that you are reading?

K: Mmm, hmm.

T: Mmm kay. And so, could you tell me kind of how you are thinking about people getting married? Are you thinking about it kind of in words, for example, "well these people are getting married" or are you kind of imagining a wedding in you mind, or?

K: Well, I was thinking about my daughter's wedding 'cause she had a big wedding with over 300 people in the wedding and, uh, in a very ritzy...ri...ritzy hotel you know?

Karen switches back to saying that she was thinking about her daughter's wedding. It is difficult to say whether she was actually thinking about the wedding in Jerusalem or actually wanted to report that she was thinking about that wedding because the interviewer led her in that direction. What this switch does represent is that either a. Karen is truly inconsistent about her reports or b. Karen is easily led. Either way, either of these possibilities are grounds for substantial skepticism. Furthermore, Karen continues to talk about content when asked about form, a common occurrence throughout sampling.

T: Okay. And so are you reading about people in Jerusalem getting married?

K: Mmm hmm.

T: Okay. And so you're thinking about a wedding?

K: Yep.

T: Okay. And are you thinking of...are you think about the Jerusalem people getting married...

K: Yeah.

T: ...or are you thinking about your daughter getting married?

K: No, I...I'm thinking about these people here... (*motions toward book*)

T: Right at that, right at that moment? (*snaps fingers to signify beep*)

K: Yeah.

Here Karen goes back to stating that she is not thinking about her daughter's wedding at the moment of the beep, but is rather thinking about the wedding from the book even though she had just stated that she was thinking about her daughter's wedding at the moment of the beep. This is the first time that she has excluded one of the weddings from her experience (her daughter's wedding).

T: Okay. So it's possible you could be reading that but thinking about your daughter's wedding.

K: Yeah, uh huh.

T: Or it's possible you're reading that and thinking kind of about the wedding in the book.

K: Yeah.

T: Can you say which one of those you were thinking about? Or are you not sure?

K: A little bit of both.

This is the first time that Karen has said that she was thinking about both weddings.

T: A little bit of both? Okay. And are you thinking about, are they kind of separate, so you're thinking about one and you're also thinking about the other...

K: Yeah.

T: ...or are you thinking about, like, one wedding and it kind of has aspects of both?

K: Well...

T: Or is that too hard to answer?

K: It, it's hard to answer. Because, see, this girl here had a very simple wedding, and not...

T: In the book?

K: Yeah.

T: Okay.

K: And then my daughter had an, an enormous wedding...

T: Mmm kay.

K: ... so...and my daughter got married in the same church as we got married.

T: Okay.

K: So that's something else that I was thinking about.

Here, Karen has added another potential aspect to her experience that she did not mention before (thinking about the fact that her daughter got married in the same church as she and her husband). However, it should be noted that Karen may not have been saying that she was thinking about that at the moment of the beep, but may have been saying that she was thinking about it after the beep, or during the conversation, etc.

T: And so are these again, are these things that you're thinking about kind of near the beep and around it?

K: Mmm hmm.

T: So what are you thinking about right at it? Just a split second where you kind of free...if you, if you could freeze what you were thinking or what you were aware of, what would that look like, or what would, what would that be? Or can you, I mean maybe you can't say, right at that moment?

K: Not really.

T: You can't say?

K: No.

T: Right at the moment?

K: No.

T: But you kind of know, you kind of know what you were thinking about kind of around and near that moment?

K: Yes, uh huh.

This was again a leading question on the interviewer's part as Karen never stated that she knew what she was thinking about around the moment of the beep. Nevertheless, either it is true or Karen is easily led.

T: Okay. And so do you...are you th...do you...maybe...and if you're not sure that's fine and I want you to tell me you're not sure, but are you thinking about weddings at the moment of the beep?

K: Yeah.

T: Okay. And you're thinking...can you say whether you're thinking about the wedding in Jerusalem or your daughter's wedding right at the moment, or not sure?

K: Not sure.

T: Okay. But you were thinking about them both kind of around the beep?

This is another leading question that Karen affirms.

K: Yes.

To this point, the interviewer has suggested options while Karen simply responds yes or no. This is a cause for increased skepticism as she has not offered this information on her own.

The interviewer now turns to questions about form:

T: Okay. And is there an imagining at some point? Is there, for example, you're kind of having a pi...you're remembering your daughter's wedding and you kind of have a picture in your head? Or there's a picture of your head, or in your...*(laughs)*...a picture of your head ...*(laughs)*...a picture in your head of the wedding in the book? Do you think that there's any pictures in your head at any time, at the beep or around the beep, or no, not necessarily?

K: Well, the, the wedding there was so, oh, what would you call it...so simple...

T: Mmm hmm.

K: ...compared to what my daughter had, you know? That wedding there was, was simple yet, for the Jewish people, it was something special.

Karen discusses reality rather than her inner experience.

T: Okay. And are you comparing, so are you, you're comparing the two weddings?

K: Mmm hmm. *(Nods)*.

There is reason for substantial skepticism with this response because a. the interviewer suggested it and b. Karen has not directly stated that she was comparing the two weddings to this point.

T: Right, can, can you say if you were doing that right when that beep went off or was it near when the beep went off?

K: Near when the beep went off.

T: But you're not sure if it was exactly there or kind of around it?

K: Yes sir.

T: Okay. Good. And is there a way to say how you were comparing them? So for example, people might have kind of a tense feeling about comparing two weddings, or a happy feeling, or maybe they're kind of having a picture of both in their minds, or maybe they're thinking in words about "well, this wedding was really big, but this one was really small." Can you say how you were kind of com...how you were comparing it? If there were pictures or words or neither or not sure?

K: Well, this wedding was such, such, such a nothing, you know? And the, the other, my daughter's wedding was such a big wedding that it, it's hard to compare both of them.

T: Okay. But you were kind of comparing them at the beep or around the beep?

K: Yeah.

At this point, Karen was asked if there was anything else in her experience at or near the moment of the beep, and she said no.

Although this was one of Karen's better (perhaps her best) sample, it is still apparent that Karen cannot narrow her experience to the moment of the beep. Furthermore, her reports of inner experience cause reason for a very high level of skepticism. This is due to their inconsistencies, the fact that Karen does not offer much information but rather follows with what is suggested, that Karen typically answered in the affirmative to leading questions, and her tendency to talk about real life compared to the moment of the beep.

REFERENCES

- Abrams, J. (2007). Passionate engagement with life in elderhood: A phenomenological and heuristic study. *Dissertation Abstracts International: Section B: The Sciences and Engineering, Vol 68(4-B)*, pp.2634.
- Allen, N.H.P. & Burns, A. (1995). The treatment of Alzheimer's Disease. *Journal of Psychopharmacology, 9(1)*, 43-56.
- Almkvist, O., Backman, L., Basun, H., & Wahlund, L. O. (1993). Patterns of neuropsychological performance in Alzheimer's disease and vascular dementia. *Cortex, 29*, 661–673.
- American Psychiatric Association (2000). *The Diagnostic and Statistical Manual-IV-Text Revision*. American Psychiatric Association: Washington D.C.
- American Psychiatric Association (2002). *Practice guidelines for the treatment of psychiatric disorders. Compendium 2002*. American Psychiatric Association: Washington, D.C.
- Arenberg, D. (1982). Change with age in problem-solving. In F.I.M. Craik & S. Trehaub (Eds.), *Aging and cognitive processes* (pp. 221-235). Plenum Press: New York.
- Arkin, S.M. (2001). Alzheimer rehabilitation by students: Interventions and outcomes. *Neuropsychological Rehabilitation, 11*, 273-318.
- Asp, E., Song, X., & Rockwood, K. (2005). Self-referential tags in the discourse of people with Alzheimer's Disease. *Brain and Language, 97*, 41-52.

- Auchus, A., Brashear, H., Salloway, S., Korczyn, A., De Deyn, P., & Gassmann-Mayer, C. (2007). Galantamine treatment of vascular dementia: A randomized trial. *Neurology, 69*(5), 448-458.
- Backman, L., Jones, S., Berger, A.-K., Laukka, E.J., & Small, B.J. (2005). Cognitive impairment in preclinical Alzheimer's disease: A meta-analysis. *Neuropsychology, 19*, 520-531.
- Backman, L. & Small, B.J. (1998). Influences of cognitive support on episodic remembering: Tracing the process of loss from normal aging to Alzheimer's disease. *Psychology and Aging, 13*, 267-276.
- Backman, L. & Small, B.J. (2007). Cognitive deficits in pre-clinical Alzheimer's disease and vascular dementia: patterns of findings from the Kungsholmen Project. *Physiology & Behavior, 92*, 80-86.
- Backman, L., Small, B.J., & Fratiglioni, L. (2001). Stability of the preclinical episodic memory deficit in Alzheimer's disease. *Brain, 124*, 96-102.
- Baddeley, A.D., Baddeley, H.A., Bucks, R.S., & Wilcock, G.K. (2001). Attentional control in Alzheimer's disease. *Brain, 124*, 1492-1508.
- Baddeley, A.D., Bressi, S., Della Salla, S., Logie, R., & Spinnler, H. (1991). The decline of working memory in Alzheimer's disease: A longitudinal study. *Brain, 114*, 2521-2542.
- Ballard, C.G. (2002). Advances in the treatment of Alzheimer's disease: Benefits of dual cholinesterase inhibition. *European Neurology, 47*, 64-70.
- Ballenger, J.F. (2006). *Self, Senility, and Alzheimer's Disease in Modern America: A History*. The Johns Hopkins University Press: Baltimore, Maryland.

- Balthazar, M., Cendes, F., & Damasceno, B. (2008). Semantic error patterns on the Boston Naming Test in normal aging, amnesic mild cognitive impairment, and mild Alzheimer's disease: Is there semantic disruption?. *Neuropsychology, 22*, 703-709.
- Barr, A., & Brandt, J. (1996). Word-list generation deficits in dementia. *Journal of Clinical and Experimental Neuropsychology, 18*, 810-812.
- Bayles, K.A. & Tomoeda, C.K. (1991). Caregiver report of prevalence and appearance order of linguistic symptoms in Alzheimer's patients. *Gerontologist, 31*, 210-216.
- Belleville, S., Chertkow, H., & Gauthier, S. (2007). Working memory and control of attention in persons with Alzheimer's disease and mild cognitive impairment. *Neuropsychology, 21*(4), 458-469.
- Benjamin, A., & Craik, F. (2001). Parallel effects of aging and time pressure on memory for source: Evidence from the spacing effect. *Memory & Cognition, 29*(5), 691-697.
- Benton, A.L. (1963). Revised Visual Retention Test. Psychological Corporation: New York.
- Berger, A.K., Fratiglioni, L., Forsell, Y., Winblad, B., & Backman, L. (1999). The occurrence of depressive symptoms in the preclinical phase of AD: A population-based study. *Neurology, 53*, 1998-2002.
- Blanchet, S., Belleville, S., & Peretz, I. (2006). Episodic encoding in normal aging: Attentional resources hypothesis extended to musical material. *Aging, Neuropsychology, and Cognition, 13*(3), 490-502.
- Blessed, G., Tomlinson, B.E., & Roth, M. (1968). The association between quantitative

measures of dementia and of senile change in the cerebral gray matter of elderly subjects. *British Journal of Psychiatry*, 114, 797-811.

Bondi, M.W., Salmon, D.P., Monsch, A.U., Galasko, D., Butters, N., Klauber, M.R., Thal, L.J., & Saithoh, T. (1995). Episodic memory changes are associated with the APOE- epsilon 4 allele in nondemented older adults. *Neurology*, 45, 2203-2206.

Bouchard, R.W. & Rossor, M.N. (1999). Typical clinical features. In S. Gauthier & M. Dunitz (Eds.), *Clinical diagnosis and management of Alzheimer's disease* (pp. 57-72). The Livery House: London, England.

Bowlby Sifton, C. (2000). Maximizing the functional abilities of persons with Alzheimer's disease and related dementias. In M.P. Lawton & R.L. Rubinstein (Eds.). *Interventions in dementia care: Toward improving quality of life* (pp. 11-37). Springer Publishing Company: New York.

Braak, H. & Braak, E. (1995). Staging of Alzheimer disease-related neurofibrillary tangles. *Neurobiology of Aging*, 16, 271-284.

Braaten, A., Parsons, T., McCue, R., Sellers, A., & Burns, W. (2006). Neurocognitive differential diagnosis of dementing diseases: Alzheimer's dementia, vascular dementia, frontotemporal dementia, and major depressive disorder. *International Journal of Neuroscience*, 116(11), 1271-1293.

Brandstatter, H. (1978). Time sampling of subjective well-being. In W. Molt, H. A.

Hartmann, & P. Stringer (Eds.), *Advances in economic psychology: Third European colloquium on economic psychology*. Edition Meyn: Heidelberg, Germany.

- Braver, T. S. & Barch, D. M. (2002). A theory of cognitive control, aging cognition, and neuromodulation. *Neuroscience and Biobehavioral Reviews*, 26, 809–817.
- Bullock, R. (2004). Cholinesterase inhibitors and vascular dementia: Another string to their bow?. *CNS Drugs*, 18(2), 79-92.
- Burger, G.K., Calsyn, R.J., Morse, G.A., Klinkenberg, W.D., & Trusty, M.L. (1997). Factor structure of the brief psychiatric rating scale. *Journal of Clinical Psychology*, 53, 451-454.
- Butler, R.N. (1974). Successful aging and the role of the life review. *Journal of the American Geriatrics Society*, 22, 529-535.
- Cabeza, R. (2002). Hemispheric asymmetry reduction in older adults: The HAROLD model. *Psychology and Aging*, 17, 85-100.
- Cairns, R., Evans, J., & Prince, M. (2004). The impact of NICE guidelines on the diagnosis and treatment of Alzheimer's disease among general medical hospital inpatients. *International Journal of Geriatric Psychiatry*, 19, 800-802.
- Camp, C.J., Foss, J.W., O'Hanlon, A.M., & Stevens, A.B. (1996). Memory interventions for persons with dementia. *Applied Cognitive Psychology*, 10, 193-210.
- Camp, C.J., Foss, J.W., Stevens, A.B., Reichard, C.C., McKittrick, L.A., & O'Hanlon, A.M. (1993). Memory training in normal and demented elderly populations: The E-I-E-I-O model. *Experimental Aging Research*, 19, 277-290.
- Campos, A., Pérez-Fabello, M., & Gómez-Juncal, R. (2006). Time requirement for formation of mental images. *North American Journal of Psychology*, 8(2), 277-288.
- Canadian Consensus Conference (1991). Assessing dementia: The Canadian consensus.

Canadian Medical Association Journal, 144, 851-853.

- Carlsson, A. (1983). Changes in neurotransmitter systems in the aging brain and in Alzheimer's disease. In B. Reisberg (Ed.), *Alzheimer's disease* (pp. 100-106). Free Press: New York.
- Carstensen, L.L., Fung, H.H., & Charles, S.T. (2003). Socioemotional selectivity theory and the regulation of emotion in the second half of life. *Motivation and Emotion*, 27, 103-123.
- Cath, S.H. & Sadavoy, J. (1991). Psychosocial aspects. *Comprehensive review of geriatric psychiatry* (pp. 79-98). American Psychiatric Association: Washington D.C.
- Chafetz, P.K. (1991). Structuring environments for dementia patients. In M.F. Weiner (Ed.), *The dementias: Diagnosis and management* (pp. 249-262). American Psychiatric Press: Washington D.C.
- Cheston, R. (2004). Innovative practice: "Falling into a hole": narrative and emotional change in a psychotherapy group for people with dementia. *Dementia*, 3, 95-109.
- Cheston, R., Bender, M., & Byatt, S. (2000). Involving people who have dementia in the evaluation of services: A review. *Journal of Mental Health*, 5, 471-479.
- Christensen, H. (2001). What cognitive changes can be expected with normal ageing?. *Australian and New Zealand Journal of Psychiatry*, 35(6), 768-775.
- Citron, M. (2002). Alzheimer's disease: Treatments in discovery and development. *Nature Neuroscience*, 5, 1055-1057.
- Clark, A.J. (2004). On the meaning of color in early recollections. *Journal of Individual Psychology*, 60 (2), 141-154.

- Coffey, C., Wilkinson, W., Weiner, R., & Parashos, I. (1993). Quantitative cerebral anatomy in depression: A controlled magnetic resonance imaging study. *Archives of General Psychiatry*, 50, 7-16.
- Cohen, D. & Eisdorfer, C. (1986). The loss of self: A family resource for the care of Alzheimer's disease and related disorders. W.W. Norton & Company: New York.
- Collette, F. & Van Der Linden, M. (2004). Executive functions in Alzheimer's disease. In R. Morris & J. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 103-121). The Oxford University Press: New York.
- Cotrell, V.C. (1997). Awareness deficits in Alzheimer's disease: Issues in assessment and intervention. *The Journal of Applied Gerontology*, 16(1), 71-90.
- Craik, F.I.M. (1986). A functional account of age differences in memory. In F. Klix & H. Hagendorf (Eds.), *Human memory and cognitive capabilities, mechanisms, and performance* (pp. 409-422). Elsevier Science Publishers: Amsterdam.
- Craik, F.I.M. (1987). Age differences in human memory. In J.E. Birren & K.W. Schaie (Eds.), *Handbook of psychology of aging* (pp. 384-420). Van Nostrand Reinhold: New York.
- Crawford, S., & Channon, S. (2002). Dissociation between performance on abstract tests of executive function and problem solving in real-life-type situations in normal aging. *Aging & Mental Health*, 6(1), 12-21.
- Croisile, B.C., Brabant, M.-J., Carmoi, T., Lepage, Y., Aimard, G., & Trillet, M. (1996). Comparison between oral and written spelling in Alzheimer's disease. *Brain and Language*, 54, 361-387.

- Cronholm, B. & Schalling, D. (1987). Cognitive decline with ageing, and working capacity. *Society, stress, and disease, Volume 5: Old age* (pp. 227-235). Oxford University Press: New York.
- Csikszentmihalyi, M. & Larson, R. (1987). Validity and reliability of the experience sampling method. *Journal of Nervous and Mental Disease, 175*, 526-536.
- Cullum, S., Huppert, F., McGee, M., Denning, T., Ahmed, A., Paykel, E., et al. (2000). Decline across different domains of cognitive function in normal ageing: Results of a longitudinal population-based study using CAMCOG.
- Curran, H.V., Kopelman, M.D., & Rusted, J.M. (2004). The cognitive psychopharmacology of Alzheimer's disease. In R. Morris & J. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 321-356). The Oxford University Press: New York.
- Cummings, J.L.(2003). Neuropsychiatric symptoms. In R.C. Petersen (Ed.), *Mild cognitive impairment: Aging to Alzheimer's disease* (pp. 41-62). The Oxford University Press: New York.
- Cummings, J., & Benson, D. (1989). Speech and language alterations in dementia syndromes. *Brain organization of language and cognitive processes* (pp. 107-120). New York, NY, US: Plenum Press.
- Cummings, J.L. & Benson, D.F. (1992). *Dementia: A clinical approach* (2nd Ed.). Boston, MA: Butterworth-Heinmann.
- Cummings, J.L. & Cole, G. (2002). Alzheimer's disease. *Journal of the American Medical Association, 287*, 2335-2338.
- Cummings, J.L. & Khachaturian, Z.S. (1999). Definitions and diagnostic criteria. In S.

- Gauthier (Ed.), *Clinical diagnosis and management of Alzheimer's disease* (pp. 3-16). Martin Dunitz: London.
- Cummings, J.L., Vinters, H.V., Cole, G.M. & Khachaturian, Z.S. (1998). Alzheimer's disease: Etiologies, pathophysiology, cognitive reserve, and treatment opportunities. *Neurology*, *51*(Supplement), S2-S17.
- Curran, H.V., Kopelman, M.D., & Rusted, J.M. (2004). The cognitive psychopharmacology of Alzheimer's disease. In R. Morris & J. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 321-356). The Oxford University Press: New York.
- Davignon, D.D. & Leshowitz, B.H. (1986). The speech-in-noise test: A new approach to the assessment of communication capability of elderly persons. *International Journal of Aging and Human Development*, *23*, 149-160.
- Davis, B.H. (2005). *Alzheimer talk, text, and context: Enhancing communication*. Palgrave Macmillan: New York.
- Davis, L.T. & Johnson, P.J. (1983-84). An assessment of conscious content as related to introversion-extraversion. *Imagination, Cognition, and Personality*, *3*, 149-168.
- Davison, G.C., Robins, C., & Johnson, M.K. (1983). Articulated thoughts during simulated situations: A paradigm for studying cognition in emotion and behavior. *Cognitive Therapy and Research*, *7*, 17-40.
- Dawson, P., Kline, K., Wiancko, D.C. (1986). Preventing excess disability in patients with Alzheimer's disease. *Geriatric Nursing*, *7*, 298-301.
- Debaggio, T. (2002). *Losing my mind: An intimate look at life with Alzheimer's*. The Free Press: New York.

- Delespaul, P.A.E.G. & deVries, M.W. (1987). The daily life of ambulatory chronic mental patients. *The Journal of Nervous and Mental Disease*, 175, 537-544.
- Dementia Study Group of the Italian Neurological Society (2000). Guidelines for the diagnosis of dementia and Alzheimer's disease. *Neurological Science*, 21, 187-194.
- Desai, A.K. & Grossberg, G.T. (2005). Diagnosis and treatment of Alzheimer's disease. *Neurology*, 64 (Supplement 3), S34-S39.
- deVries, M.W. (1992). The experience of psychopathology in natural settings: introduction and illustration of variables. In M.W. deVries (Ed.), *The experience of psychopathology: Investigating mental disorders in their natural settings* (pp. 3-26). Cambridge University Press: New York.
- deVries, M.W. & Delespaul, P.A.E.G. (1989). Time, context, and subjective experiences in schizophrenia. *Schizophrenia Bulletin*, 15, 233-244.
- deVries, M.W. & Delespaul, P.A.E.G. (1992). Variability of schizophrenia symptoms. In M.W. deVries (Ed.), *The experience of psychopathology: Investigating mental disorders in their natural settings* (pp. 97-109). Cambridge University Press: New York.
- deVries, M.W., Delespaul, P.A.E.G., & Dijkman-Caes, C.I.M. (1992). Consequences of depression for the experience of anxiety in daily life. In M.W. deVries (Ed.), *The experience of psychopathology: Investigating mental disorders in their natural settings* (pp. 141-147). Cambridge University Press: New York.
- deVries, M.W., Dijkman-Caes, C.I.M., & Delespaul, P.A.E.G. (1990). The sampling of experience: A method of measuring the co-occurrence of anxiety and

- depression in daily life. In J.D. Maser & C.R. Cloninger (Eds.), *Comorbidity of mood and anxiety disorders* (pp. 707-727). American Psychiatric Press, Inc.: Washington, D.C.
- Dickerson, B.C., Salat, D.H., Greve, D.N., Chua, E.F., Rand-Giovannetti, E., Rentz, et al., (2005). Increased hippocampal activation in mild cognitive impairment compared to normal aging and Alzheimer's disease. *Neurology*, *65*, 404-411.
- DiFabio, R.P., Zampieri, C., Henke, J., Olson, K., Rickheim, D., & Russell, M. (2005). Influence of elderly executive cognitive function on attention in the lower visual field during step initiation. *Gerontology*, *51*, 94-107.
- Dixon, R.A., Hopp, G.A., Cohen, A.L., de Frias, C.M., & Backman, L. (2003). Self-reported memory compensation: Similar patterns in Alzheimer's disease and very old samples. *Journal of Experimental and Neuropsychology*, *25*(3), 382-390.
- Dror, I.E., & Kosslyn, S.M. (1994). Mental imagery and aging. *Psychology and Aging*, *9*, 90-102.
- Duncan, B.A. & Siegal, A.P. (1998). Early diagnosis and management of Alzheimer's disease. *Journal of Clinical Psychiatry*, *59*(Supplement 9), 15-21.
- Ebly, E.M., Parhad, I.M., Hogan, D.B., & Fung, T.S. (1994). Prevalence and types of dementia in the very old: Results from the Canadian study of health and aging. *Neurology*, *44*, 1593-1600.
- Ernst, R.L., Hay, J.W., Fenn, C., Tinklenberg, J., & Yesavage, J.A. (1997). Cognitive function and the costs of Alzheimer disease: An exploratory study. *Archives of Neurology*, *54*, 687-693.
- Fabrigoule, C., Lafont, S., Letenneur, L, Rouch, I, & Dartigues, J.F. (1996). WAIS

- similarities subtest performances as predictors of dementia in elderly community residents. *Brain and Cognition*, 30, 323-326.
- Fabrigoule, C., Rouch, I., Taberly, A., Letenneur, L., Commenges, D., Mazaux, J.-M., et al., (1998). Cognitive processes in preclinical dementia. *Brain*, 121, 135-141.
- Feil, N. (2002). *The validation breakthrough*. Health Professions Press, Inc.: Baltimore, Maryland.
- Fernandez, A.L., Manoiloff, L.M., & Monti, A.A. (2006). Long-term cognitive treatment of Alzheimer's disease: A single case study. *Neuropsychological Rehabilitation*, 16, 96-109.
- Fernández-Martínez, M., Castro, J., Molano, A., Zarranz, J., Rodrigo, R., & Ortega, R. (2008). Prevalence of neuropsychiatric symptoms in Alzheimer's disease and vascular dementia. *Current Alzheimer Research*, 5(1), 61-69.
- Finch, C., & Zelinski, E. (2005). Normal aging of brain structure and cognition: Evolutionary perspectives. *Research in Human Development*, 2(1), 69-82.
- Findler, M. (2000). Organizational processing, encoding, and storage in subjects with mild Alzheimer's disease. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 60 (8-B), 4220-4303.
- Fleischman, D. & Gabrieli, J. (1998). Repetition priming in normal aging and Alzheimer's disease: A review of findings and theories. *Psychology and Aging*, 13, 88-119.
- Fleischman, D., Gabrieli, J., Gilley, D., Hauser, J., Lange, K., Dwornik, L., et al. (1999). Word-stem completion priming in healthy aging and Alzheimer's disease: The effects of age, cognitive status, and encoding. *Neuropsychology*, 13(1), 22-30.

- Fodor, J. A. (1981). Imagistic representation. In N. Block (Ed.), *Imagery* (pp. 64-66). The MIT Press: Boston.
- Folstein, M.F., Folstein, S.E., & McHugh, P.R. (1975). Mini-mental-state: A practical method for grading the cognitive state of patients for the clinician. *Journal of Psychiatric Research, 12*, 189-198.
- Fox, N., & Schott, J. (2004). Imaging cerebral atrophy: Normal ageing to Alzheimer's disease. *Lancet, 363*(9406), 392-394.
- Fox, N.C., Shahill, W.R., Crum, R.I., & Rosser, M.N. (1999). Correlation between rates of brain atrophy and cognitive decline in Alzheimer's disease. *Neurology, 52*, 1687-1689.
- Frazer, D. (2000). Psychotherapy with the cognitively impaired. In M.P. Lawton & R.L. Rubinstein (Eds.), *Interventions in dementia care: toward improving quality of life* (pp. 65-94). Springer Publishing Company: New York.
- Freeman, R.Q., Giovannetti, T., Lamar, M., Cloud, B.S., Stern, R.A., Kaplan, E., et al. (2000). Visuoconstructional problems in dementia: Contribution of executive systems functions. *Neuropsychology, 14*, 415-426.
- Frodl, T., Hampel, H., Juckel, G., Burger, K., Padberg, F., Engel, R.R., et al., (2002). Value of event-related P300 subcomponents in the clinical diagnosis of mild cognitive impairment and Alzheimer's disease. *Psychophysiology, 39*, 175-181.
- Garrard, P., Patterson, K., & Hodges, J.R. (2004). Semantic processing in Alzheimer's disease. In R. Morris & J. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 179-196). The Oxford University Press: New York.

- Gauvin, L. & Szabo, A. (1992). Application of the experience sampling method to the study of the effects of exercise withdrawal on well-being. *Journal of Sports & Exercise Psychology, 14*, 361-373.
- Germano, C., & Kinsella, G. (2005). Working memory and learning in early Alzheimer's disease. *Neuropsychology Review, 15*(1), 1-10.
- Geula, C. (1998). Abnormalities of neural circuitry in Alzheimer's disease: Hippocampus and cortical cholinergic innervation. *Neurology, 51*, 18-29.
- Giambra, L.M. (2000). "Daydreaming characteristics across the life-span: age differences and seven to twenty year longitudinal changes." In Individual Differences in Conscious Experience. R.G. Kunzendorf & B. Wallace (Eds.). pp. 147-208; John Benjamins Publishing Company: Philadelphia.
- Giffard, B., Desgranges, B., Kerrouche, N., Piolino, P., & Eustache, F. (2003). The hyperpriming phenomenon in normal aging: A consequence of cognitive slowing?. *Neuropsychology, 17*(4), 594-601.
- Granholm, E., & Butters, N. (1988). Associative encoding and retrieval in Alzheimer's and Huntington's disease. *Brain and Cognition, 7*(3), 335-347.
- Graff-Radford, N. (2003). Biological markers. In R.C. Petersen (Ed.), *Mild cognitive impairment: Aging to Alzheimer's disease* (pp. 205-228). The Oxford University Press: New York.
- Gray, C. & Della Sala, S. (2004). Measuring impairment and charting decline in Alzheimer's disease. In R. Morris & J. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 23-46). The Oxford University Press: New York.

- Greene, J. D. W., Baddeley, A. D., and Hodges, J. R. (1996). Analysis of the episodic memory deficit in early Alzheimer's disease: Evidence from the doors and people test. *Neuropsychologia*, *34*, 537–551.
- Greene, J.D.W., Hodges, J.R., & Baddeley, A. (1995). Autobiographical memory and executive function in early dementia of the Alzheimer's type. *Neuropsychologia*, *33*(12), 1647-1670.
- Gross, J.J., Carstensen, L.L., Pasupathi, M., Hsu, A., Tsai, J., & Gotestana Skorpen, C. (1997). Emotion and aging: experience, expression, and control. *Psychology and Aging*, *12*(4), 590-599.
- Gomez-Isla, T. & Hyman, B.T. (2003). Neuropathological changes in normal aging, mild cognitive impairment, and Alzheimer's disease. In R.C. Petersen (Ed.), *Mild cognitive impairment: Aging to Alzheimer's disease* (pp. 191-204). The Oxford University Press: New York.
- Grober, E., Buschke, H., Kawas, C., and Fuld, P. (1985). Impaired ranking of semantic attributes in dementia. *Brain Language*, *26*, 276–286.
- Gubrium, J.F. (2000). Narrative practice and the inner worlds of the Alzheimer disease experience. In P.J. Whitehouse, K. Maurer, & J.F. Ballenger (Eds.), *Concepts of Alzheimer disease: Biological, clinical, and cultural perspectives* (pp. 181-204). The Johns Hopkins University Press: Baltimore, Maryland.
- Han, L., Cole, M., Bellavance, F., McCusker, J., & Primeau, F. (2000). Tracking cognitive decline in Alzheimer's disease using the MMSE: A meta-analysis. *International Psychogeriatrics*, *12*, 231-247.
- Hannesdottir, K. & Snaedel, J. (2002). A study of the Alzheimer's disease assessment

- scale-cognitive (ADAS-Cog) in an Icelandic elderly population. *Nordic Journal of Psychiatry*, 56, 201-206.
- Harris, P.B. & Sterin, G.J. (1999). Insider's perspective: Defining and preserving the self in dementia. *Journal of Mental Health and Aging*, 5, 241-256.
- Harrison, B., Son, G., Kim, J., & Whall, A. (2007). Preserved implicit memory in dementia: A potential model for care. *American Journal of Alzheimer's Disease and Other Dementias*, 22(4), 286-293.
- Hasher, L. & Zacks, R.T. (1979). Automatic and effortful processes in memory. *Journal of Experimental Psychology: General*, 108, 356-388.
- Haug, H., Barmwater, U., Eggers, R., Fischer, D., Kuhl, S., & Sass, N.L. (1983). Anatomical changes in the aging brain: Morphometric analysis of the human prosencephalon. In J. Cervos-Navarro & H.I. Sarkander (Eds.), *Aging: Volume 21. Brain aging: Neuropathology and neuropharmacology* (pp. 1-12). Raven Press: New York.
- Haut, M., Chen, S., & Edwards, S. (1999). Working memory, semantics, and normal aging. *Aging, Neuropsychology, and Cognition*, 6(3), 179-186.
- Haxby, J.V., Raffaele, K., Gillette, J., Schapiro, M.B., & Rapoport, S.I. (1992). Individual trajectories of cognitive decline in patients with dementia of the Alzheimer type. *Journal of Clinical and Experimental Neuropsychology*, 14(4), 575-592.
- Heavey, C.L., & Hurlburt, R.T. (2008). The phenomena of inner experience. *Consciousness and Cognition*, 17, 798-810.
- Hebert, L.E., Scherr, P.A., Bienias, J.L., Bennett, D.A., & Evans, D.A. (2003).

- Alzheimer disease in the US population: Prevalence estimates using the 2000 census. *Archives of Neurology*, 60, 1119-1122.
- Hedden, T., & Gabrieli, J. (2004). Insights into the ageing mind: A view from cognitive neuroscience. *Nature Reviews Neuroscience*, 5(2), 87-96.
- Hedges, S.M., Krantz, D.S., Contrada, R.J., & Rozanski, A.R. (1990). Development of a diary for use with ambulatory monitoring of mood, activities, and physiological function. *Journal of Psychopathology and Behavioral Assessment*, 12, 203-217.
- Hektner, J.M. & Csikszentmihalyi, M. (2002). The experience sampling method: Measuring the context and the content of lives. In R.B. Bechtel & A. Churman (Eds.), *Handbook of environmental psychology* (pp. 233-243) John Wiley & Sons Inc.: Hoboken, NJ.
- Helzner, E.P., Cauley, J.A., Pratt, S.R., Wisniewski, S.R., Zmuda, J.M., Talbott, E.O., et al. (2005). Race and sex differences in age-related hearing loss: The health, aging, and body composition study. *Journal of the American Geriatrics Society*, 53(12), 2119-2127.
- Henderson, C.M. (1998). Partial view: An Alzheimer's journal. J.H. Main, R.D. Henderson, & N. Andrews (Eds.). Southern Methodist University Press: Dallas, Texas.
- Hillbrand, M. & Waite, B.M. (1994). The experience of an institutionalized sex offender: An idiographic application of the experience sampling method. *Archives of Sexual Behavior*, 23, 453-463.
- Hnatiuk, S.H. (1991). Experience sampling with elderly persons: An exploration of the method. *International Journal of Aging and Human Development*, 33, 45-64.

- Hogan, D.B. & Patterson, C. (2002). Progress in clinical neurosciences: Treatment of Alzheimer's disease and other dementias – review and comparison of the cholinesterase inhibitors. *Le Journal Canadien Des Sciences Neurologiques*, 29, 306-314.
- Hormuth, S.E. (1986). The sampling of experience in situ. *Journal of Personality*, 54, 262-293.
- Howes, M. Siegel, M. & Brown, F. (1993). Early childhood memories: Accuracy and effect. *Cognition*, 47, 95-119.
- Hughes, C.P., Berg, L., Danziger, W.L., Coben, L.A., & Martin, R.L. (1982). A new clinical scale for the staging of dementia. *British Journal of Psychiatry*, 140, 566-572.
- Hulme, C., Lee, G., & Brown, G. (1993). Short-term memory impairments in Alzheimer-type dementia: Evidence for separable impairments of articulatory rehearsal and long-term memory. *Neuropsychologia*, 31(2), 161-172.
- Huppert, F.A. (1991). Age-related changes in memory: Learning and remembering new information. In F. Boller & J. Grafman (Eds.), *Handbook of neuropsychology*, volume 5 (pp. 123-147). Elsevier: Amsterdam.
- Hurlburt, R.T. (1979). Random sampling of cognitions and behavior. *Journal of Research in Personality*, 13, 103-111.
- Hurlburt, R.T. (1980). Validation and correlation of thought sampling with retrospective measures. *Cognitive Therapy and Research*, 4, 235-238.
- Hurlburt, R. T. (1990). *Sampling normal and schizophrenic inner experience*. New York: Plenum Press.

- Hurlburt, R. T. (1993). *Sampling inner experience in disturbed affect*. New York: Plenum Press.
- Hurlburt, R. T. (1997). Randomly sampling thinking in the natural environment. *Journal of Consulting and Clinical Psychology, 65*, 941-949.
- Hurlburt, R.T. (2006). Retrieved September 2, 2006. Retrieved from <http://www.nevada.edu/~russ/beeper.html>.
- Hurlburt, R.T. & Akhter, S.A. (2006). The Descriptive Experience Sampling method. *Phenomenology and the Cognitive Sciences, 5*, 271-301.
- Hurlburt, R.T., Happe', F., & Frith U. (1994). Sampling the form of inner experience in three adults with Asperger syndrome. *Psychological Medicine, 24*, 385-395.
- Hurlburt, R.T., & Heavey, C.L. (2001). Telling what we know: Describing inner experience. *Trends in Cognitive Sciences, 5*, 400-403.
- Hurlburt, R.T., & Heavey, C.L. (2004). To beep or not to beep: Obtaining accurate reports about awareness. *Journal of Consciousness Studies, 11*, 113-128.
- Hurlburt, R.T., Heavey, C., & Seibert, T.M. (2006). Toward accurate reports of inner experience. In R.T. Hurlburt & C. Heavey (Eds.), *Exploring inner experience: The Descriptive Experience Sampling Method: Advances in consciousness research*. (pp. 41-60). John Benjamins: Amsterdam/Philadelphia.
- Hurlburt, R.T. & Schwitzgebel, E. (2007). *Describing inner experience?* MIT Press: Cambridge, MA.
- Hurlburt, R.T. & Sippelle, C.N. (1978). Random sampling of cognitions in alleviating anxiety attacks. *Cognitive Therapy and Research, 2*, 165-169.
- Ikeda, M. (2004). Early diagnosis and memory clinic for Alzheimer's disease.

Psychogeriatrics, 4, 130-132.

Inagaki, H., Meguro, K., Shimada, M., Ishizaki, J., Okuzumi, H., & Yamadori, A. (2002).

Discrepancy between mental rotation and perspective-taking abilities in normal aging assessed by Piaget's three-mountain task. *Journal of Clinical and Experimental Neuropsychology*, 24(1), 18-25.

Innes, A. & Hatfield, K. (Eds.)(2001). *Healing arts therapies and person-centered dementia care*. Jessica Kingsley Publishing: London, England.

Jacobson, M.W., Delis, D.C., Bondi, M.W., & Salmon, D.P. (2002). Do neuropsychological tests detect preclinical Alzheimer's disease: Individual-test versus cognitive-discrepancy score analyses. *Neuropsychology*, 16, 132-139.

Jacobson, M.W., Delis, D.C., Bondi, M.W., & Salmon, D.P. (2005). Asymmetry in auditory and spatial attention span in normal elderly genetically at risk for Alzheimer's disease. *Journal of Clinical and Experimental Neuropsychology*, 27, 240-253.

Jacobson, M.W., Delis, D.C., Lansing, A., Houston, W., Olsen, R., Wetter, S., et al. (2005). Asymmetries in global-local processing ability in elderly people with the apolipoprotein E-e4 allele. *Neuropsychology*, 19, 822-829.

Jacoby, L.L., Toth, J.P., & Yonelinas, A.P. (1993). Separating conscious and unconscious influences on memory: Measuring recollection. *Journal of Experimental Psychology: General*, 122, 139-154.

Johannsen, P. (2004). Long-term cholinesterase inhibitor treatment of Alzheimer's disease. *CNS Drugs*, 18, 757-768.

Just, M.A. & Carpenter, P.A. (1992). A capacity theory of comprehension: Individual

- differences in working memory. *Psychological Review*, 99, 122-149.
- Karlsson, T., Adolfsson, R., Börjesson, A., & Nilsson, L. (2003). Primed word-fragment completion and successive memory test performance in normal aging. *Scandinavian Journal of Psychology*, 44(4), 355-361.
- Kasl-Godley, J. & Gatz, M. (2000). Psychosocial interventions for individuals with dementia: An integration of theory, therapy, and a clinical understanding of dementia. *Clinical Psychology Review*, 20, 755-782.
- Kato, T., Knopman, D., & Liu, H. (2001). Dissociation of regional activation in mild Alzheimer's disease during visual encoding: A functional MRI study. *Neurology*, 57, 812-816.
- Kawas, C.H., Corrada, M.M., Brookmeyer, R., Morrison, A., Resnick, S.M., Zonderman, A.B., et al. (2003). Visual memory predicts Alzheimer's disease more than a decade before diagnosis. *Neurology*, 60, 1089 – 1093.
- Kenyon, G.M., Ruth, J.-E., & Mader, W. (1999). Elements of a narrative gerontology. In V.L. Bengtson & K.W. Schaie (Eds.), *Handbook of theories of aging*. (pp. 40-58). New York: Springer Publishing Company.
- Kertesz, A. (2004). Language in Alzheimer's disease. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 197-218). The Oxford University Press: New York.
- Kidron, D. & Freedman, M. (2004). Motor functioning. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 249-266). The Oxford University Press: New York.
- Kitwood, T. (1990). Psychotherapy and dementia. *British Psychological Society*,

- Psychotherapy Section Newsletter*, 2, 40-56.
- Kitwood, T. (1993). Person and process in dementia. *International Journal of Geriatric Psychiatry*, 8, 1993.
- Kitwood, T. (1997). The experience of dementia. *Aging & Mental Health*, 1(1), 13-23.
- Kitwood, T. & Bredin, K. (1992). Towards a theory of dementia care: Personhood and well-being. *Ageing and Society*, 12, 269-287.
- Kitwood, T. & Bredin, K. (1994). *Evaluating dementia care: The dementia care mapping method* (6th edition). Bradford: Bradford University Dementia Group.
- Klinger, E. (1978). Modes of normal conscious flow. In K.S. Pope & J.L. Singer (Eds.), *The stream of consciousness: Scientific investigations into the flow of human experience* (pp. 225-259). Plenum Press: New York.
- Klinger, E. (1978-79). Dimensions of thought and imagery in normal waking states. *Journal of Altered States of Consciousness*, 4, 97-113.
- Klinger, E. (1984). A consciousness-sampling analysis of test anxiety and performance. *Journal of Personality and Social Psychology*, 47, 1376-1390.
- Klinger, E. (1974). Utterances to evaluate steps and control attention distinguish operant from respondent thought while thinking out loud. *Bulletin of the Psychonomic Society*, 74, 44-46.
- Klinger, E., Barta, S.G., & Glas, R.A. (1981). Thought content and gap time in basketball. *Cognitive Therapy and Research*, 5, 109-114.
- Klinger, E., Barta, S.G., & Maxeiner, M.E. (1980). Motivational correlates of thought content frequency and commitment. *Journal of Personality and Social Psychology*, 6, 1222-1237.

- Klinger, E. & Cox, W.M. (1987-88). Dimensions of thought flow in everyday life. *Imagination, Cognition, & Personality*, 7, 105-128.
- Klinger, E. & Kroll-Mensing, D. (1995). Idiopathic assessment experience sampling and motivational analysis. In J.N. Butcher (Ed.), *Clinical personality assessment: Practical approaches* (pp. 267-277). Oxford University Press: New York.
- Kopelman, M. (1985). Multiple memory deficits in Alzheimer-type dementia: Implications for pharmacotherapy. *Psychological Medicine*, 15, 527-541.
- Kosslyn, S.M., Pinker, S., Smith, G., & Schwartz, S. (1981). On the demystification of mental imagery. In N. Block (Ed.), *Imagery* (pp. 131-150). The MIT Press: Boston.
- Lambert, J., Eustache, F., & Viasto, F. (1996). Agraphia in Alzheimer's disease: An independent lexical impairment. *Brain and Language*, 53, 222-233.
- LaRue, A. & Jarvik, L.F. (1980). Reflections of biological changes in the psychological performance of the aged. *Age*, 3, 29-32.
- Laukka, E., Jones, S., Small, B., Fratiglioni, L., & Bäckman, L. (2004). Similar patterns of cognitive deficits in the preclinical phases of vascular dementia and Alzheimer's disease. *Journal of the International Neuropsychological Society*, 10(3), 382-391.
- Lawton, M.P., Van Haitsma, K., & Klapper, J. (1996). Observed affect in nursing home residents with Alzheimer's disease. *Journal of Gerontology. Psychological Sciences*, 51B, P3-P14.

- Lawton, M.P., Van Haitsma, K., & Perkinson, M. (2000). Emotion in people with dementia: A way of comprehending their preferences and aversions. In M.P. Lawton & R.L. Rubinstein (Eds.), *Interventions in dementia care: Toward improving quality of life* (pp. 95-120). Springer Publishing Company: New York.
- Lazzara, M., Yonelinas, A., & Ober, B. (2001). Conceptual implicit memory performance in Alzheimer's disease. *Neuropsychology, 15*(4), 483-491.
- Leifer, B.P. (2003). Early diagnosis of Alzheimer's disease: Clinical and economic benefits. *Journal of the American Geriatric Society, 51*, 281-288.
- Lezak, M.D. (1995). *Neuropsychological assessment*. (3rd edn.). New York: Oxford.
- Libon, D. J., Price, C., Davis-Garrett, K., & Giovannetti, T. (2004). From Binswanger's disease to Leukoaraiosis: What we have learned about subcortical vascular dementia. *The Clinical Neuropsychologist — Vascular Dementia Special Edition, 18*, 83-100.
- Lipinska, B., & Backman, L. (1997). Encoding-retrieval interactions in mild Alzheimer's disease: The role of access to categorical information. *Brain and Cognition, 34*(2), 274-286.
- Lojkowska, W., Ryglewicz, D., Jedrzejczak, T., Minc, S., Jakubowska, T., Jarosz, H., et al. (2003). The effect of cholinesterase inhibitors on the regional blood flow in patients with Alzheimer's disease and vascular dementia. *Journal of the Neurological Sciences, 216*, 119-126.
- Lopez, O.L. & Becker, J.T. (2004). The natural history of Alzheimer's disease. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease*

- (pp. 47-62). The Oxford University Press: New York.
- Lopez, O.L., Becker, J.T., Klunk, W., Saxton, J., Hamilton, R.L., Kaufer, D.I., et al. (2000). Research evaluation and diagnosis of probable Alzheimer's disease over the last two decades: I. *Neurology*, *55*, 1854-1862.
- Lopez, O.L., Becker, J.T., Wisniewski, S., Saxton, J., Kaufer, D.I., & DeKosky, S.T. (2002). Cholinesterase inhibitor treatment alters the natural history of Alzheimer's disease. *Journal of Neurological and Neurosurgical Psychiatry*, *72*, 310-314.
- Lopez, O.L. & Bell, A.S. (2004). Neurobiological approaches to the treatment of Alzheimer's disease. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 391-414). The Oxford University Press: New York.
- Lund, D.J.B. (1997). The contribution of auditory processing to adult age differences in memory performance. *Dissertation Abstracts International: Section B: Science & Engineering*, *58 (1-B)*, 0420.
- Mace, N.L. & Rabins, P.V. (1991). *The 36-hour day*. The Johns Hopkins University Press: Baltimore, Maryland.
- Margolin, D.I., Pate, D.S., Friedrich, F.J. (1996). Lexical priming by pictures and words in normal aging and in dementia of the Alzheimer's type. *Brain and Language*, *54*, 275-301.
- Martin, A. & Fedio, P. (1983). Word production and comprehension in Alzheimer's disease: The breakdown of semantic knowledge. *Brain and Language*, *19*, 124-141.

- Martin, A., Brouwers, P., Cox, C., & Fedio, P. (1985). On the nature of the verbal memory deficit in Alzheimer's disease. *Brain and Language*, 25, 323-341.
- Massman, P.J., Delis, D.C., Butters, N., Dupont, R.M., & Gillan, J.C. (1992). The subcortical dysfunction hypothesis: Neuropsychological validation in a subgroup of patients. *Journal of Clinical and Experimental Neuropsychology*, 12(4), 529-538.
- Masur, D.M., Sliwinski, M., Lipton, R.B., Blau, A.D., & Crystal, H.A. (1994). Neuropsychological prediction of dementia and the absence of dementia in healthy elderly persons. *Neurology*, 44, 1427-1432.
- Mathews, P.J., Obler, L.K., & Albert, M.L. (1994). Wernicke and Alzheimer on the language disturbances of dementia and aphasia. *Brain and Language*, 46, 439-462.
- Maurer, K., Volk, S., & Gerbaldo, H. (2000). Auguste D.: The history of Alois Alzheimer's first case. In P.J. Whitehouse, K. Maurer, & J.F. Ballenger (Eds.), *Concepts of Alzheimer disease: Biological, clinical and cultural perspectives* (pp. 5-29). The Johns Hopkins University Press: Baltimore, Maryland.
- Mayeux, R., Saunders, A.M., Shea, S., Mirra, S., Evans, D., Roses, et al. (1998). Utility of the apolipoprotein E genotype in the diagnosis of Alzheimer's disease. *The New England Journal of Medicine*, 338, 506-511.
- McGeer, P.L. & McGeer, E.G. (2001). Inflammation, autotoxicity and Alzheimer disease. *Neurobiology of Aging*, 22, 799-809.
- McGowin, D.F. (1993). *Living in the labyrinth: A personal journey through the maze of Alzheimer's*. Elder Books: New York.

- Meguro, K., Shimada, M., Yamaguchi, S., Ishizaki, J., Ishii, H., Shimada, Y., et al. (2001). Cognitive function and frontal lobe atrophy in normal elderly adults: implications for dementia not as aging-related disorders and the reserve hypothesis. *Psychiatry and Clinical Neurosciences*, *55*, 565-572.
- Meiran, N., & Jelicic, M. (1995). Implicit memory in Alzheimer's disease: A meta-analysis. *Neuropsychology*, *9*(3), 291-303.
- Mejia, S., Pineda, D., Alvarez, L., & Ardila, A. (1998). Individual differences in memory and executive function abilities during normal aging. *International Journal of Neuroscience*, *95*(3), 271-284.
- Mendez, M.F., Cherrier, M.M., & Perryman, K.M. (1997). Differences between Alzheimer's disease and vascular dementia on information processing measures. *Brain and Cognition*, *34*, 301-310.
- Micieli, G. (2006). Vascular dementia. *Neurological sciences*, *27* (Suppl. 1), S37-S39.
- Miller, E. (2004). The assessment of dementia. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 357-378). The Oxford University Press: New York.
- Misciagna, S., Masullo, C., Giordano, A., & Silveri, M. (2005, December). Vascular dementia and Alzheimer's disease: The unsolved problem of clinical and neuropsychological differential diagnosis. *International Journal of Neuroscience*, *115*(12), 1657-1667.
- Mitrushina, M., Satz, P., Drebing, C., Van Gorp, W., Mathews, A., Harker, J., et al. (1994). The differential pattern of memory deficit in normal aging and dementias of different etiology. *Journal of Clinical Psychology*, *50*(2), 246-252.

- Misciagna, S., Masullo, C., Giordano, A., & Silveri, M.C. (2005). Vascular dementia and Alzheimer's disease: The unsolved problem of clinical and neuropsychological differential diagnosis. *International Journal of Neuroscience*, 115, 1657-1667.
- Mohr, E., Dastoor, D., & Claus, J.J. (1999). Neuropsychological assessment. In S. Gauthier (Ed.), *Clinical diagnosis and management of Alzheimer's disease* (pp. 93-106). Martin Dunitz: Amsterdam.
- Monson, L.D. & Hurlburt, R.T. (1993). A comment to suspend the introspection controversy: Introspecting subjects did agree about "imageless thought." In R.T. Hurlburt (Ed.), *Inner experience in disordered affect* (pp. 15-26). Plenum Press: New York.
- Morris, R.G. (1996). Attentional and executive dysfunction. In R.G.M. Morris (Ed.), *The cognitive neuropsychology of Alzheimer-type dementia*. pp. 49-70. Oxford University Press: New York.
- Morris, R.G. (2004). Neurobiological abnormalities in Alzheimer's disease: Structural, genetic, and functional correlates of cognitive dysfunction. In R.G. Morris & J.T. Morris (Eds.), *The cognitive neuropsychology of Alzheimer's disease*. The Oxford University Press: New York.
- Morris, R.G. & Becker, J.T. (2004a). Preface. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (no page). Oxford University Press: New York.
- Morris, R.G. & Becker, J.T. (2004b). A cognitive neuropsychology of Alzheimer's disease. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (p. 3-10). Oxford University Press: New York.

- Morris, R.G. & Hannesdottir, K. (2004). Loss of 'awareness' in Alzheimer's disease. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 275-298). The Oxford University Press: New York.
- Muller, G., Richter, R.A., Weisbrod, S., & Klingberg, F. (1991). Reaction time prolongation in the early stage of presenile onset Alzheimer's disease. *European Archives of Psychiatry and Clinical Neuroscience*, 241, 46-48.
- National Center for Health Statistics (2005). Life expectancy hits record high: Gender gap narrows. Retrieved June 27, 2006 from <http://www.cdc.gov/nchs/pressroom/05facts/lifeexpectancy.htm>.
- National Institute on Aging (2000). Life expectancy in G-7 industrialized nations may exceed past predictions, study suggests. Retrieved June 27, 2006 from <http://www.nia.nih.gov/NewsAndEvents/PressReleases/PR20000614LifeExpectancy.htm>.
- National Institute On Aging (2006). The impact of Alzheimer's disease. Retrieved June 15, 2006 from www.nia.nih.gov/Alzheimers/Publications/UnravelingTheMystery/ImpactOfAlzheimerIll.htm.
- Nelson, H.E. & O'Connell, A. (1978). Dementia: The estimation of premorbid intelligence levels using the New Adult Reading Test. *Cortex*, 14, 234-244.
- Nisbett, R.E. & Wilson, T.D. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, 84, 231-259.
- Nolen-Hoeksema, S. & Morrow, J. (1993). Effects of rumination and distraction on naturally occurring depressed mood. *Cognition and Emotion*, 7, 561-570.

- Norman, D.A., & Shallice, T. (1987). Attention to action: Willed and automatic control of behaviour. In R.J. Davidson, G.E. Schwartz, & D. Shapiro (Eds.), *Consciousness and self-regulation. Advances in research and theory* (Vol. 4, pp. 1–18). New York: Plenum Press.
- Nyenhuis, D., Gorelick, P., Geenen, E., Smith, C., Gencheva, E., Freels, S., et al. (2004). The pattern of neuropsychological deficits in vascular cognitive impairment-no dementia (vascular CIND). *Clinical Neuropsychologist*, *18*(1), 41-49.
- Nygaard, L. (2003). Instrumental activities of daily living: A stepping-stone towards Alzheimer's disease diagnosis in subjects with mild impairment? *Acta Neurologica Scandinavica*, *107*, 42-46.
- Oosterman, J.M. & Scherder, E.J.A. (2006). Distinguishing between vascular dementia and Alzheimer's disease by means of the WAIS: A meta-analysis. *Journal of Clinical and Experimental Neuropsychology*, *28*(7), 1158-1175.
- Overall, J.E. & Gorham, D.R. (1962). The brief psychiatric rating scale. *Psychological Reports*, *10*, 799-812.
- Overman, A.A. & Becker, J.T. (2004). Information processing defects in episodic memory in Alzheimer's disease. R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 121-140). The Oxford University Press: New York.
- Palladino, P. & De Beni, R. (2003). When mental images are very detailed: Image generation and memory performance as a function of age. *Acta Psychologica*, *113*(3), 297-314.
- Palmer, K., Backman, L., Winblad, B., & Fratiglioni, L. (2003). Detection of

- Alzheimer's disease and dementia in the preclinical phase: Population based cohort study. *The British Medical Journal*, 326, 245.
- Parasuraman, R. (2004). Attentional functioning in Alzheimer's disease. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 81-102). Oxford University Press: New York.
- Parasuraman, R., Greenwood, P.M., & Sunderland, T. (2002). The apolipoprotein E gene, attention, and brain function. *Neuropsychology*, 16, 254-274.
- Parkin, A., & Java, R. (1999). Deterioration of frontal lobe function in normal aging: Influences of fluid intelligence versus perceptual speed. *Neuropsychology*, 13(4), 539-545.
- Parkin, A., & Walter, B. (1992). Recollective experience, normal aging, and frontal dysfunction. *Psychology and Aging*, 7(2), 290-298.
- Patin, J.R., Hamot, H.B., & Singer, J.M. (1984). Replicated evidence on the construct validity of the SCAG (Sandoz clinical assessment-geriatric) scale. *Progress in Neuro-Psychopharmacology & Biological Psychiatry*, 8, 293-306.
- Paul, R., Garrett, K., & Cohen, R. (2003). Vascular dementia: A diagnostic conundrum for the clinical neuropsychologist. *Applied Neuropsychology*, 10(3), 129-136.
- Pekkonen, E., Jaaskelainen, I.P., Hietanen, M., Huotilainen, M., Naatenen, R., Ilmoneimi, R.J., et al. (1999). Impaired preconscious auditory processing and cognitive functions in Alzheimer's disease. *Clinical Neurophysiology*, 110, 1942-1947.
- Pekkonen, E., Jousmäki, V., Könönen, M., & Reinikainen, K. (1994). Auditory sensory

- memory impairment in Alzheimer's disease: An event-related potential study. *Neuroreport: An International Journal for the Rapid Communication of Research in Neuroscience*, 5(18), 2537-2540.
- Perri, R., Serra, L., Carlesimo, G., & Caltagirone, C. (2007). Amnesic mild cognitive impairment: Difference of memory profile in subjects who converted or did not convert to Alzheimer's disease. *Neuropsychology*, 21(5), 549-558.
- Perry, R., & Hodges, J. (1999). Attention and executive deficits in Alzheimer's disease: A critical review. *Brain: A Journal of Neurology*, 122(3), 383-404.
- Petersen, R.C. (2003). Conceptual overview. In R.C. Petersen (Ed.), *Mild cognitive impairment: Aging to Alzheimer's disease* (pp. 1-14). The Oxford University Press: New York.
- Petersen, R.C., Doody, R., Kurz, R., Mohs, J.C., Morris, J.C., Rabins, K., et al. (2001). Current concepts in mild cognitive impairment. *Archives of Neurology*, 58, 1985-1992.
- Petersen, R.C. & Morris, J.C. (2003). Clinical features. In R.C. Petersen (Ed.), *Mild cognitive impairment: Aging to Alzheimer's disease* (pp. 15-40). The Oxford University Press: New York.
- Petersen, R.C., Smith, G.E., Waring, S.C., Ivnik, R.J., Tangalos, E.G., & Kokman, E. (1999). Mild cognitive impairment: Clinical characterizations and outcome. *Archives of Neurology*, 56, 303-308.
- Pignatti, R., Rabuffetti, M., Imbornone, E., Mantovani, F., Alberoni, M., Farina, E., et al. (2005). Specific impairments of selective attention in mild Alzheimer's disease. *Journal of Clinical and Experimental Neuropsychology*, 27(4), 436-448.

- Poore, Q., Rapport, L., Fuerst, D., & Keenan, P. (2006). Word list generation performance in Alzheimer's disease and vascular dementia. *Aging, Neuropsychology, and Cognition, 13*(1), 86-94.
- Poulsen, C., Picton, T.W., & Paus, T. (2007). Age-related changes in transient and oscillatory brain responses to auditory stimulation in healthy adults 19-45 years old. *Cerebral Cortex, 17*, 1454-1467.
- Pratt, R. D., & Perdomo, C. A. (2002). Donepezil-treated patients with probable vascular dementia demonstrate cognitive benefits. *Annals of the New York Academy of Science, 977*, 513-522.
- Prescott, S., Csikszentmihalyi, M., & Graef, R. (1981). Environmental effects on cognitive and affective states: The experiential time sampling approach. *Social Behavior and Personality, 9*, 23-32.
- Prinz, J.J. (2004). The fractionation of introspection. *Journal of Consciousness Studies, 11*, 40-57.
- Punzo, V.A. & Miller, E. (2002). Investigating conscious experience through the beeper project. *Teaching of Psychology, 29*, 295-297.
- Pynoos, J. & Regnier, V. (1991). Improving residential environments for frail elderly: Bridging the gap between theory and application. In J.E. Birren, J.E. Lubben, J.C. Rowe, & D.E. Deutchman (Eds.), *The concept and measurement of quality of life in the frail elderly* (pp. 91-119). Academic Press Inc.: San Diego, CA.
- Rabins, P.V. (2000). The development of treatment guidelines for Alzheimer's disease. In M.P. Lawton & R.L. Rubenstein (Eds.), *Interventions in dementia care: Toward improving quality of life* (pp.1-10). Springer Publishing Company: New

York.

- Rah, M.J., Mitchell, G.L., Bullimore, M.A., Mutti, D.O., & Zadnik, K. (2001). Prospective quantification of near work using the experience sampling method. *Optometry and Vision Science, 78*, 496-502.
- Ramsay, C., Nicholas, M., Au, R., Obler, L., & Albert, M. (1999). Verb naming in normal aging. *Applied Neuropsychology, 6*(2), 57-67.
- Ramsden, C., Kinsella, G., Ong, B., & Storey, E. (2008). Performance of everyday actions in mild Alzheimer's disease. *Neuropsychology, 22*(1), 17-26.
- Reisberg, B. (1983). *A guide to Alzheimer's disease*. New York: The Free Press.
- Reisberg, B., Ferris, S.H., De Leon, M.J., & Crook, T. (1982). The Global Deterioration Scale for assessment of primary degenerative dementia. *American Journal of Psychiatry, 139*, 1136-1139.
- Rickert, E., Duke, L., Putzke, J., Marson, D., & Graham, K. (1998). Early stage Alzheimer's disease disrupts encoding of contextual information. *Aging, Neuropsychology, and Cognition, 5*(1), 73-81.
- Ridderinkhof, K.R., Span, M.M., & M.W. (2002). Perseverative behavior and adaptive control in older adults: Performance monitoring, rule induction, and set shifting. *Brain and Cognition, 49*, 382-401.
- Riley, K.P. (1989). Psychological intervention in Alzheimer's disease. In G.C. Gilmore, P.J. Whitehouse, M.L. Wykle (Eds.), *Memory, aging, and dementia: Theory, assessment, and treatment* (pp. 199-211). Springer Publishing Company: New York.
- Rockwood, K., Macknight, C., Wentzel, C., Black, S., Bouchard, R., Gauthier, S., et al.

- (2000). The diagnosis of “mixed” dementia in the Consortium for the Investigation of Vascular Impairment of Cognition (CIVIC). *Annals of the New York Academy of Sciences*, 903, 522–528.
- Roman, G. C., Erkinjutti, T., Wallin, A., Pantoni, L., & Chui, H. C. (2002). Subcortical ischaemic vascular dementia. *Lancet Neurology*, 1, 426–436.
- Roman, G. C., Sachdev, P., Royall, D. R., Bullock, R.A., Orgogozo, J. M., Lopez-Pousa, S., et al. (2004). Vascular cognitive disorder: A new diagnostic category updating vascular cognitive impairment and vascular dementia. *Journal of Neurological Science*, 226, 1–2, 81–87.
- Rose, L. (1996). Show me the way to go home. Elder Boods: Forest Knolls, CA.
- Rosen, V.M., Bergeson, J.L., Putnam, K., Harwell, A., & Sunderland, T. (2002). Working memory in apolipoprotein E: What’s the connection?. *Neuropsychologia*, 40, 2226-2233.
- Rosen, W.G., Mohs, R.C., & Davis, K.L. (1984). A new rating scale for Alzheimer’s disease. *American Journal of Psychiatry*, 11, 1356-1364.
- Rosenberg, P.B. (2005). Clinical aspects of inflammation in Alzheimer’s disease. *International Review of Psychiatry*, 17, 503-514.
- Royall, D.R., Chiodo, L.K., & Polk, M.J. (2000). Correlates of disability among elderly retirees with ‘sub-clinical’ cognitive impairment. *The Journals of Gerontology Series: Series A: Biological Sciences and Medical Sciences*, 55, 541-546.
- Royall, D., Palmer, R., Chiodo, L., & Polk, M. (2004). Declining executive control in normal aging predicts change in functional status: The Freedom House study. *Journal of the American Geriatrics Society*, 52(3), 346-352.

- Rusted, J.M. & Clare, L. (2004). Cognitive approaches to the management of dementia. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 379-390). The Oxford University Press: New York.
- Ryan, E.B., Byrne, K., Spykerman, H., & Orange, J.B. (2005). Evidencing Kitwood's personhood strategies: Conversation as care in dementia. In B.H. Davis (Ed.), *Alzheimer talk, text, and context: Enhancing communication* (pp. 18-36). Palgrave Macmillan: New York.
- Sabat, S.R. (1994a). Language function in Alzheimer's disease: A critical review of selected literature. *Language & Communication, 14*, 331-351.
- Sabat, S.R. (1994b). Excess disability and malignant social psychology: A case study of Alzheimer's disease. *Journal of Community & Applied Social Psychology, 4*, 157-166.
- Sabat, S.R. (2000). Time past, time present, time future: The Alzheimer's disease sufferer as Stern's unitas multiplex. *Theory & Psychology, 10*, 787-800.
- Sabat, S.R. (2001). *The experience of Alzheimer's disease: Life through a tangled veil*. Malden, Massachusetts: Blackwell Publishers Inc.
- Sabat, S.R. & Cagigas, X.E. (1997). Extralinguistic communication compensates for the loss of verbal fluency: A case study of Alzheimer's disease. *Language & Communication, 17*, 341-351.
- Sabat, S.R., Fath, H., Moghaddam, F.M., & Harre', R. (1999). The maintenance of self-esteem: Lessons from the culture of Alzheimer's sufferers. *Culture and Psychology, 5*, 1354-1367.
- Sabat, S.R. & Harre' R. (1992). The construction and deconstruction of self in

- Alzheimer's disease. *Aging and Society*, 12, 443-461.
- Sadasivan, M. (1989). Encoding deficits in persons with senile dementia of the Alzheimer type. *Dissertation Abstracts International*, 50 (3-B), 919-1040.
- Salmon, D.P., Shimamura, A.P., Butters, N., & Smith, S. (1988). Lexical and semantic priming deficits in patients with Alzheimer's disease. *Journal of Clinical and Experimental Neuropsychology*, 10, 477-494.
- Salmon, D.P., Thomas, R.G., Pay, M.M., Booth, A., Hofstetter, C.R., Thal, L.J., et al. (2002). Alzheimer's disease can be accurately diagnosed in very mildly impaired individuals. *Neurology*, 59, 1022-1028.
- Salthouse, T.A. (1985). Speed of behavior and its implications for cognition. In J.E. Birren & K.W. Schaie (Eds.), *Handbook of the Psychology of Aging 2nd Edition* (pp. 400-426). Van Nostrand Reinhold: New York.
- Salthouse, T.A. & Becker, J.T. (1998). Independent effects of Alzheimer's disease on neuropsychological functioning. *Neuropsychology*, 12, 242-252.
- Samdahl, D.M. (1989). Analyzing "beeper" data: Statistical considerations for experience sampling studies. *Therapeutic Recreation Journal*, 23, 47-61.
- Saunders, A.M., Strittmatter, W.J., Schmechel, D., St. George-Hyslop, P.H., Pericak-Vance, M.A., Joo, S.H., et al. (1993). Association of apolipoprotein E allele e4 with late-onset familial and sporadic Alzheimer's disease. *Neurology*, 43, 1467-1472.
- Scollon, C.N., Kim-Prieto, C., & Diener, E. (2003). Experience sampling: Promises and pitfalls, strengths and weaknesses. *Journal of Happiness Studies*, 4, 5-34.
- Schooler, J.W. & Schreiber, C.A. (2004). Experience, meta-consciousness, and the

- paradox of introspection. *Journal of Consciousness Studies*, 11, 17-39.
- Shafto, M., Burke, D., Stamatakis, E., Tam, P., & Tyler, L. (2007). On the tip-of-the-tongue: Neural correlates of increased word-finding failures in normal aging. *Journal of Cognitive Neuroscience*, 19, 2060-2070.
- Shenk, D. (2005). The was an old woman: Maintenance of identity by people with Alzheimer's dementia. In B.H. Davis (Ed.). *Alzheimer talk, text, and context: Enhancing communication* (pp. 3-17). Palgrave Macmillan: New York.
- Schwitzgebel, E. (2002). Why did we think we dreamed in black and white? *Studies in History and Philosophy of Science*, 33, 649-660.
- Sliwinski, M., Lipton, R., Buschke, H., & Stewart, W. (1996). The effects of preclinical dementia on estimates of normal cognitive functioning in aging. *Journals of Gerontology: Series B: Psychological Sciences and Social Sciences*, 51B(4), 217-225.
- Skoog, I. (2004). Subcortical vascular dementia. *Clinical Neuropsychologist*, 18(1), 4-5.
- Small, B.J., Fratiglioni, L., Viitanen, M., Winblad, B., & Backman, L. (2000). The course of cognitive impairment in preclinical Alzheimer disease: Three- and six-year follow-up of a population-based sample. *Archives of Neurology*, 57, 839-844.
- Small, B.J., Herlitz, A., & Backman, L. (2004). Preclinical Alzheimer's disease: Cognitive and memory functioning. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 63-80). The Oxford University Press: New York.
- Small, B.J., Herlitz, A., Fratiglioni, L., Almkvist, O., & Backman, L. (2000). Cognitive

- predictors of incident Alzheimer's disease: A prospective longitudinal study. *Neuropsychology*, *11*, 413-420.
- Snowden, D.A., Kemper, S.J., Mortimer, J.A., Greiner, L.H., Wekstein, D.R., & Markesbury, W.R. (1996). Linguistic ability in early life and cognitive function and Alzheimer's disease in late life: Findings from the nun study. *Journal of the American Medical Association*, *275*, 528-532.
- Snowden, D.A., Greiner, L.H., Mortimer, J.A., Riley, K.P., Greiner, P.A., & Markesbury, W.R. (1997). Brain infarction and the clinical expression of Alzheimer disease: The nun study. *Journal of the American Medical Association*, *277*, 813-817.
- Strouse, A.L., Hall, J.W., III, & Burger, M.C. (1995). Central auditory processing in Alzheimer's disease. *Ear and Hearing*, *16*, 230-238.
- Standridge, J.B. (2004). Pharmacotherapeutic approaches to the treatment of Alzheimer's disease. *Clinical Therapeutics*, *26*, 615-630.
- Stiles, W., Eliot, R., Llewelyn, S., Firth-Cozens, J., Margison, F., Shapiro, D., et al. (1990). Assimilation of problematic experiences by clients in psychotherapy. *Psychotherapy*, *27*, 411-420.
- Tadaka, E., & Kanagawa, K. (2007). Effects of reminiscence group in elderly people with Alzheimer disease and vascular dementia in a community setting. *Geriatrics & Gerontology International*, *7*(2), 167-173.
- Thomas, D., Libon, D., & Ledakis, G. (2005). Treating dementia patients with vascular lesions with donepezil: A preliminary analysis. *Applied Neuropsychology*, *12*(1), 12-18.

- Trahan, D., & Larrabee, G. (1992). Effect of normal aging on rate of forgetting. *Neuropsychology, 6*(2), 115-122.
- Treitz, F., Heyder, K., & Daum, I. (2007). Differential course of executive control changes during normal aging. *Aging, Neuropsychology, and Cognition, 14*(4), 370-393.
- Van der Elst, W., Van Boxtel, M. P. J., Van Breukelen, G. J. P., & Jolles, J. (2005). Rey's Verbal Learning Test: Normative data for 1,855 healthy participants aged 24–81 years and the influence of age, sex, education, and mode of presentation. *Journal of the International Neuropsychological Society, 11*, 290–302.
- Vakil, E. & Blachstein, H. (1993). Auditory-verbal learning test structure analysis. *Journal of Clinical Psychology, 49*, 883-890.
- Van Gerven, P., Meijer, W., Vermeeren, A., Vuurman, E., & Jolles, J. (2007). The irrelevant speech effect and the level of interference in aging. *Experimental Aging Research, 33*(3), 323-339.
- Van Petten, C., Plante, E., Davidson, P.S., Kuo, T.Y., Bajuscak, L., & Glisky, E.L. (2004). Memory and executive function in older adults: Relationships with temporal and prefrontal gray matter volumes and white matter hyperintensities. *Neuropsychologia, 42*, 1313-1335.
- Villardita, C. (1993). Alzheimer's disease compared with cerebrovascular dementia: Neuropsychological similarities and differences. *Acta Neurologica Scandinavica, 87*(4), 299-308.
- Warrington, E.K. (1975). The selective impairment of semantic memory. *Quarterly Journal of Experimental Psychology, 27*, 635-657.

- Watkins, R., Cheston, R., Jones, K., & Gilliard, J. (2006). Coming out with Alzheimer's disease: Changes in awareness during a psychotherapy group for people with dementia. *Aging & Mental Health, 10*, 166-176.
- Wechsler, D. (1945). A standardized memory scale for clinical use. *Journal of Psychology, 19*, 87-95.
- Weiner, M.F. (1991). The diagnosis of dementia. In M.F. Weiner (Ed.), *The dementias: Diagnosis and management* (pp. 1-28). American Psychiatric Press: Washington D.C.
- Weiner, M.F. (1991). Psychological and behavioral management. In M.F. Weiner (Ed.), *The dementias: Diagnosis and management* (pp. 107-134). American Psychiatric Press: Washington D.C.
- Wegesin, D., Jacobs, D., Zubin, N., Ventura, P., & Stern, Y. (2000). Source memory and encoding strategy in normal aging. *Journal of Clinical and Experimental Neuropsychology, 22*(4), 455-464.
- West, R. (1996). An application of prefrontal cortex function theory to cognitive aging. *Psychological Bulletin, 120*(2), 272-292.
- Wetter, S.R., Delis, D.C., Houston, W.S., Jacobson, M.W., Lansing, A., Cobell, K., et al. (2005). Deficits in inhibition and flexibility are associated with the apoe-e4 allele in nondemented older adults. *Journal of Clinical and Experimental Neuropsychology, 27*, 943-952.
- Whitehouse, P.J. (1997). Genesis of Alzheimer's disease. *Neurology, 48*(7), 2-7.
- Whitehouse, P.J., Maurer, K., Ballenger, J.F. (2000). Concepts of Alzheimer disease: Biological, clinical, and cultural perspectives. The Johns Hopkins University

Press: Baltimore, Maryland.

- Whitehouse, P.J., Mayeux, R., & Growden, J.H. (1989). Diagnosis and treatment of Alzheimer's disease and related disorders: Issues for the future. In G.C. Gilmore, P.J. Whitehouse, & M.L. Wykle (Eds.), *Memory, aging, & dementia: Theory, assessment, and treatment* (pp. 189-198). Springer Publishing Company: New York.
- Wilson, B.A. & Hughes, J.C. (2001). Coping with amnesia: The natural history of a compensatory memory system. *Neuropsychological Rehabilitation*, 7, 43-56.
- Wingfield, A., Alexander, A.H., & Cavigelli, S. (1994). Does memory constrain utilization of top-down information in spoken word recognition: Evidence from normal aging. *Language and Speech*, 37, 221-235.
- Woodard, J., Grafton, S., Votaw, J., Green, R., Dobraski, M., & Hoffman, J. (1998). Compensatory recruitment of neural resources during overt rehearsal of word lists in Alzheimer's disease. *Neuropsychology*, 12(4), 491-504.
- Wright, C., Geula, C., & Mesulam, M. (1993). Neuroglial cholinesterases in the normal brain and in Alzheimer's disease: Relationship to plaques, tangles, and patterns of selective vulnerability. *Annals of Neurology*, 34, 373-384.
- Zaitchik, D. & Albert, M.S. (2004). Cognition and emotion. In R.G. Morris & J.T. Becker (Eds.), *Cognitive neuropsychology of Alzheimer's disease* (pp. 267-274). The Oxford University Press: New York.
- Zakzanis, K. K., Leach, L., & Kaplan, E. (1999). *Neuropsychological differential diagnosis*. Netherlands: Swets & Zeitlinger.
- Zamarian, L., Sinz, H., Bonatti, E., Gamboz, N., & Delazer, M. (2008). Normal aging

affects decisions under ambiguity, but not decisions under risk. *Neuropsychology*, 22(5), 645-657.

Zamrini, E., De Santi, S., & Tolar, M. (2004). Imaging is superior to cognitive testing for early diagnosis of Alzheimer's disease. *Neurobiology of Aging*, 25, 685-691.

Zarit, S.H., Orr, N.K., & Zarit, J.M. (1985). *The hidden victims of Alzheimer's disease*. New York University Press: New York.

VITA

Graduate College
University of Nevada, Las Vegas
Todd Seibert

Home Address :
4072 West 158th Street
Cleveland, OH 44135

Degrees :
Bachelor of Arts, Psychology, 1998
Gettysburg College

Master of Arts, General Psychology, 2002
University of Northern Colorado

Publications :
Hurlburt, R.T., Heavey, C.L., Seibert, T. (2006). Psychological science's prescription for accurate reports about inner experience. In R.T. Hurlburt & C.L. Heavey (Eds.), *Exploring Inner Experience: The Descriptive Experience Sampling Method* (pp. 41-60). Amsterdam: John Benjamins.

Dissertation Title : The Inner Experience of Older Individuals

Dissertation Examination Committee :
Chairperson : Dr. Russell Hurlburt, Ph.D.
Committee Member : Dr. Christopher Heavey, Ph.D.
Committee Member : Dr. David Copeland, Ph.D.
Graduate Faculty Representative : Dr. Jennifer Keene, Ph.D.