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EXPLORING THE PHENOMENA OF INNER EXPERIENCE WITH DESCRIPTIVE EXPERIENCE SAMPLING

by

Janell M. Mihelic

Bachelor of Science
Nevada State College
2005

A thesis submitted in partial fulfillment
of the requirement for the

Master of Arts Degree in Psychology
Department of Psychology
College of Liberal Arts

Graduate College
University of Nevada, Las Vegas
August 2010

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THE GRADUATE COLLEGE

We recommend the thesis prepared under our supervision by

Janell M. Mihelic

entitled

Exploring the Phenomena of Inner Experience with Descriptive Experience Sampling

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

Master of Arts in Psychology

Christopher Heavey, Committee Chair

Russell Hurlburt, Committee Member

Jeffrey Kern, Committee Member

Joel Leiberman, Graduate Faculty Representative

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

August 2010

ABSTRACT

Exploring the Phenomena of Inner Experience with Descriptive Experience Sampling

by

Janell M. Mihelic

Dr. Christopher Heavey, Examination Committee Chair
Associate Professor of Psychology
University of Nevada, Las Vegas

This study provides a survey of the phenomena of normal, everyday inner experience using the *Descriptive Experience Sampling* (DES) method. Results demonstrated that five types of inner experience (sensory awareness, feeling, unsymbolized thinking, inner seeing, and inner speech) occurred in approximately one-quarter of sampled moments and that there were significant individual differences regarding the frequency with which subjects experienced these phenomena. Three new dimensions (richness of inner experience, the number of experiences present, and the overall valence of the experience) along which inner experience could be characterized were identified and used reliably to characterize moments of experience. Finally, although there was some agreement in subject and interviewer perceptions of the ability to capture and report experience, it was determined that these ratings could not be used to determine the fidelity of reports or descriptions of inner experience.

ACKNOWLEDGMENTS

I would like to extend my sincere appreciation to Dr. Chris Heavey for being a wonderful mentor and for dedicating an abundant amount of time and energy to this project. I would also like to thank Dr. Russell Hurlburt for working tirelessly to train me in the DES method. I would also like to thank my committee members, Drs. Jeffery Kern and Joel Lieberman, for their meaningful contributions to this project. Lastly, I would like to thank my husband, Tim Straw, for his endless support and encouragement of my academic pursuits. I dedicate this to my parents, Larry and Jana Mihelic, whom I appreciate more than words can express.

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CHAPTER 1

INTRODUCTION

A professor stands in front of a packed, 200-person lecture hall teaching the principles of psychology and wonders to herself: *What is going on through the minds of the students in this class? Is anyone paying attention?* An audience watches American Idol contestants attempt to woo the judges with their talents and become a final contestant. As viewers watch the tryouts, some may wonder: W*hat is going on through contestants' minds?* Over a century of psychological debate has focused on understanding the characteristics of inner experience; however, to date, psychology knows surprisingly little about the nature or details of inner experience.

Psychology, at its inception, set out to understand and describe people's internal worlds using introspection, a method of studying an observing subject looking within his/her internal states (Boring, 1953). Despite their attempts, early introspective investigators largely relied upon theoretical inferences, focused on the psychophysical aspects of experience, and only included subjects who had practiced introspection approximately 10,000 times before being used in published studies (Hurlburt & Heavey, 2004; Boring, 1953).

The American introspectionists at Cornell University and the German introspectionists at the Würzburg school were two prominent groups of psychologists using early introspective techniques. For over 20 years, these two groups of researchers feuded over the characteristics of inner experience, especially regarding the existence of imageless thought (Hurlburt & Heavey, 2006). Meanwhile behaviorism took center stage as the new branch of psychology whose agenda for studying human psyche was

diametrically opposite to that of introspective investigators. Behaviorism pushed for the study of overt and observable behaviors and criticized introspective methods for their focus on mental activities and subjective reports. Behaviorism changed the research method away from the subject's being the observer of his/her own experiences to the investigator's being the observer of the subject (Boring, 1953). The lack of agreement about phenomena of inner experience and the rise of behaviorism left the task of discovering the characteristics of inner experience unfinished (Danziger, 1980).

After a prolonged disappearance, the past 30 years has seen a resurgence of interest in inner experience. This resurgence is partly because there was a realization that the accounts of human functioning that relied solely on behavioral principles were incomplete. Despite psychology's current interest and early efforts aimed at the exploration of inner experience, we still do not have a clear understanding of day-to-day inner experience: *What is it like? Is everyone's inner experience the same?*

The present study attempted these questions by evaluating the characteristics of normal, everyday inner experience. This study will use the *Descriptive Experience Sampling* (DES) method developed by Hurlburt (1990, 1993). DES is an introspective technique distinct from the methods used at the inception of psychology (Hurlburt & Heavey, 2004). DES is a descriptive and idiographic method aimed at exploring and describing inner experiences. DES is a bottom-up technique that involves faithfully describing a single experience and working up to portraying aspects of a single person based upon multiple single experiences (Hurlburt & Akhter, 2006). DES has been used successfully to investigate a collection of subjects having in common one specific feature (e.g., an external characteristic or psychiatric diagnosis) in which a collection of

idiographic reports are examined to discover any salient characteristics that emerge across the collected group, providing nomothetic data (Hurlburt & Akhter, 2006).

The present study is similar to Heavey and Hurlburt (2008) which also examined the phenomena of inner experience in a sample of college students. Heavey and Hurlburt (2008) used the DES method to investigate the phenomena of inner experience within and across 30-undergraduate students. They found five phenomena (inner speech, inner seeing, unsymbolized thinking, feeling, and sensory awareness) that occurred quite frequently (22% or more) in their sample. Most subjects had one dominant form of inner experience with the most common phenomenon being inner seeing. Moreover, their study revealed that there were often large differences in the frequency of the phenomena experienced by subjects. Heavey and Hurlburt (2008) also compared inner experience phenomena with subject's self-reported psychological distress on the Symptom Checklist 90 Revised (SCL-90-R; Derogatis, 1992). The correlations were generally small with the only significant correlation being between inner speech and psychological distress (negatively).

The purpose of the present study was to investigate further the characteristics of inner experience. Similar to Heavey and Hurlburt (2008), this study investigated the relative frequency of the phenomena of inner experience previously identified (Hurlburt, 1990, 1993; Hurlburt & Heavey, 2006; Heavey & Hurlburt, 2008). This study also examined the degree to which there are individual differences in inner experience and set out to identify other meaningful dimensions along which inner experience could be characterized. Lastly, this study examined perceptions of the degree to which subjects could to capture, describe and understand inner experience.

CHAPTER 2

LITERATURE REVIEW

Modern Methods of Exploring Inner Experience

Questionnaires

In 1883, Galton created a questionnaire to assess subjects' mental imagery (Klinger, 1978). Since then, a multitude of questionnaires have been developed to study aspects of inner experience. Questionnaires consist of a series of questions and/or other prompts for the purpose of gathering information from subjects.

For example, Pekala and Levine (1981) designed a 53-item questionnaire called the Phenomenology of Consciousness Inventory (PCI) to evaluate characteristics of inner experience. The PCI has 12 major subdimensions: state of awareness, altered experience, volitional control, self-awareness, rationality, internal dialogue, positive affect, negative affect, imagery, attention, memory, and arousal (Pekala, 1982). Subjects rate the 53-items on a 7-point Likert scale. The PCI has been used primarily to study hypnosis and the changes in internal states such as differences between meditative and non-meditative states. Studies that have used the PCI have identified differences in perception and meaning between meditative and non-meditative states of consciousness (Venkatesh, Raju, Shivani, Tompkins, & Meti, 1997). Moreover, differences in imagery, vividness, self-awareness, and arousal were found between the meditative and non-meditative states (Venkatesh, Raju, Shivani, Tompkins, & Meti, 1997). When compared with self-report measures of creativity, PCI results were correlated with reported creativity, positive affect, attention to internal processes, visual imagery, and subjective trance depth experienced during hypnosis (Angelini, Kumar, & Chandler, 1999; Kumar et al., 1996).

Questionnaires are advantageous as they are usually easy to administer, time efficient, and yield quantitative data which may be more easily interpreted than open-ended techniques which often require subjective analyses. Questionnaires are also advantageous as they place minimal demands on subjects.

Despite the ease in which questionnaires can be used and their popularity in exploring experiences, questionnaires can be fallible in their ability to obtain a pure, accurate, unbiased account of a subject's experience. Minor changes to question's wording, format, or context can result in unexpected alterations in results. For example, Schwarz (1990) evaluated how questionnaire response alternatives can alter subjects' reports. Subjects completed a questionnaire pertaining to how many hours they watch television each day. The two conditions had different multiple choice options to the same questions. In one condition, the questionnaire's multiple choices incorporated low-frequency response alternatives; in this condition only 16.2% of subjects reported watching television as much as two and one-half hours per day. The second condition incorporated a questionnaire with high-frequency response alternatives; in this condition 37.5% of subjects reported watching television as much as two and one-half hours per day.

Two studies by Norenzayan and Schwarz (1999; 2006) also assessed changes in questionnaire results after changing one word on a questionnaire. Norenzayan and Schwarz (2006) instructed subjects to answer 20 open-ended "I am …" statements printed on either "Institute of Political Research" or "Institute of Psychological Research" letterhead. Results showed a significant difference in the frequency of social aspects

reported on the questionnaire printed on the "Institute of Political Research" letterhead (25% as compared to 15%).

Questionnaires can also be fallible because of subjects' retrospective mistakes. Human memory is fragile and powerfully affected by the time lapse between the event and its recall with larger lapses being associated with greater loss or distortion of information (Ericsson & Simon, 1980; Kahneman & Tversky, 1982; Schwarz, 1990). Autobiographical memory, or a subject's personal representation of specific events or personal facts, continues to decay after an event with specific thoughts pertaining to the event decaying most rapidly (Brewer, 1988). Robinson (1976) found that life events can alter the accessibility of memories suggesting any account of subjective experience should be recorded as close as possible to its actual occurrence.

Misrepresentations of experience can also be made when subjects answer frequency questions such as how many times they engage in a specific behavior. When asked a frequency related question, most subjects do not think back and count the number of times they engaged in the target behavior. Rather, subjects often employ a fragment of recall and use inference to compute frequency estimations (Bradburn, Rips, & Shevell, 1987). Sudman and Schwarz (1989) studied subjects' methods of answering frequency questions. Subjects were asked the following question: "how many sticks of deodorant did you buy in the last six months?" Results concurred with Bradburn, Rips, and Shevell's (1987) finding that the majority of subjects did not use a recall and count method to answer the question, but rather estimated their responses by remembering a single event of the behavior and extrapolated from that incident to the rest of the time period in question.

This research, taken as a whole, indicates that questionnaires have many advantages such as they can be easily administered, they are time efficient, and they place minimal demands on subjects. However, questionnaires can easily result in a misrepresentation of a subject's experience due to wording effects, memory errors caused by retrospective or other failings of memory, or the use of heuristics or other potentially biased strategies for answering questions. Given the substantial vulnerability of questionnaires to misrepresent or other sources of bias, the ability of this method to obtain a pure, accurate, and unbiased account of a subject's experience is doubtful.

Experience Sampling Method (ESM)

The Experience Sampling Method (ESM) is another method of studying inner experience. ESM was developed to understand the relationship of inner experiences, behaviors, and situational variables within subjects' natural environments (Csikszentmihalyi & Larsen, 1987; Hormuth, 1986). ESM uses signaling devices such as pagers, programmable wrist watches, or telephones to alert subjects at quasi-random intervals. In response to the signal, subjects complete a questionnaire pertaining to their current experience (e.g., mood, affect, activities, etc). The content of the questionnaire differs based on the investigator's interests; however, most questionnaires include questions pertaining to the subject's social context, location, time of the signal as well as his/her current affect, and cognitions. In general, ESM aims to obtain an understanding of subjects' internal and external states at the moment of each signal.

ESM has been used to investigate a multitude of inner experiences and how they relate to situational variables (Hormuth, 1986). In terms of inner experiences, ESM has been used to explore subjects' mood, cognitions, and affects. ESM has investigated

gender differences (Graef, 1979), inner experiences of individuals with schizophrenia (Kimhy, Delespaul, Corcoran, Ahn, Yale, and Malaspina, 2007; Delespaul, 1995), adolescents as they emerge through puberty (Savin-Williams & Jaquish, 1981), the affects of mothers' with infants (Wells, 1988), clusters of emotions within families (Larson & Richards, 1994), differences in positive and negative emotional experiences among culturally-different subjects (Scollon, Diner, Oishi, & Biswas-Diner, 2004) among others.

ESM can be completed in two ways. Traditionally, a paper-and-pencil technique is used in which subjects complete a paper questionnaire at the moment of a signal or interval. The paper-and-pencil method is cost efficient and can be administered to a large number of subjects with minimal risk of subjects' losing or damaging laboratory equipment. On the other hand, the paper-and-pencil method does not allow investigators to randomize presentation of items on the questionnaires, lacks the ability to extract compliance data, increases data management demands, and increases human error in data entry. More recently, ESM has replaced the paper questionnaires with computerized technologies, such as handheld electronic devices or Palm Pilots, on which subjects complete their questionnaires. Using electronic devices allows the time in which subjects complete the questionnaire to be recorded and thus yields compliance data. Furthermore, computerized devices are advantageous as they allow for precisely controlled timing, randomization of item presentation, and reduce human error. Using electronic devices also increases the likelihood of timely reporting (Barrett & Barrett, 2001). Disadvantages of electronic devices include possible programming complications, additional setup and maintenance, possible loss of data as a result of electronic malfunctions, and increased

cost associated with purchasing the electronic devices (Stone, Kessler, & Haythornthwaite, 1991).

ESM provides many advantages. ESM reduces reliance on memory as subjects report their current experience at the moment of the signal. ESM can be used in single case studies, yielding idiographic results, and also with a large number of individuals, yielding nomothetic results (Csikszentmihalyi & Larson, 1987). ESM is an ecologically valid method allowing for real-life contextual analysis of behavior with repeated-measure designs. ESM can extract information about subjects' behavior, affect, and/or cognitions that can be compared to situational variables (Hormuth, 1986). Lastly, the questionnaires used in ESM procedures can vary to obtain as much information as desired about a subject's internal and external experiences.

ESM techniques also have limitations. For example, Larson and Csikszentmihalyi (1983) expressed concerns about sample biases. Potentially, subjects who are willing to participate in such studies like ESM studies that are time-consuming and require divulging of personal information may differ in important ways from subjects who refuse to participate. Furthermore, because of lengthy nature of ESM, many subjects may prematurely drop-out of the study. ESM questionnaires incorporate several questionnaires that intend to be thorough but it is impossible to create an exhaustive list of questions that address all possible events experienced by a subject. In addition, it is possible that subjects may misunderstand or misread questions and the procedure does not provide subjects an opportunity to explain their answers or provide additional information. Lastly, due to the personal nature of some ESM questionnaires, subjects may tend to under-report parts of their experiences and over-report other aspects.

Ecological Momentary Assessment (EMA)

The Ecological Momentary Assessment (EMA) is a modification of the Experience Sampling Method (ESM). As in ESM, EMA subjects are given a device (e.g. a beeper, wrist watch, etc), that randomly emits a signal, at which time subjects are instructed to complete an experience questionnaire or record physiological states, such as heart rate (Stone & Shiffman, 1994). Subjects are usually signaled several times a day over a few weeks. EMA differs from ESM in that it provides investigators with increased flexibility in choosing to signal subjects in three different types of schedules: time contingent (e.g. every few hours), event contingent (e.g. after a target event, such as every meal), and signal contingent (e.g. at the prescribed signal; Wheeler & Reis, 1991). Investigators have the ability to choose the EMA sampling schedule that is most advantageous to their purpose. Questionnaires implemented in EMA studies also are slightly different from ESM questionnaires in that they elicit momentary reflection (e.g. at the moment of the signal) or recollections of events (e.g.; in the past 30-minutes; Smyth & Stone, 2003)

EMA has been used frequently in the field of behavioral medicine to evaluate subjects' behavioral, psychological, and physiological states in their natural environments (Stone & Shiffman, 1994). EMA has yielded data in several behavioral medicine and psychological fields such as stress and coping (Bolger & Zuckerman, 1995), behavior of cigarette smoking (Shiffman, 2005), cardiovascular disease (Kamarck, Schwartz, Janicki, Shiffman, & Raynor, 2003), asthma symptoms (Smyth, Stone, Hurewitz, & Kaell, 1999), and the possible uses of EMA in the field of psychiatry (Moskowitz & Young, 2006). Recently, EMA procedures have been used in the field of clinical psychology as Norton

and colleagues (2003) paired cognitive behavioral treatment and EMA in treating individuals with bulimia nervosa. Although significant differences were not found, results demonstrated slightly more favorable outcomes when EMA was included in the treatment, suggesting further research in this area may be worthwhile.

EMA has also been used to study patterns of experience among couples or families. For example, Janicki and colleagues (2006) compared spousal interactions of married adults with their health. This study assessed subjects' experiences and cardiovascular health for three years. They found men with better marital adjustment and frequent spousal interaction had decreased intima medial thickness (IMT), or thickness to artery walls, whereas women with better martial adjustment and more frequent spousal interaction were associated with increased IMT (Janicki, Kamarck, Shiffman, & Gwaltney, 2006). Moreover, marital adjustment was associated with frequent agreeable spousal interactions but not associated with the frequency of conflicted spousal interactions (Janicki et al., 2006).

EMA is advantageous in providing researchers with flexibility, allowing for a variety of avenues to study both psychological and physical states over long periods of time (Stone, Turkkan, Bachrach, Jobe, Kurtzman, & Cain, 1999). Similar to ESM, EMA does not ask subject's to speculate retrospectively about their experiences. Furthermore, EMA is ecologically valid in that it provides investigators with a glimpse into subjects' experiences in their natural environments.

EMA is limited by its lengthy nature, requiring an extended time commitment from subjects in having them report physical and psychological data several times a day for several weeks. Lengthy techniques like EMA can potentially result in selection biases

and attrition difficulties. Moreover, occupational demands may hinder an individual's opportunity to participate in EMA studies, leading to possible sample biases. For example, individuals in strenuous work environments (e.g., a construction worker, bus driver, fireman, etc.) which are loud or demanding may not have a chance to record thoughts or cognitions at a signal (Shiffman, Stone, & Hufford, 2008). EMA is also at-risk of causing changes in the behaviors it seeks to observe. EMA instructs subjects to observe and record their behaviors repeatedly, several times a day over several weeks. This type of attention to behavior can affect the rate at which these behaviors are preformed (Hufford, Shields, Shiffman, Paty, & Balabanis, 2002). Korotitsch and Nelson-Gray (1999) suggest that behaviors that the client wants to see change are most susceptible to changes as a result of self-monitoring.

Think-Aloud (TA) Methods

Another technique used to explore the characteristics of inner experiences is Think-Aloud (TA). TA is used to primarily assess cognitions, what and how a person thinks, as he/she completes a prescribed task. Although TA mostly assesses cognitions, it was originally developed to better understand the relationship between cognition, affect, and behavior (Davison, Vogel, & Coffman, 1997; Ericsson & Simon, 1984). TA techniques have been used as early as the 1950s to study college students' problem-solving skills (Bloom & Broder, 1950) and to study the thought processes of average and superior chess players (de Groot, 1965).

TA studies typically explain to subjects that most people have some sort of "internal monologue," like an ongoing stream of thoughts that occur as they go about their daily activities. Subjects are asked, as they complete an assigned task such as a math

problem or a game of chess, to tune into their mental thoughts and verbally repeat them out loud, or "think-aloud." Subjects' thoughts are recorded and later transcribed and interpreted (Davison, Navarre, & Vogel, 1995).

TA techniques have been used in a variety of branches of psychology from consumer psychology studying the thought processes of African-American women as they purchase fruits and vegetables (Reicks, Smith, Henry, Reimer, Atwell, & Thomas, 2003) to social psychology studying the thoughts of individuals as they recall and report at-risk sexual behaviors (Bogart, Walt, Pavlociv, Ober, Brown, & Kalichman, 2007). Recently, TA has been used to assess the effectiveness of educational tools. Cotton and Gresty (2006) completed a pilot study evaluating the effectiveness of TA at studying students' ease with e-learning tools, or internet based learning tools. Subjects were asked to navigate through an e-learning site and verbalize their thoughts as they occurred. Although this study found potential uses of TA with the assessment of e-learning tools, they cited some specific methodological complications which need to be addressed prior to applying TA in this specific setting, such as monitoring guidance given to subjects and the effects of having subjects perform a task, subjects' ability to pay attention to their ongoing internal monologue, and subjects' ability to verbalize their thoughts out-loud as they occur internally.

An advantage of TA is that it minimizes retrospective errors as subjects are asked to report their ongoing thought processes as they occur or immediately thereafter (Davison, Navarre, & Vogel, 1995). Also, TA is relatively unstructured, allowing subjects to report all cognitions in an open-ended manner rather than being limited to

prescribed questions chosen by an investigator. Lastly, TA methods are easily used in laboratory settings providing for a plethora of research opportunities.

Despite its many advantages, TA also has some disadvantages. TA methods are not ecologically valid; thus they present a picture of laboratory-induced mental processes that may or may not parallel mental process outside of the laboratories. Some investigators have presented caution about reactive interference between verbalizing thoughts and the actual thinking process. During a TA task, subjects are asked to verbalize their ongoing cognitions while completing a task. Some critics of TA question subjects' ability to complete the dual demands of paying attention to cognitions and simultaneously verbalizing them while not losing any important parts of the experience (Davison, Navarre, & Vogel, 1995). Also, Klinger (1975) suggested that subjects, while completing the Think-Aloud task, can only express a small portion of their cognitions since subjects' verbalization will interfere with the natural flow of experience. It is also possible that cognitions that seem of relatively low frequency or low importance may not be reported at all or as often as those that seem to be of high relevance (Davison, Navarre, & Vogel, 1995). For example, if a subject is asked to report his experience while taking a math test, the subject may begin to think about what he is going to have for lunch but because this thought seems not related to the task at hand, the subject may be reluctant to verbalize it.

Fundamentally, TA assumes a person's stream of consciousness consists only of words and is presented in a constant stream of ongoing thoughts. However, some introspective research does not support this language-dominant internal world but rather an internal world populated by mental images, unsymbolized thinking, inner speech,

inner hearing, sensory experiences, and much more (Hurlburt & Heavey, 2006). Asking subjects to report thoughts as they occur could result in subjects converting these other rich experiences into verbal terms that may not provide a precise portrait of the nature or richness of inner experience as it occurs.

Articulated Thoughts in Simulated Situations (ATSS)

The Articulated Thoughts in Simulated Situations (ATSS) paradigm was created as an alternative to the Think-Aloud (TA) method (Davison, Robins & Johnson, 1983). Like TA, ATSS assumes people have an ongoing "internal dialogue" that can be naturally and easily attended to (Davison, Navarre, & Vogel, 1995). Similarly, ATSS assesses subjects' inner thoughts as they verbalize their cognitions at the moment they occur. ATSS is a laboratory procedure in which subjects listen to a hypothetical scenario via a video or audio tape player and are asked to imagine themselves in that situation. Once the scenario has been played, subjects are asked to articulate their ongoing thoughts as they occur (Eckhardt, Barbour, & Davison, 1998). Following the simulated situation, subjects' responses are coded for content and structure and further analyzed.

ATSS is advantageous in studying emotional experience because the selected scenarios can elicit a target emotion. Surveying subjects with similar or different scenarios and comparing the changes in think-aloud reports extracts qualitative data in terms of how cognitions change as a result of external influences. ATSS has been used to investigate the thought patterns of subjects with psychopathology. For example, ATSS has been used to compare the thoughts of subjects with and without depression (White, Davidson, Haaga, & White, 1992) and subjects with and without anxiety (Davidson,

Feldman, & Osborn, 1984). The latter study found an increase in intrusive thoughts concerning trauma for subjects with anxiety.

ATSS has also contributed to the study of personality. For example, Rayburn and Davison (2002) evaluated subjects' thoughts and empathy toward anti-gay hate crimes. They found that subjects expressed more aggressive intentions towards the perpetrator in hate crime scenarios as compared with non-hate crimes. Furthermore, subjects indicated more willingness to intervene and help the hate crime victim as compared to the non-hate crime victim. Rayburn and Davison (2002) also compared subjects' attitudes towards homosexuals with ATSS. They found antigay attitudes predicted anger against the hate crime victim, disapproval of the hate crime victim, and support of the hate crime perpetrator.

ATSS has also been used to study behavioral characteristics and their relations to thoughts. For example, Eckhardt, Barbour, and Stuart (1997) compared thoughts, cognitive distortions, and cognitive deficiencies of married men who were or were not violent with their wives. Their results indicated that violent men produced increased irrational beliefs and hostile attributional biases as compared with non-violent men. In addition, non-violent men reported less negative affect during anger provoking scenarios compared with violent men.

ATSS provides investigators with the ability to explore thoughts as they occur free from retrospective errors. ATSS provides investigators with laboratory flexibility in that investigators can alter emotion or thought provoking scenarios to explore, describe, and compare thoughts from a variety of subjects in an assortment of scenarios (Davison,

Vogel, & Coffman, 1997). ATSS is primarily open-ended and allows for variability in the content and form of the cognitions reported.

In terms of disadvantages, ATSS lacks ecological validity. Also, laboratory-induced cognitions may not parallel real-life cognitions. ATSS techniques are also confounded by the dual demands of externally verbalizing thoughts. Particular thoughts that a subject may believe to be unimportant or off-task by could be left out due to the on-the-spot, demanding task of ATSS. Lastly, ATSS provides information about how a subject thinks in specific situations; however, ATSS does not provide data with regard to how a person regularly thinks within his/her natural environment. It may be important to characterize the common thinking experience in order to better identify irregular thought patterns.

Diary Methods

Diary methods have also been used to investigate subject's inner experiences. Diary methods refer to self-report instruments that are used repeatedly to examine experiences; for example, subjects may be asked to maintain a diary of their experiences over hours, days, weeks, and sometimes months (Bolger, Davis, & Rafaeli, 2003). Diary methods usually have two goals: to explore phenomena as it unfolds over time and to investigate particular phenomena (Bolger et al., 2003). Diary strategies differ from personal diaries in that subjects are instructed to record thoughts, emotions, or behaviors about a specific topic as it occurs within a time-frame rather than writing freely about anything. Subjects are made aware of the research target such that they record accordingly.

There are three types of diary demands: interval-contingent, signal-contingent, and event-contingent (Bolger et al., 2003). Interval-contingent methods require subjects to report their experiences at predetermined intervals (e.g., every 5 hours, every day, etc). Signal contingent relies upon signal devices to alert subjects to record diary entries at fixed, random, or a combination of fixed and random intervals. Event-contingent diary methods require subjects to record their experience each time an event occurs (e.g., every time they eat, each time they speak to their spouse, etc.).

Similar to ESM techniques, some diary studies use electronic devices for data collection. Electronic devices used with diary methods include palmtop computers or personal digital assistants (PDAs; Bolger et al., 2003). Despite the trend of using electronic devices, paper-and-pencil diaries are still the most often used. Paper-and-pencil diaries are equipped with some obvious limitations including subjects' forgetfulness and compliance as well as subjects feeling hesitant to be completely open and honest in their entries with fear their diary can be viewed by others in their environment. Some studies have found electronic diaries increase compliance as compared to paper-and-pencil methods. Stone, Shiffman, Schwarz, Broderick, and Hufford (2002) demonstrated substantial differences in compliance between paper-and-pencil and computerized diaries. The study surveyed 80 subjects suffering from chronic pain. The study had 40 subjects complete the procedures using the paper-and-pencil method and 40 subjects used the computerized method. The investigators unobtrusively placed photosensors that detected when diaries in the paper-pencil method were open and closed. The electronic devices were equipped with the ability to record automatically when diary entries were completed. Results found 90% of subjects reported compliance in the paper-and-pencil

method, whereas actual compliance was as low as 11%. Diary entries were submitted for scheduled times that did not line up with the photosensors registry of the diary being opened and closed suggesting many subjects made-up diary entries that were supposed to be completed at a specific time with regard to a specific event. The electronic diaries yielded substantially higher actual compliance at 94%.

On the other hand, Green, Rafaeli, Bolger, Shrout, and Reis (2006) found both the paper-and-pencil method and computerized method yielded a compliance rate of approximately 86 percent. Despite the comparable compliance rate, they found that subjects using the paper-and-pencil method were less likely than subjects using the computerized method to complete all of the daily entries. Green and colleagues (2006) also investigated compliance rates of the paper-and-pencil method combined with increasing subjects' motivation and researcher-subject rapport. Results found only 9.9% of paper-and-pencil entries were made outside of a five to fifteen minute interval.

Diary methods are advantageous in that they reduce retrospective memory errors and allow for analysis of within-person differences as well as between-person differences (Bolger et al., 2003). For example, McAuliffe, DiFrancesico, and Reed (2007) requested subjects to maintain a daily diary of sexual behaviors for three months. At the end of the three months, subjects completed a retrospective survey estimating the frequency of sexual behaviors. Fifty-percent of subjects under-estimated their sexual practices and 17% over-estimated their sexual practices on the retrospective questionnaire (McAuliffe, DiFranceisco, & Reed, 2007). Winkielman, Schwarz, and Belli (1998) suggest differences among retrospective questionnaires, sampling procedures, and diary reports are due to subjects' interpretation of the questions. Concurrent reports, such as diary

methods and sampling procedures, provide a shorter reference period such as at the moment of a signal. How often a subject reports experiencing negative, self-degrading thoughts in the past week, month, or even year would most likely be less accurate than the same subject's report of how often he/she experienced self-degrading thoughts within one day or one hour.

Diary methods also have a number of disadvantages. For example, diary methods often require detailed training sessions to ensure subjects fully understand the diary protocols (Reis & Gabel, 2000). Little is known about whether dairying daily affects experiences that are reported (Bolger, Davis, & Rafaeli, 2003). Some diary studies have documented negative mood elevation at the beginning of sampling, although the elevated mood is usually short-lived (Gleason, Bolger, & Shrout, 2001). Moreover, diary methods cover a broad range of experiences and may not be the best tool for focusing in on important details in order to explore the fundamental, precise characteristics of inner experience.

Descriptive Experience Sampling

Descriptive Experience Sampling (DES) is an idiographic, exploratory method developed by Hurlburt (1990, 1993) to describe inner experience faithfully. DES begins by attempting to apprehend single, randomly chosen moments of inner experience and then uses these individual moments of experience to build an idiographic profile of an individual's inner experience. DES aims to observe and describe pristine internal experience free of interference from the subject or the investigator (Hurlburt & Akhter, 2006). Unlike ESM, DES rules out anything that is outside of the subject's current awareness (Hurlburt & Akhter, 2006) and thus subject's explanations, interpretations,

“unconscious” processes, and events occurring before or after the beep are withheld from the DES method.

DES subjects are given a device that randomly emits a beep through an earphone. Subjects are asked to choose a time during the day to turn on the beeper and carry it with them throughout their regular daily activities. Once turned on, the beeper randomly will emit six beeps. At the moment a beep sounds, subjects are asked to “freeze” and remember or take notice of their inner experience at the moment the beep sounded. Inner experience refers to anything within a subject’s awareness, including but not limited to thoughts, feelings, sensations, images, etc. Subjects are asked to jot down notes about their inner experience in a small notebook, reset the beeper, and continue on with their daily activities. This procedure is typically repeated until the subject has received six beeps, which usually takes about three hours. By nature, DES is an exploratory procedure; therefore, specific instructions as to what the subject will most likely experience are not given and it is entirely possible a subject will experience something no previous subject has experienced. A detailed description of the instructions given to subjects, including an annotated transcript of the instructions, can be found in Hurlburt and Heavey (2006).

Within 24 hours of sampling, an interview takes place between the investigator and the subject in which they discuss each moment of sampled inner experience. The goal of this interview is to develop as clear and precise an understanding of each sampled moment of inner experience as possible. During the interview the investigator strives to remain non-leading in his/her questioning. In order to remain unbiased and non-leading, the subject and investigator must bracket their presuppositions with regard to the nature

of inner experience (Hurlburt & Heavey, 2006). In addition, the investigator must also carefully evaluate the subject's use of "subjunctifiers," or descriptions of inner experiences that are verbally asserted using subjunctive, non-declarative statements (Hurlburt & Heavey, 2006).

DES is an iterative procedure (Hurlburt, 2009; Hurlburt & Akhter, 2006). Most subjects are not skilled observers of their inner experiences. During the first day of sampling they usually are unprepared for the investigator's direct and specific questioning about their moments of inner experiences. Thus, DES practitioners usually consider the first day of sampling a practice session and do not include the first day of sampled moments in data analyses (Hurlburt & Heavey, 2006). Usually, subjects engage in three to eight days of sampling yielding between 18 and 48 beeps.

DES studies vary greatly in the types of subjects sampled and subjects' reported experiences. Some DES studies explore one subject's inner experiences. In these studies, the DES method is used for idiographic purposes, aimed to describe the unique characteristics of a unique individual (Hurlburt & Akhter, 2006). Other DES studies explore a collection of subjects who have a feature in common, such as a psychiatric diagnosis (e.g., schizophrenia, depression, Asperger's syndrome, etc.) or an external characteristic (e.g., speed of talking). In such studies, the investigator first apprehends subjects' experiences idiographically and then nomothetically examines if any salient characteristics emerge across the collection of subjects as a whole (Hurlburt & Akhter, 2006). Such nomothetic analyses of inner experiences begin at the bottom – faithfully describing a single experience of a single subject. Idiographic DES studies have been

used to develop a codebook for frequently occurring characteristics of experience (Hurlburt & Heavey, 1999).

DES has been used to explore inner experiences of individuals with psychiatric diagnoses in common. For example, Hurlburt, Happe, and Frith (1994) explored the inner experience of three subjects diagnosed with Asperger's syndrome. They found the Aspergers subjects' inner experiences were either nonexistent or exclusively characterized by images with rarely any other feature of inner experience. In addition, these subjects showed no interest or curiosity about the differences between their own experiences and experiences of other subjects, something that is uncommon with the DES subjects (Hurlburt, Happe, & Frith, 1994). DES has also been used to explore experiences of subjects diagnosed with schizophrenia (Hurlburt & Melancon, 1987; Hurlburt, 1990). Such studies have demonstrated that subjects diagnosed with schizophrenia tend to experience "goofed-up" images and hyper-clear emotional experiences. These studies have suggested perhaps individuals with schizophrenia experience distortions or hallucinations on a smaller scale everyday in their conscious experience (Hurlburt & Melancon, 1987a). Subjects' with anxiety (Hebert & Hurlburt, 1993) and depression (Hurlburt, 1993) have also participated in DES studies. Results indicate subjects with increased anxiety often engage in self and other-directed criticism (Hebert & Hurlburt, 1993). Subjects with depression tend to experience more unsymbolized thinking as compared to subjects without depression (Hurlburt, 1993).

DES has also explored the relationship between inner experiences and external characteristics. Hurlburt, Koch, and Heavey (2002) evaluated the connection between inner experience and the rate of subjects' speaking measured in words per minute. They

found the collection of subjects with high-speech-rates experienced three-times more multiple awarenesses (25.9% as compared with 7.1%) and experienced higher frequency of just engaging in an activity with no ongoing inner experience, a phenomenon called "just doing," as compared to the comparison group.

High inter-rater reliability has been demonstrated for the DES method such that DES investigators agree upon the categorization of experiences using a codebook developed by Hurlburt and Heavey (1999; Hurlburt & Heavey, 2006). Results yielded interobserver agreement of 98% for the 11 low frequency characteristics of inner experience and 91.3% for the five high frequency characteristics. The characteristic with the lowest reliability was sensory awareness.

DES is well suited to exploring inner experience in that it captures pristine inner experiences; it is exploratory and idiographic in nature; and it does not make assumptions about the characteristics of inner experience such as assuming inner experience is always present or consists of one pattern for all subjects. DES reduces reliance on subjects' memory by having the subject take notes about the experience immediately after it occurs and by scheduling the follow-up expositional interview within 24-hours of the collection of beeps. DES is ecologically valid, allowing for a depiction of inner experience in subjects' natural environments.

Like most qualitative methods, data collection in the DES method is time-consuming requiring a substantial commitment of the investigator's and subject's time. For example, subjects are asked to come in for an initial meeting with the researchers during which they are given a brief description of the DES procedure as well as instructions regarding using the beeper and collecting sampled moments of experience.

This first meeting generally lasts between a half hour and an hour. Subjects are then asked to collect six moments of experience during a time of their choosing. This takes approximately another three hours. After the collection of the beeps, subjects return for an hour long expositional interview about their experiences at each moment of the beep. After the completion of this process, the researchers write a brief description of each moment of experience. This process is repeated usually four to six times. The time consuming nature of DES limits the number of subjects that can be used for each study. For example, sampling with 30 subjects may take an entire academic year to collect.

Another potential limitation to DES research is the lack of situational control. Subjects are asked to collect sampled moments of their experience during any time of their choosing. Some subjects collect their moments of experience while in class while other subjects may collect their moments of experience while working and so forth. The situational variability may account for some of the differences in experience observed between groups. Additional research is needed to further understand the effects of situational variability on inner experience.

Another challenge faced by DES researchers is reducing the inner experience of subjects into valid idiographic summaries. There is the potential for bias or error to occur during this process. This process can be likened to trying to describe a unique landscape: What does one focus on? What are the salient features of the landscape? How do you describe them with fidelity? Different investigators might focus on different aspects or features of the "landscape" even in equally faithful descriptions of it.

Perhaps most importantly, DES is a method that appears to require high levels of skill to be performed with fidelity. It is difficult to train these skills and challenging to

determine the level of skill of specific investigators. Furthermore, neither the subject nor the investigator appear to be in a good position to independently assess their level of skill at performing DES. This is a complex issue that deserves further attention.

Present Study

This study employed Descriptive Experience Sampling (DES) to explore the inner experiences of a sample of college students. There were four aims of this study. The first was to describe the phenomena of inner experience, their relative frequency and the degree to which moments of experience could be coded reliably. The second aim was to examine the degree to which there were individual differences in inner experience. Third, this study set out to identify other meaningful dimensions along which inner experience could be characterized. Fourth, this study examined perceptions of the degree to which subjects could to capture, describe and understand inner experience.

CHAPTER 3

METHOD

Subjects

The sample comprised 21 undergraduate students (14 female and 7 male) taking introductory psychology courses at the University of Nevada, Las Vegas (UNLV). In return for their participation, subjects were provided credit for their course research requirement. The mean age of the students was 24.6 years (*SD* = 9.3 years). Fifty-two percent of the subjects self identified as Caucasian, 24% as Asian/Pacific Islander, 19% as Hispanic, and 5% as other. Freshman made up 33% of the sample, sophomores made up 19%, juniors made up 33%, and seniors made up 14%. Data was collected between September 2008 and May 2009.

Materials

The informed consent form provided subjects with a description of the study including expected risks and benefits of participation. It also included contact information for the present study's investigators and the office for the protection of research subjects.

The demographic questionnaire included questions concerning a subject's name, address, phone number(s), email address, age, ethnicity, sex, marital status, education level, and employment.

The Subject's Sampling Feedback Questionnaire and Interviewer's Sampling Feedback Questionnaire were self-report questionnaires created by the investigators of the present study. Both questionnaires included four questions pertaining to a subject's or the interviewer's perceptions about the DES process. The Subject's Sampling Feedback Questionnaire included the following questions: *To what degree could you adequately*

capture your inner experience at the moment of the beep? To what degree could you fully describe your experience at the moment of the beep? To what degree did the interview(s) fully understand your inner experience at the moment of the beep? To what degree did the subject's understanding of your inner experience change as a result of the interview? Subjects were asked to rate the four questions on a seven-point scales ranging from 0 (*not at all*) to 6 (*extremely).* The Interviewer's Sampling Feedback Questionnaire included the following questions: *To what degree did the subject adequately capture his/her inner experience at the moment of the beep? To what degree did the subject fully describe his/her experience at the moment of the beep? To what degree did you fully understand the subject's inner experience at the moment of the beep? To what degree did your understanding of his/her inner experience change as a result of the interview?* The interviewer(s) rated the four questions on a seven-point scale ranging from 0 (*not at all*) to 6 (*extremely).*

A portable, pocket-sized beeper created by Hurlburt (2007) was used to randomly beep subjects and alert them to pay attention to their current inner experience. The beeper is a small rectangular box and is equipped with an on/off/volume control. When activated, the pocket-sized beeper randomly emits a 700-Hz tone through an ear-piece in intervals ranging from 0 to 60 minutes with a mean of 30 minutes. The volume is adjustable, thus allowing adjustment for personal preference and background noise levels. A pocket-sized, 3 X 5 inch notebook was given to subjects to record notes about their inner experience when the beep sounds.

Procedure

Subjects volunteered for the present study through *Experimetrix*, a web-based database of current psychology research projects seeking volunteers at the University of Nevada, Las Vegas (UNLV). Students enrolled in introductory psychology courses at UNLV have access to participation opportunities via *Experimetrix*. Interested subjects signed up for the study and scheduled an appointment for an initial meeting. All appointments took place in the Experience Sampling Lab at UNLV and were conducted individually.

During the first appointment, the study was explained to subjects including the DES method and procedures (Hurlburt & Heavey, 2006). It was explained that audiotaped or videotaped interviews were required for participation in this study. Any questions were answered and then subjects were asked to provide informed consent. Consenting subjects were asked to complete a demographic questionnaire.

After consenting to the research project and completing the demographic questionnaire, the subject was given a beeper and a 3 X 5 notebook. The investigator demonstrated how to work the beeper including how to turn it on and off, how to adjust the volume, how to plug in and wear the earphone, and how to reset it. The subject was instructed to turn on the beeper during a time of his/her choosing and to then continue on with his/her daily activities. The investigator told the subject that once the beeper is turned on, it would emit a beep sometime within the next hour. At the onset of the beep, the subject was asked to recall what was occurring in his/her inner experience. The subject was instructed to jot down notes about his/her ongoing inner experience in the 3 X 5 notebook. It was explained that the purpose of these notes was to help him/her recall

the details of his/her experience during a later interview. The subject was asked to stop the beeper after each beep and reset the beeper and continue this process until a total of six beeps were emitted. In explaining the procedures, the investigator was careful not to give specific, detailed instructions about what to pay attention to at the moment of the beep other than whatever was ongoing in awareness; these details were left unclear because the investigator did not know what subjects would experience at the moment of the beep.

The investigator also explained to the subject the nature of the co-investigator relationship of DES. The investigator explained to subjects that participation involved wearing the beeper a total of four days and returning to the lab after each day of sampling in order to participate in an expositional interview. The purpose of these expositional interviews was to faithfully apprehend and then describe the subject's inner experience at each beep. During the expositional interview, the subject was asked to be open and honest about his/her inner experiences and was given the right, at any time, to refuse discussion of sensitive material that may have been captured by the moment of the beep. At any point in the study, subjects were allowed to terminate their participation in the study. One subject decided not to participate in the study after hearing the description from the investigators. Another subject only completed three days of sampling but was included in the final sample.

Prior to the completion of this first appointment, a second appointment was scheduled for a one-hour long expositional interview. The second appointment was scheduled to take place within 24 hours of the collection of beeps.

During the second appointment, a team DES researchers including an experienced DES researcher (either Dr. Chris Heavey or Dr. Russell Hurlburt) and one or two graduate students training in the DES method interviewed the subject about his/her collected samples until both the interviewers and the subject believed they have clear apprehension of the subject's inner experience at each beep. The interview was videotaped or audiotaped. After the interview, the subject was asked to complete a Subject's Sampling Feedback Questionnaire. At the same time but independently, the interviewers(s) completed the Interviewer's Sampling Feedback Questionnaire. Subjects were also provided with a brief written description of the moments of experience they had described in the previous interview session. Subjects were asked to read and rate the accuracy of the descriptions on a scale of 1 to 10 with 1 representing *not at all accurate* and 10 representing *completely accurate.* Subjects were given these instructions verbally and they were told to record their ratings next to each beep descriptions. Subjects were also given permission to change anything in the written description that did not accurately represent their experience. Subjects rated the accuracy of beep descriptions discussed in the first three interviews. The collection of sampled beeps followed by an expositional interview was repeated four times yielding a possible combined 24 samples per subject.

After each day of sampling, the interviewers(s) prepared a written summary of each sampled moments of the subject's experiences. Generally, one of the graduate students present during the interview composed a draft of the beep summaries which was then reviewed and edited by the other researchers present during the interview. The final agreed upon description of each experience was used for analysis within this study.

After completing this iterative process of sampling, interviewing, and writing up the sampled moments of experience, the primary investigators had the beep descriptions coded by three DES researchers using the codebook of experience developed by Hurlburt and Heavey (1999) for the presence of seven previously identified phenomena of experience including sensory awareness, inner speech, unsymbolized thinking, inner seeing, feeling, inner hearing, and just doing. The researchers were asked to indicate either "yes" if the phenomena was present in a particular beep description or "no" it was not.

Sensory awareness refers to an experience in which one pays attention to a specific sensory aspect of something within one's environment (Hurlburt, Heavey, & Bensaheb, 2009). For example, if a person had just bitten into a juicy apple and was paying particular attention to the sweet taste of the juice in his mouth, he would be experiencing a sensory awareness. In this example, the sensory aspect (e.g., sweet taste of juice in his mouth) is the primary focus of experience.

Inner speech refers to the experience of speaking words in one's own voice (e.g., same vocal characteristics) without the presence of external sound (Heavey & Hurlburt, 2008). A person would be experiencing inner speech if while eating an apple he innerly (with no external sound) says to himself, "this is a good apple."

Unsymbolized thinking refers to the experience of thinking without the content of the thinking being represented in words, images, or other symbols (Hurlburt & Heavey, 2002; Hurlburt & Heavey, 2006; Hurlburt & Akhter, 2008). An example of unsymbolized thinking could be a person eating an apple and wondering what type of apple he is eating.

To be unsymbolized thinking, the wondering would occur without being represented in words, images, or other symbols.

Feeling refers to an emotional experience (Heavey & Hurlburt, 2008). A feeling can include any affective experience including happiness, sadness, anger, nervousness and so forth. An example of a feeling could include a person feeling nervous which was accompanied by an uneasy, butterfly feeling in his stomach. For this to be coded as a feeling, the affective experience must be directly present in experience rather than inferred from actions or other signs of emotional processes.

Inner seeing is the experience of seeing something that is not physically present (Heavey & Hurlburt, 2008). An example of inner seeing could be a person thinking about the lunch he is about to eat

Inner hearing refers to the experience of hearing something that is not physically present(Hurlburt & Heavey, 2006). An example of inner hearing is a person innerly hearing with no real external sound a song playing in which they do not experience producing the sound (as with inner speech) but rather experience hearing it. Another example of this phenomenon is recording ones voice in a tape player and hearing it back. Inner hearing resembles the experience of hearing one's voice without producing it. Inner hearing can also involve hearing one's own voice mentally without the experience of innerly speaking.

Lastly, just doing is where a person is engaged in doing something without any mental experience beyond the engagement in the activity (Heavey & Hurlburt, 2008). For example, someone would be just doing if at the moment of the beep they were watching television and were engaged in what they were watching. In these instances the

individual is experientially engaged in the activity without anything else being present in experience.

The three DES researchers who coded the beep descriptions for the presence of the aforementioned phenomena of experience were graduate students training in the DES method. At the time at which they coded the beep descriptions for the present study they each had a minimum of one year of experience with the DES method. At the same time as they were asked to code the seven previously identified phenomena of inner experience they were also asked to rate the beep descriptions on three new dimensions of experience. They were asked to *Rate the degree of richness and detail in the inner experience* on a Likert scale from 1 (*Not at all)* to 6 (*Extremely).* They were also asked to indicate *How many experiences (e.g., thoughts, emotions, sensory awarenesses) are present at the moment of the beep* with 0 – *No Experience Present,* 1 – *One Experience Present (e.g., one thought),* 2 – *Two Experiences Present (e.g., a thought and an emotion),* 3 – *Three Experiences Present,* 4 – *Four or more Experiences Present.* Raters were also asked to *Rate the overall positivity or negativity of the experience* using a Likert scale ranging from -3 (*Negative)* to 3 *(Positive).*All of the beeps collected were coded for the presence of these phenomena and rated for the new dimensions of experience with the exception of beeps collected on the first day of sampling, beeps that occurred while the subject was writing or discussing a previous beep, and beeps that occurred while the subject was asleep or away from the beeper. Following the first day of sampling, subjects were asked to collect 6 moments of beeps 3 additional times yielding 18 beeps per subject. After the beeps were eliminated for the aforementioned reasons, we

were left with 327 beep descriptions that the researchers coded. The researchers were not given any practice trials to code the beep descriptions or any additional training

CHAPTER 4

RESULTS

The Phenomena of Inner Experience

The first aim of this study was to carefully observe and describe the phenomena of inner experience present in this sample. The researchers conducting each expositional interview sought to apprehend each moment of experience and then produce a written description of each moment. As this process unfolded, researchers tried to remain open to the possibility that previously undiscovered or unrecognized phenomena would emerge. No new phenomena were recognized.

The beep descriptions were coded by three DES researchers using the codebook of experience developed by Hurlburt and Heavey (1999) for the presence of seven previously identified phenomena of experience including sensory awareness, inner speech, unsymbolized thinking, inner seeing, feeling, inner hearing, and just doing.

The three independent raters demonstrated significant inter-rater agreement for each phenomenon of experience. The percentage of agreement was determined by dividing the frequency with which all three raters agreed on the presence of a given phenomena for a particular moment with the total number of coded samples. As shown in Table 1, the raters were in agreement more than 70% of the time for each dimension of inner experience with the exception of just doing, for which the percentage of agreement was 67%. The highest percentage of agreement was for inner seeing followed by inner hearing (93% and 91% respectively).

Table 1 also summarizes the frequency with which these phenomena were present in sampled moments. A phenomenon was determined to be present when it was identified

by at least two of the three coders. The most frequently occurring phenomenon was sensory awareness, which was present in approximately 33% of sampled moments. Feeling and unsymbolized thinking were also present in more than one-quarter of the sampled moments of experience (30.4% and 26.4% respectively). The least frequently occurring form of coded experience was inner hearing which was present only 6.3% of the time. Several phenomena can occur simultaneously (e.g., a person can experience sensory awareness and inner speech at the time same); therefore, the sum of the frequencies of phenomena exceeds 100%.

Table 1

Frequency of Phenomena Experienced and Percentage of Agreement

Characteristic	Frequency	Percentage of Agreement
1. Sensory Awareness	33.3%	72%
2. Feeling	30.4%	83%
3. Unsymbolized Thinking	26.4%	82%
4. Inner Seeing	24.2%	93%
5. Inner Speech	18.5%	89%
6. Just Doing	10.5%	67%
7. Inner Hearing	6.3%	91%

Individual Differences in Inner Experience

To determine the extent to which there were individual differences in the relative frequency of phenomena of inner experience, we used the beep codings described above for the seven previously identified phenomena of experience and looked at the frequency with which each phenomena was experienced by each subject. Table 2 demonstrates that there were large individual differences in the frequency of phenomena experienced within this sample. The column *Within Subject Lowest Frequency* gives the lowest percentage for which that phenomenon was experienced by a single subject as well as the number of subjects who had the same degree of (in)frequency. For example, inner hearing was the least common of the coded phenomenon, being entirely absent (0% frequency) for 12 subjects. In contrast, every subject experienced some sensory awareness in their sampled moments with the lowest frequency for sensory awareness being 6%. The column *Within Subject Highest Frequency* gives the highest percentage for which that phenomenon was experienced by a subject as well as the number of subjects that experienced that phenomenon within 10% of the highest value. For example, the highest frequency for feeling was 62% and five subjects experienced feeling within 10% of that frequency. The highest percentage was for inner speech as one subject experienced inner speech 94% of the time. In contrast, the highest percentage of just doing experienced by one subject was 31%.

The column *Dominant Experience* in Table 2 represents the number of subjects who experienced that phenomenon 50% or more of the time. The most common dominant form of experience was feeling (dominant for seven subjects) followed by sensory awareness (dominant for five subjects). No subjects experienced just doing or

inner hearing more than 50% of the time. Some subjects appeared to have their inner experience dominated by a single form of inner experience. In contrast, other subjects did not seem to have a dominant form of inner experienced but rather had several forms of inner experience approximately equally. Some subjects did not have some forms of inner experience in any of their sampled moments.

Table 2

Frequency of Common Phenomena of Inner Experience

Characteristic	Within Subject Lowest Frequency	Within Participant Median (%)	Within Subject Highest Frequency**	Dominant Experience (number of subjects)*
Sensory Awareness	6% (1)	31	79% (1)	5
Feeling	0% (3)	25	62% (5)	7
Unsymbolized Thinking	0% (2)	17	65% (3)	4
Inner Seeing	0% (4)	16	80% (1)	4
Inner Speech	0% (6)	11	94% (1)	2
Just Doing	0% (5)	7	31% (1)	0
Inner Hearing	0% (12)	0	33% (1)	0

Note. *An experience was considered "dominant" when it was present in greater than 50% of the sampled moments. **The number in parantheses represents the number of individuals who experienced that phenomenon within 10% of the highest frequency.

Other Characteristics of Inner Experience

The third aim of the study was to examine the moments of experience and look for other meaningful dimensions by which inner experience could be characterized. To explore new possible dimensions of experience, the primary investigators (Janell Mihelic and Christopher Heavey) independently reviewed the same 327 beep descriptions that were coded previously to brainstorm potential characterizations of inner experience. After independently reviewing the beep descriptions, the primary investigators came together to review the possible characterizations. Six new dimensions, described below, were identified as possible new dimensions.

To determine the extent to which these new potential characterizations could be used to characterize moments of experience, 20 beep descriptions were selected randomly and the primary investigators independently tried to apply the new dimensions to the beep descriptions. If both investigators agreed that a dimensions could be reliably applied to our sampled moments, we then had the same three independent raters describes above rate 327 beep descriptions using the new dimension. Only three dimensions were found to be well suited for the sampled moments.

One type of characterization of inner experience considered was evaluating whether the focus of the experience was on future, past, or presently occurring events. At times, subjects had moments of inner experience in which they were engaged in recalling a past event or emotional experience. Future focused experiences referred to sampled moments in which the focus was on an event that had not yet occurred (e.g., worrying about an upcoming exam). Presently occurring events referred to paying attention to something occurring in present time. The primary investigators tried to characterize

moments of experience using these dimensions but found it difficult to differentiate between future occurring events (e.g., would they really occur in the future) and past events (e.g., did they really exist or are they fantasy). In addition, some may argue that what a person experiences in the present moment regardless of what it pertains to would be a presently occurring event. After discussion we agreed that the moments of experience could not be reliably characterized along this dimension.

Another characterization that was considered was differentiating between experiences in which the focus was on internal phenomenon (e.g., thought, emotion, etc.) or on external phenomenon (e.g., doing something, looking at something in one's environment). The primary investigators tried to characterize moments of experience in this way but found it difficult as some sampled moments consisted of both internally focused and externally focused experiences (e.g., the subject was doing both at the moment of the beep). Similarly, at times it was difficult to determine if something was an internal or external phenomenon. For example, a subject may have been typing the letter "A" on a keyboard and was innerly saying "A." This experience could be considered both an internal phenomenon as well as an external phenomenon. After discussion we agreed that the moments of experience could not be reliably characterized along this dimension.

The primary investigators also considered whether subjects' inner experiences were related to what they were doing at the moment of the beep. For example, a subject may have been typing on the computer but having a thought about what they were going to have for dinner. In this example, the inner experience was not related to what the subject was physically doing at the moment of the beep. In contrast, a subject may have been physically typing on the computer and having a thought about what he/she was

typing about, an example in which inner experience is related to the physical behavior. The investigators found this characterization of inner experience complicated as it was often difficult to specify what a subject was actually doing at the moment of the beep. For example, a person could be sitting in front of a television that is turned on (behavior) but actually looking at the clock and having a thought about what they were going to do in 30 minutes. In that example, the external behavior could be either watching television, in which case the inner experience was not related to what the subject was doing at the moment of the beep, or the external behavior could be looking at the clock which could be related to the subject's inner experience at that moment. In addition, it is not standard protocol in DES to ask detailed questions regarding what the subject was doing at the moment of the beep. After discussion we agreed that the moments of experience could not be reliably characterized along this dimension.

Three other characterizations of inner experience were evaluated and determined to be potentially viable. First, we tried to characterize moments of experience based upon the degree of richness and detail in the experience. For example, some subjects had simple experiences in which one may have been innerly saying to himself, "I need to go to the store." In contrast, some subjects had richer or detailed experiences. For example, one subject may have been feeling anxious about an upcoming test which was associated with experiencing a large knot the size of a softball lodged in their throat. After discussion we agreed that the moments of experience potentially could be reliably characterized along this dimension.

Another characterization of inner experience that we examined was the number of experience (e.g., thoughts, emotions, sensory awareness … etc) present at a particular

moment. Some subjects only had one phenomenon of experience present at a particular moment (e.g., only inner speech). On the other hand, other subjects regularly experienced more than one phenomenon of experience at a particular moment. For example, one could simultaneously be feeling sad (feeling), innerly speaking to oneself (inner speech), and imaginally seeing something (inner seeing). After discussion we agreed that the moments of experience potentially could be reliably characterized along this dimension.

The last characterization that we examined was the overall valence (e.g., positivity or negativity) of a particular experience. Some subjects' experiences appeared to be primarily negative. For example, one may have felt sad at the moment of the beep thinking about a deceased loved one. In contrast, other experiences appear to be relatively positive. For instance, a person could have been feeling happy at the moment of the beep thinking of an upcoming date. After discussion we agreed that the moments of experience potentially could be reliably characterized along this dimension.

To examine the inter-rater reliability for the new characterizations of inner experience, we calculated intraclass correlations for each beep across the three raters within each subject. We then took the mean of those intraclass correlations for each of the dimensions. We found a mean intraclass correlation greater than .80 for all three dimensions (see Table 3). Table 3 also presents the mean ratings for each of these three dimensions of inner experience and the respective standard deviations.

Table 3

Inter-Rater Agreement

Characterization	Mean ICC Rater Agreement	*SD*	Mean Rating	*SD*
Richness	.83	.09	2.70	.78
Number of experiences present	.68	.09	1.53	.37
Valence	.87	.06	-.04	.23

Table 4 summarizes the correlations between the new characterizations. These correlations are based on the average rating for all three raters averaged across all beeps for each subject (i.e., one average characterization value per subject). Valence was not significantly correlated with either richness or number of experience. In contrast, richness and number of experience were significantly correlated.

Table 4

Correlation between Ratings

	Richness	Number of Experiences	Valence
Richness	1		
Number of Experience	.67*	1	
Valence	.00	-.13	1

* $p<.01$, n = 21

Table 5 provides the correlations between the newly identified characterizations of experience (richness, number of experience, and valence) and the seven previously identified phenomena of experience. To calculate this, we again used the average ratings of the three raters for each subject averaged across all of the subject's beeps. Both r*ichness* and *number of experiences* were significantly positively correlated with *sensory awareness* and *feeling.* Both were negatively correlated with *just doing*. The *valence* of an experience was not significantly correlated with the frequency of any of the phenomena of experience.

Table 5

Correlation between New Dimensions and Previously Identified Dimensions

	Sensory Awareness	Inner Speech	Inner Hearing	Unsymb. Thinking	Inner Seeing	Just Doing	Feeling
Richness	.43*	-.34	-.08	-.01	.46*	-.64**	.47*
Number	.53*	.12	-.10	.08	.37	-.50*	.64**
Valence	-.24	.07	.04	.16	-.26	-.04	.11

* $p<.05$, ** $p<.01$, n = 21

We also examined the relationship between the ratings for the newly identified characterizations of experience (richness, number of experience, and valence) with the presence or absence of the seven previously identified phenomena of experience for each beep. Table 6 demonstrates the correlations.

Table 6

Correlation between New Dimensions and Previously Identified Phenomena for Each Beep

	Sensory Awareness	Inner Speech	Inner Hearing	Unsymb. Thinking	Inner Seeing	Just Doing	Feeling
Richness	.27**	.03	-.09	-.01	.44**	-.36**	.31**
Number	.42**	.12*	-.09	-.11	.21**	-.28*	.39**
Valence	-.14	.05	.12*	.09	-.01	.00	-.014

* $p<.05$, ** $p<.01$.

Subject and Interviewer Feedback Forms

To examine subjects' and interviewers' perceptions of subjects' ability to capture and describe inner experience and interviewers' understanding of subjects' inner experiences, subjects and interviewers were asked to independently complete the Feedback Questionnaire after each expositional interview. For most interviews, three DES researchers were present. First, we examined the degree to which the interviewers agreed with one another on their ratings. Table 7 demonstrates the agreement between the three interviewers' ratings. For all three dimensions, the interviewers demonstrated substantial agreement yielding interclass correlations greater than .65.

Table 7

Intraclass Correlations between Interviewers

	Intraclass Correlations
Subjects' Ability to Capture Experience	.79
Subjects' Ability to Describe Experience	.71
Interviewers' Ability to Understand Experience	.68

The three interviewers' ratings were averaged together to produce a mean for each rating for each interview day. Table 8 contains the means of the interviewers' ratings for all four days of sampling. The interviewers reported perceiving an increase in subjects' ability to capture and describe their experience from Day 1 to Day 4. Interviewers also reported an increase in interviewers' ability to understand subjects' inner experiences between Day 1 and Day 4.

Table 8 also summarizes the mean of subjects' ratings of their ability to capture and describe their inner experience by sampling day as reported on the Subject and Interviewer Feedback forms. Subjects were also asked to rate the degree to which they believed the interviewers' understood their inner experiences. Overall, subjects reported that they improved in their ability to capture and describe their inner experiences between Day 1 and Day 4. In contrast, there was a slight decrease in reported ability to describe inner experience between Day 3 and Day 4.

Table 8

Subjects' and Interviewers' Mean Responses on the Feedback Questionnaire

Question on Feedback Questionnaire	Day 1	Day 2	Day 3	Day 4
Subject's Ratings: Subjects' Ability to Capture Experience	3.10	4.33	4.67	4.95
Interviewers' Ratings: Subjects' Ability to Capture Experience	2.97	4.04	5.02	5.10
Subject's Ratings: Subjects' Ability to Describe Experience	3.55	4.29	4.76	4.60
Interviewers' Ratings: Subjects' Ability to Describe Experience	3.11	4.15	4.77	4.87
Subjects' Ratings: Interviewers' Ability to Understand Experience	3.95	4.57	4.81	5.10
Interviewers' Ratings: Interviewers' Ability to Understand Experience	3.27	3.99	4.60	4.71

The improvements in ratings from Day 1 to Day 4 were evaluated for significance using repeated measures ANOVA. Results demonstrated significant improvement in subjects' ratings of their ability to capture their inner experience across the four days of sampling, F (3, 16) = 20.17, p = .001 as well as interviewers ratings of subjects' ability to capture their inner experience, F (3, 16) = 17.56, p = .001. Results also demonstrated significant improvement in subjects' and interviewers' ratings of subjects' ability to

describe their inner experience, F (3, 16), = 5.97, p = .01 and F (3, 16) = 17.35, p = .001 respectively. Lastly, significant improvement in subjects' and interviewers' ratings of interviewers' ability to understand their inner experience across the four days of sampling were also observed, F (3, 16) = 7.24, p = .001 and F (3, 16) = 10.48, p = .001 respectively. Overall, the feedback questionnaires provide limited information regarding the quality of subjects' ability to capture and describe their inner experience and interviewers' understanding of subjects' inner experience and it was determine conceptually that these instruments cannot be relied upon as an indication of the quality of the DES process because neither subject nor investigators have a clear basis from which to judge their ability and/or effectiveness. Thus although it is likely that the perceived growth indicated by the increasing means on the respective feedback questionnaires does represent relative improvement in the process over time, it is impossible to determine from these measures the actual quality of the DES process that is unfolding.

Finally, after each expositional interview, the interviewers composed a written description of each moment of experience. In the present study, subjects were asked to read the written descriptions of their moments of experience and rate the accuracy of the descriptions on a scale of 1 to 10 with 1 representing not at all accurate and 10 representing completely accurate. The instructions for the rating scale were given to subjects verbally and subjects were asked to record their ratings next to each beep description. Subjects were also asked to change anything in the written description that did not accurately represent their experience. Out of all of the beep summaries reviewed by subjects, only 23 revisions were made to the beep summaries by subjects. Overall, the

mean beep description rating for the moments of experience discussed in the first interview was 9.16 with a *SD* of 1.35. The mean beep description rating for the moments of experience discussed in the second interview was 9.46 with a *SD* of .97. Lastly, the mean beep description rating for the moments of experience discussed in the third interview was 9.60 with a *SD* of .75. These ratings ultimately suffer from the same weakness as the feedback questionnaire and thus, while these high ratings indicate that the subject and investigator have a generally well aligned understanding of the moments of experience, they in no way ensure that the apprehensions of the moments of experience were of high fidelity.

CHAPTER 5

DISCUSSION

This study provided a description of the phenomena of inner experience in a sample of college students. First we set out to determine if there were any new or previously unrecognized phenomena in the subjects' sampled moments of inner experience. We did not find any.

Next, we evaluated the inter-rater agreement for coding of seven previously identified phenomena of experience (sensory awareness, feeling, unsymbolized thinking, inner seeing, inner speech, just doing, and inner hearing) by having three independent DES researchers read written descriptions of moments of experience and code those experiences for the presence of each phenomenon. We chose these phenomena of experience as they have been demonstrated to occur frequently in previous studies examining the phenomena of inner experience in college samples (Heavey & Hurlburt), We found that the researchers demonstrated significant inter-rater agreement for each dimension.

Our finding of the high inter-rater agreement for the previously identified phenomena of experience was consistent with Hurlburt and Heavey (2002). They examined the agreement between two DES researchers in identifying the presence of phenomena of experience. They had the two DES researchers independently interview subjects regarding their inner experience and subsequently identify the phenomena of experience present. Hurlburt and Heavey (2002) reported that of the five frequently occurring phenomena of experience (images or inner seeing, inner speech, unsymbolized thinking, feeling, and sensory awareness), the highest interobserver agreement was

demonstrated for images (or inner seeing) whereas the lowest interobserver agreement was for sensory awareness. Although we used a different method of evaluating agreement in identifying the phenomena of experience, the present study found a similar trend with the highest percentage of agreement found for inner seeing and the lowest percentage of agreement for sensory awareness followed by inner hearing. The similar results may suggest that inner seeing is a phenomenon more easily identified by researchers or perhaps subjects are better at capturing and describing inner seeing compared with other phenomena. In addition, there may be some aspect to sensory awareness that makes it more difficult to identify. For example, Hurlburt and Heavey (2002) suggest that sensory awareness may be more difficult to classify because of its relationship to feeling and the difficulty in separating bodily sensory awareness (e.g., feeling butterflies in one's stomach) from feelings (e.g., feeling anxious).

We also evaluated the frequency of the aforementioned previously identified phenomena of experience and found that four phenomena (sensory awareness, feeling, unsymbolized thinking, and inner seeing) occurred in approximately one-quarter of sampled moments. Inner speech was present in a bit less than 20% of sampled moments whereas the remaining two phenomena (just doing, and inner hearing) occurred in approximately 10% or fewer of the sampled moments. We also observed significant individual differences in the relative frequency of phenomena of inner experience in the present study. For example, one subject experienced inner speech in over 90% of her moments of experience. In contrast, six subjects experienced no inner speech at all. Such individual differences occurred for each phenomena evaluated in this study.

The frequencies of previously identified phenomena found within this sample were comparable to what was found in a similar sample of college students (Heavey & Hurlburt, 2008). This increases our confidence that these phenomena of experience, which have now appeared to occur often in two separate studies, are experienced more by the general population than other phenomena of inner experience. Additional research is needed to substantiate this idea, particularly studies using a sample other than college students. It may be beneficial for future studies to identify under which circumstances and what types of people do not experience these frequently occurring phenomena. Studies are needed to explore the nature of situational variance on inner experience. For example, additional research is needed to understand if an individual's dominant form of inner experience remains constant regardless of situational various. In addition, it may be advantageous to understand if there are circumstances or particular types of people for whom rarer forms of experience are present more often than what has been observed in the present study. For example, are there mental states (e.g., depressed or anxious) that may alter the phenomena of inner experience?

We found somewhat less inner speech in our sample than what was found in Heavey and Hurlburt's (2008) sample. We may have found this difference because we also independently examined the presence of inner hearing, which is a similar phenomenon to inner speech. Since the earlier Heavey and Hurlburt (2008) study, it is our impression that DES researchers have become more careful about distinguishing between inner speech and inner hearing. If we add the frequencies of these two phenomena, we get a similar frequency as was found in the earlier sample. Also, we may have observed different frequencies because Heavey and Hurlburt (2008) selected their

sample using a stratified method according to psychological distress as measured by the SCL-90. The present study did not use a stratified sampling method but rather used a convenience sample. It is possible that the difference in frequencies found were the result of differences between the samples with regards to some psychological construct like distress. It may also simply reflect fluctuations due to the small size of both samples. Further research is needed to understand what influence or relationship psychological constructs like distress have to the phenomena of inner experience.

With regards to the significant individual differences observed in this study, our findings were consistent with Heavey and Hurlburt (2008), who also found significant individual differences in the frequency of phenomena experienced. It is unclear what mediates if one person experiences significantly more of one phenomenon (e.g., inner speech) compared to another (e.g., sensory awareness). Future research focused on understanding the pattern of such individual differences will be needed in order to interpret the significance, if any, of these large individual differences.

We also examined the moments of experience to determine if we could identify other meaningful dimensions along which inner experience could be characterized. We developed three characterizations (the degree to which an experience focuses on future, past, or presently occurring phenomena; differentiating between external and internal phenomena; and the degree to which inner experience is related to what a subject was doing at the moment of the beep) that we ultimately decided were not viable. Three characterizations (richness of experience, valence, and how many experiences present) of inner experience, however, were used reliably to characterize the sampled moments. Two of these characterizations (richness and number of experiences) were correlated with each

other and generally captured the complexity of the ongoing experience. The third characterization, valence, focused on the overall emotional tone of the moment. Although valence was rated reliably, it was not related to any of the forms of inner experience. Overall, the mean of valence ratings for the sample was close to 0 suggesting that we had relatively equal positive and negative ratings of inner experience.

It should be noted, however, these characterizations are fundamentally different than the phenomena usually described in DES. DES research generally examines the form of the phenomena of experience. In that sense, a specific phenomenon (e.g., *inner seeing*) is either present or is not within a particular experience. It is something that is directly experienced by the subject at the sampled moment. On the other hand, these proposed characterizations provide a description of the degree to which a sampled moment represents or contains some underlying (i.e., not directly present in experience) characteristic. All moments of experience, regardless of the phenomena present, can be rated using these new characterizations. Additional studies are needed to further evaluate the usefulness of these new characterizations. In addition, future studies should continue to remain open to finding phenomena or characterizations of experience that have not been previously identified.

This study also examined the degree to which subjects and interviewers perceive a subjects ability to capture and describe one's experience as well as the interviewer's understanding of a subject's experience. Overall, the results suggest that subjects and interviewers perceive subjects to be improving in their ability to capture and describe their experience from the first expositional interview to the last one. Interviewers demonstrated significant agreement among themselves regarding subjects' abilities.

Overall, the feedback questionnaires provided limited information regarding the quality of subjects' ability to capture and describe their inner experience and interviewers' understanding of subjects' inner experiences. While subjects reported improvement across the four days of sampling, it is unclear if perceived growth actually represents increased skill and furthermore it is impossible to interpret the absolute meaning of these ratings of the ability to perform the tasks inherent in DES. Subjects do not have a base with which to compare themselves and their ability, so their ratings are solely based upon their experiences in attempting these skills during the particular interviews they experience. This is similar to a novice basketball player who may think he is good at dribbling the ball but does not have any comparison group with whom he can compare his level of skill.

Furthermore, the only feedback a subject receives regarding his skills in capturing or describing his experience is within the interview. Usually subjects do not know what to expect from the expositional interview until they participate in the first one. Often, subjects leave the first interview with a better understanding of what it means to describe their experience at a particular moment. For example, during the first interview often novice subjects will experience difficulty narrowing down the moment of the beep. They may discuss a minute of their experience surrounding the onset of the beep but DES research asks subjects to narrow their experience down to a specific second of experience. Some subjects also are surprised at the extent to which they are asked to pay attention to the details of their experience. For example, at the first expositional interview a subject may report that he/she was thinking of eating an apple. However, DES researchers seek additional information regarding how that thought was present to the

subject such as whether the thought was present in words (e.g., inner speech) or images (e.g., inner seeing). The low ratings in ability to capture and describe experience seen for Day 1 may represent a subject's lack of familiarity with the questions asked during the expositional interview and potential feedback they get from the interviewers rather than a pure measure of their abilities.

It is also important to note that neither the ratings done by the subjects nor the researchers' ratings regarding the perceived ability to capture, describe and understand the moments of experience can be used as a reliable guide to the quality or fidelity of the process. As was discussed, the primary information the subject has regarding how well he/she is performing the task comes through the exchange during the interview. Thus if the expositional interview was performed by an unskilled researcher, one could easily imaging a scenario in which the researcher asks the subject what he or she is experiencing, the subject gives a general answer which the researcher accepts and all concerned judge the process to be successful. These participants would likely report using such a rating scale that the subject could capture and describe his or her experience and the researcher could apprehend it in high fidelity. Thus we conclude that these types of ratings cannot be used as a guide to the quality of the DES process or the fidelity of the apprehensions of experience.

Limitations and Suggestions for Future Research

A limitation of this study was that we used a convenience sample of college students and did not stratify them according to any meaningful dimensions. We set out to describe the frequency of inner experience in a sample of college students; however, we are unable to estimate how representative our sample is of the general college student

population. Our convenience sample also makes it difficult to compare our sample with other similar college samples as we did not collect much information regarding the psychological profiles or general characteristics of our sample. Future research may want to use other sampling methods (e.g., stratified method, random sampling, or quota sampling) in order to obtain a more representative sample of the general population or to stratify the subjects according to their relationship to some characteristic that may be related to inner experience.

In addition, our sample size for this study was small (N = 21) due to the labor and time intensive nature of the DES method. For example, this study took approximately one academic year to collect data with six DES researchers involved with the collection of the data. Our limited sample size provided lower than ideal statistical power for detecting relationships and differences.

Another potential limitation of the present study was that we did not set out with any hypotheses regarding what we expected to find within our sample. Instead, we tried to remain unbiased regarding the frequencies, phenomena, and characterizations we might have encountered in our sample allowing us to remain open to the possibility of finding dimensions of experience not previously encountered. However, we did examine the degree to which our frequencies of phenomena of inner experience were comparable to previous studies on inner experience in college students. Some would argue that a weakness of the exploratory strategy employed in this study is that we did not directly advance any psychological theory or answer any specific theoretical question. Future research may want to use the DES method to explicitly address theories regarding the nature and frequency of inner experience.

Based on our findings, we believe that future research designed to understand the frequency of inner experience in a variety of samples (e.g., non-college student samples, those suffering from particular psychological disorders, with some specific external characteristics , etc.) would be advantageous in further understanding the nature of inner experience. Furthermore, research aimed at understanding the significant individual differences we found in this study would be useful.

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VITA

Graduate College
University of Nevada, Las Vegas

Janell M. Mihelic

Degree:
Bachelor of Science, Psychology, 2005
Nevada State College

Thesis Title: Exploring the Phenomena of Inner Experience with Descriptive Experience Sampling

Thesis Examination Committee:
Chairperson, Christopher Heavey, Ph.D.
Committee Member, Russell Hurlburt, Ph.D.
Committee Member, Jeffrey Kern, Ph.D.
Graduate Faculty Representative, Joel Lieberman, Ph.D.