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The Experience of feelings in depression

Noelle L. Lefforge
University of Nevada, Las Vegas

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THE EXPERIENCE OF FEELINGS IN DEPRESSION

by

Noelle L. Lefforge

Bachelor of Arts
University of Nevada, Las Vegas
2002

Master of Arts
University of Nevada, Las Vegas
2007

A dissertation submitted in partial fulfillment
of the requirements for the

Doctor of Philosophy in Psychology
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Noelle L. Lefforge

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Christopher L. Heavey, Committee Chair

Russell Hurlburt, Committee Member

Russell T. Hurlburt, Committee Member

Jennifer Keene, Graduate Faculty Representative

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

August 2010

ABSTRACT

The Experience of Feelings in Depression

by

Noelle L. Lefforge

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

Emotions, such as sadness, guilt, and irritability, are at the core of depressive symptoms and suggest a need for an in-depth understanding of feelings, the experiential component of emotion, during depression. Therefore, the purpose of this study was to describe the experience of emotion in depressed participants and find out if these experiences are similar to those of nondepressed participants. Descriptive Experience Sampling (DES) was used to sample five depressed and four nondepressed participants for four days and then in a controlled setting while watching positive, negative, and neutral film clips. Due to the limited sample size, this study was largely exploratory. The primary findings were that depressed participants experienced more feelings than nondepressed participants. They also experienced a higher ratio of negative to positive feelings and more sadness in response to the negative film clip. In addition, depressed participants experienced more secondary depressive symptoms in momentary awareness. However, differences between the groups in overall experience of depression in momentary experience were much smaller than was expected based upon their differences on a depression questionnaire. Additionally, depressed participants' feelings included the types of phenomena that have been found in previous studies of nondepressed participants. The

depressed participants also demonstrated a significant decline in self-reported depression over the course of the study.

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CHAPTER 1

INTRODUCTION

There can be no doubt about the prominent role of emotions in depression. Emotions such as sadness, guilt, and irritability, as well as emotion related experience, such as anhedonia, are core symptoms of depression, but little is known about the actual experience of these and other emotions in people with depression. This lack of understanding, in combination with a widening focus on understanding emotions in depression as more than just symptoms (Goldston, Gara, & Woolfolk, 1992), highlight the need for a study that directly examines the experience of emotion in depression. The aspect of emotion that occurs before the footlights of consciousness is referred to as feelings or emotion experience. In accordance with modern research convention (Kagan, 2007; Kalat & Shiota, 2007), I will use “feelings” and “emotion experience” interchangeably to refer to this aspect of emotion, and it is this aspect that is the primary target of interest for the present study.

Given the potential value of understanding emotion experience in depression, it is surprising that there are limited studies that provide descriptions of feelings in depression and there is extremely limited empirical knowledge on how these experiences differ from emotion experiences of nondepressed individuals. A primary reason for this void in our understanding may be psychology’s avoidance of phenomenological studies. Hurlburt (1997) stated three reasons why psychology has not addressed characteristics of thoughts which likely are equally applicable to explain the field’s avoidance of descriptions of feelings: the belief that subjective reports are inaccurate, that the experience is already well understood, and that experience does not vary between individuals. Most studies

that do exist on emotion in depression have partially acknowledged these potential issues and addressed at least one of these issues, often while ignoring the others.

For example, the questionable accuracy of reports of experience has been widely acknowledged. This problem is compounded in research on depression by the well documented memory biases associated with depression. Specifically, people with depression have consistently demonstrated a mood-congruency effect in which they have enhanced encoding and retrieval for material consistent with their current affective state (Daglish & Watts, 1990; Matt, Vázquez, & Campbell, 1992). Emotion-related literature, particularly from a cognitive perspective, has attempted to overcome limitations that memory bias exerts on subjective reports of experience by implementing methods that do not rely on self-report. In particular, emotion-related attention studies have examined only underlying, largely automatic processes. These studies have used experimental paradigms, such as the Stroop task or dot-probe task, that use measures of reaction time and accuracy that are unaffected by memory bias. These studies revealed that depression is associated with increased attention toward negative stimuli and decreased attention (avoidance) toward positive stimuli as well as an impaired ability to disengage attention from negative stimuli (Bradley, Mogg, & Lee, 1997; Gotlib, Krasnoperova, Yue, & Joormann, 2004; Mathews, Ridgeway, & Williamson, 1996; Mogg, Bradley, & Williams, 1995). While these are important findings, these studies are conducted in controlled laboratory settings and therefore the extent to which these findings generalize to real life situations may be limited. In addition, the focus of these types of studies is on processes that occur mostly, if not entirely, outside of awareness.

Other information-processing based studies have addressed limitations imposed by memory bias by decreasing the time interval between experience and report of emotion-related experience. These studies have examined emotion-related perceptions and responses by having participants report their reactions after presentation of affective stimuli. These studies have found that depressed persons have a negative perceptual bias in which, for example, they are likely to perceive neutral-expression faces as negative and happy-expression faces as neutral (Gur, Erwin, Gur, & Zwi, 1992). Depression is also associated with decreased responsiveness to both positive and negative stimuli, a phenomenon referred to as emotion context insensitivity (Rottenberg, 2005; Rottenberg, Gross, & Gotlib, 2005). Like emotion-related attention studies, these studies were conducted in controlled environments and their relevance to real-life situations has not been fully explored. Another potential problem with this research is that it is based on participants' response to measures that typically consist of a list of emotions. The extent to which these forced choice measures may contribute to inaccurate recall or reporting of actual experience is unknown; but this should be carefully considered in light of findings that memory biases have been shown to exert significant influence on subjective reports in depression.

Although information-processing studies have contributed to our understanding of emotion-related processes in depression, they have not produced descriptions of actual emotion experiences. It is reasonable to expect that such descriptions could be obtained. One source of such descriptions is memoirs of depression; they do not, however, address the important limitations of memory bias in reports of subjective experience. Other experience-based studies have attempted to address memory limitations by obtaining

reports of experience as it is occurring or shortly after it has occurred. These studies have typically shown that depressed persons experience more negative feelings and fewer positive feelings than do nondepressed persons (Barge-Schaapveld, Nicolson, Berkof, & deVries, 1999; Myin-Germeys et al., 2003; Peeters, Berkhof, Delespaul, Rottenberg, & Nicolson, 2006). Although these studies have increased ecological validity in comparison to information-processing studies, they still have typically obtained results from forced-choice items which may influence responses and miss dimensions or aspects of experience not anticipated by researchers in advance. Perhaps more importantly, the purposes of these studies have not been to obtain accurate descriptions of emotion experiences.

The second reason Hurlburt (1997) provided for psychology's disinterest in describing characteristics of inner experience was the assumption that inner experience is already understood. This idea is reflected in the reviewed studies that use emotion labels in a way that assumes they are understood in the same way by everyone. These studies do not provide descriptions of emotion experience in their directions to participants or in their reported findings, likely because these details are not considered important. However, findings using Descriptive Experience Sampling have shown that people's inner experience differs in potentially significant and unexpected ways (Hurlburt, 1993). These findings suggest the need for careful observation of inner experience that can provide detailed reports on the characteristics of inner experience, including descriptions of emotion experience.

The third reason provided by Hurlburt (1997) for psychology's disinterest in describing inner experience is the assumption that experience does not vary between

individuals. Accordingly, studies that lack details on feelings are working under the assumption that experiences of a particular feeling are uniform. However, a recent study that carefully examined inner experience revealed that individuals exhibited extensive variations in inner experience, including variability in the experience of feelings (Heavey & Hurlburt, 2008). Other methods have also found significant variations in the experience of depressed individuals, such as patterns of diurnal mood, when within-group analyses have been conducted (Robbins & Tanck, 1987). These studies highlight the importance of thorough examination of the details of individuals' experience in understanding feelings in depression.

The purpose of the current study was to provide descriptions of feelings in depression and explore whether or not these experiences differ from the feelings of nondepressed individuals. To investigate these issues, samples of inner experience were collected from both depressed and nondepressed participants over the course of several days as they engaged in their typical daily activities. The participants were interviewed regarding their randomly selected experience in accordance with the guidelines of Descriptive Experience Sampling (Hurlburt & Akhter, 2006; Hurlburt & Heavey, 2006). I was particularly interested in what would emerge in their experience related to feelings and depression. Further exploration of inner experience was also conducted by analyzing form, content, and time orientation in inner experience. These additional analyses were important for providing the detailed idiographic profiles of each participant which is consistent with the goals of Descriptive Experience Sampling. The relationship between feeling experience and questionnaire data collected from depressed participants was considered as well.

CHAPTER 2

REVIEW OF RELATED LITERATURE

Depression is a disorder with high prevalence rates (American Psychiatric Association, 1994) and serious consequences which include reduced quality of life (Simon, 2003), functional impairment (Kessler et al., 2003), economic burden (Wang, Simon, & Kessler, 2003), and risk of suicide (Isometsä & Lönnqvist, 1998). To be diagnosed with depression a person must exhibit a depressed mood, which typically consists of experiences of sadness or anhedonia (American Psychiatric Association, 1994), an inability to experience pleasure. The prominent role of emotion in these core symptoms of depression indicates a need for a thorough understanding of the role of emotions in depression. Although emotions have traditionally been considered only as symptoms of depression, researchers have encouraged examination of emotion in the development and maintenance of depression as well (Goldston et al., 1992).

Emotion Processing

Emotion Response

The experience of negative emotions has been implicated as a core aspect of depression in foundational depression theories (e.g., Beck, Rush, Shaw, & Emery, 1979). Given the weight of negative emotions in depression theory and the prominence of negative emotion in the diagnostic criterion of depression (American Psychiatric Association, 1994), researchers have assumed that depression facilitates negative emotions, particularly sadness (Rottenberg, 2005). To investigate this assumption, researchers have examined the response to emotion-eliciting stimuli among people suffering from depression (Berenbaum & Oltmanns, 1992; Dunn, Dalgleish, Lawrence,

Cusack, & Ogilvie, 2004; Rottenberg et al., 2005; Rottenberg, 2005; Sloan, Strauss, Quirk, & Sajatovic, 1997; Sloan, Strauss, & Wisner, 2001). In these studies, participants are typically presented with positive and negative stimuli such as pictures (Dunn et al., 2004; Sloan et al., 1997; Sloan et al., 2001) or video clips (Berenbaum & Oltmanns, 1992; Rottenberg et al., 2005; Rottenberg, 2005) to elicit an emotional response. Dependent measures include observations of facial expressions (Berenbaum & Oltmanns, 1992; Rottenberg et al., 2005; Sloan et al., 1997; Sloan et al., 2001), participants' ratings of arousal (Dunn et al., 2004; Rottenberg et al., 2005; Sloan et al., 1997; Sloan et al., 2001), emotional valence (Dunn et al., 2004; Rottenberg et al., 2005; Sloan et al., 1997; Sloan et al., 2001), emotional category (Dunn et al., 2004; Dunn et al., 2004; Rottenberg et al., 2005), and emotion-related physiological measurements (Rottenberg et al., 2005). Together these studies have consistently shown that people with depression display decreased responsiveness to positive stimuli rather than increased responsiveness to negative stimuli.

Additionally, Wexler et al. (1994) found that flattened automatic affective responsiveness (as measured by electromyography of facial muscles) was observed even when depressed participants subjectively reported similar levels of emotional response as did nondepressed participants. However, Sloan et al. (1997) found that depressed participants displayed more negative facial expressions in response to negative stimuli despite an absence of self-reported experience of negative affect. Although this may be attributable to the tendency of those who are depressed to have a higher baseline of negative expression (Segrin & Abramson, 1994), these results indicate dissociation between subjective experience and observable emotional responsiveness. It is possible

that some elements of affective responsiveness during depression may occur outside of awareness, supporting theories of unconscious emotion.

Emotional flattening has been observed across tasks regardless of the level of difficulty of the task. For example, Berenbaum and Oltmanns (1992) presented participants with two types of affect-eliciting stimuli which varied in cognitive demand. The low cognitive demand trial consisted of tasting drinks whereas the higher cognitive demand trial consisted of watching brief film clips. Affective responsiveness did not vary based upon cognitive demand of the task. Furthermore, the emotional flattening does not seem to be a product of medication as the effect has been demonstrated by medicated and nonmedicated depressed participants (e.g., Berenbaum & Oltmanns, 1992).

At least one of these studies (Dunn et al., 2004) has also shown that depressed participants showed an increase in sadness toward positive images relative to neutral images. Dunn et al. (2004) noted that although this was a significant finding, the degree of sadness in response to positive images was much less than the degree of sadness in response to negative images; therefore it is difficult to state that the depressed participants truly felt sad in response to positive images. The authors speculate that a minor increase in sadness in response to positive images may be related to awareness that the images are not inducing pleasure as they typically should. Also, some of the studies (e.g., Berenbaum & Oltmanns, 1992; Sloan et al., 1997) have focused on negative emotions of fear and disgust rather than sadness, which is more central to depression. However, even when sad stimuli were used, no differences were found in responsiveness of depressed and nondepressed participants (Sloan et al., 2001).

The general flattening of affective responding has been referred to as emotional context insensitivity (Rottenberg, 2005). Researchers were concerned that emotional-context-insensitive patterns of responses may have actually been a result of disengagement from the task. It would be reasonable to believe that traits of depression, such as inattention and lack of motivation, could cause depressed participants not to engage with the emotional stimuli and thereby produce diminished emotional responses. To examine this possibility, reanalysis (Rottenberg, 2005) of a previous study which compared healthy and depressed criers was conducted to determine if disengagement from the task is responsible for decreased emotional response in depression (Rottenberg, Gross, Wilhelm, Najmi, & Gotlib, 2002). Participants who cried in response to the sad film were chosen because it was assumed that the crying signified engagement in the task. This study found that even when depressed persons are equally engaged with the stimuli as nondepressed persons (as revealed by comparison of depressed and nondepressed criers), an emotional-context-insensitive pattern of response still occurred in which depressed participants reported less change in their emotional experience and fewer physiological changes were observed during presentation of sad stimuli.

Researchers were still concerned that the sad stimuli used may have been ineffective with depressed participants. To investigate this concern, participants' responses to viewing interviews of themselves discussing their saddest moments were observed. Again, depressed participants exhibited an emotional-context-insensitive pattern of response to the personally relevant emotion eliciting stimuli (Rottenberg et al., 2005).

The overall flattening of affective responsiveness that defines emotion context insensitivity suggests a problem with emotional regulation in depression (Dunn et al.,

2004; Rottenberg et al., 2002; Rottenberg et al., 2005). An inability to react to various emotion contexts likely interferes with the ability to adapt to the environment (Rottenberg et al., 2005). Rottenberg et al. (2005) reviewed preliminary evidence that emotion context insensitivity is related to psychosocial dysfunction, potentially including depression. For example, Rottenberg, Kasch, Gross, and Gotlib (2002) found that emotional-context-insensitive responses to sad and neutral stimuli were associated with increased depression severity and duration as well as decreased psychosocial functioning.

However, it is unclear if this pattern of emotional responsiveness directly contributes to observable features of depression. Although Berenbaum and Oltmanns (1992) reported a previous finding that participants with schizophrenia who exhibited the least emotional responsiveness to presented stimuli were also judged as the most emotionally blunted during a clinical interview, the initial clinical interview of depressed participants in their study did not rate restrictive responders as emotionally blunted. Studies assessing other corollary characteristics of depressed participants who exhibit emotional context insensitivity, such as observable affect or interpersonal style, have not been conducted.

Research that has attempted to establish whether emotional dysregulation, such as emotional context insensitivity, is a symptom or causal factor of depression is also limited. Rottenberg et al. (2005) hypothesized that if emotional context insensitivity is a causal factor of depression, then it should be observed to be a trait-like characteristic and observable in previously depressed participants during euthymic periods. However, their results did not support this hypothesis, indicating that depression produces mood-state dependent changes in emotional reactivity, rather than being a trait-like feature of people with depression. An alternative explanation of these results is that emotional regulation

skills were acquired by the formerly depressed participants which resulted in symptom improvement indicated by euthymia.

Gehrick and Shapiro (2000) presented participants with happy or sad scenarios and asked participants to engage in imagery. Although depressed participants' reports of emotion were similar to controls during imagery, they showed reduced facial muscle activity. Depressed participants also had reduced facial muscle activity at baseline. In contrast to the previously reviewed study by Langenecker et al. (2005), these findings possibly indicate that lack of expressiveness in response to emotional stimuli may result from psychomotor retardation. The imagery scenarios that were presented to participants were also varied between solitary and social scenes. Depressed participants' frowning did not vary between sad-solitary and sad-social imagery. The investigators attribute this lack of response to social disengagement, a tendency to hide one's emotion in the presence of others.

Emotion Perception

The pattern of emotional responsiveness observed in depressed persons may be related to differences in perception of emotional stimuli. Prominent cognitive theories of depression (Beck et al., 1979) attribute the tendency to perceive ambiguous stimuli negatively as a key component of depression. Researchers have been particularly interested in how depressed persons perceive emotional stimuli. Therefore, many studies have been done on perception of emotion in depression.

To investigate emotion perception in depression, researchers typically present depressed and nondepressed participants with emotional stimuli. In most studies, the emotional stimuli consist of facial expressions. For example, the study may use

photographs of faces (Gur et al., 1992; Hale, 1998; Langenecker et al., 2005; Mikhailova, Vladimirova, Iznak, & Tsusulkovskaya, 1996; Persad & Polivy, 1993; Rubinow & Post, 1992) or line drawings that approximate real faces (Mikhailova et al., 1996) expressing various subsets of prototypical emotions such as happiness, sadness, fearfulness, anger, surprise, contempt/disgust, and no emotion/indifference and participants rate their perception of the emotions. All of these studies have found that depressed participants are less accurate in perceiving the emotion of the facial expression than are nondepressed participants.

This effect has been shown in both men and women. Whereas most of the studies either consist exclusively (Langenecker et al., 2005; Persad & Polivy, 1993) or predominantly (Gur et al., 1992; Rubinow & Post, 1992) of women, one study consisted exclusively of men (Mikhailova et al., 1996). The samples also consisted of both outpatient (Langenecker et al., 2005), inpatient (Mikhailova et al., 1996; Rubinow & Post, 1992), and mixed inpatient/outpatient (Gur et al., 1992; Persad & Polivy, 1993) samples. Of the two studies that reported medication status of their samples, one study reported some of the participants were on medication whereas others were not (Langenecker et al., 2005) and one study reported participants were medication free for their first assessment and all participants were on medication by the second assessment (Mikhailova et al., 1996). All of the studies included depressed participants (Gur et al., 1992; Langenecker et al., 2005; Mikhailova et al., 1996; Persad & Polivy, 1993; Rubinow & Post, 1992). Gur, Erwin, Gur, Zwil, Heimberg, and Kraemer (1992) specified that depressed participants were currently experiencing either major depression or bipolar disorder (depressed phase) and Mikhailova, Vladimirova, Iznak, Tsusulkovskaya, and

Sushko (1996) specified major depression or schizotypal personality disorder with depressive symptomatology.

Impaired processing of emotional faces does not seem to be result of general visual processing difficulties. Langenecker, Bieliauskas, Rapport, Zubieta, Wilde, and Berent (2005) found that there were no differences in response time to stimuli between depressed and non depressed participants. In this study, participants were also presented with pictures of animals and asked to categorize them. Results showed that depressed participants performed this task as well as did controls. Comparison of efficiency (reaction time/accuracy) of emotional processing to visual processing led the investigators to conclude that depressed participants were less efficient processors of emotional information.

Impaired emotional processing may be particular to visual stimuli. To measure verbal affective expression, Rubinow and Post (1992) administered a sentence-word matching task in addition to the facial expression task. They found there were no differences between depressed and nondepressed participants in the accuracy of affective verbal matching. Furthermore, Langenecker et al. (2005) demonstrated that despite differences in emotional processing, depressed participants did not exhibit impairment in attention, memory, visuo-spatial, or motor skills.

Analysis of the types of errors depressed participants made in response to facial expressions provide more information. One study (Persad & Polivy, 1993) found that negative reactions in response to negative and ambivalent facial expressions were elevated in depressed participants compared to controls. In particular, depressed participants responded with more fear than did controls to the fearful expression. Gur et

al. (1992) found that depressed participants had impaired sensitivity for happiness in that they incorrectly identified happy faces as neutral. Depressed participants also had an impaired specificity for sadness in that they incorrectly identified neutral faces as sad. These impairments indicate an overall negative bias in the perception of emotion among people with depression. However, another study found that errors occurred only in response to happy and sad faces, but not to neutral faces (Mikhailova et al., 1996). Langenecker et al. (2005) found that controls were more likely to err by over-identifying happiness, whereas depressed participants were more likely to err by not identifying any of the emotions to an expression, referred to as a “no response” error. Lastly, Rubinow and Post (1992) found that depressed participants made the most errors in response to faces exhibiting sadness, happiness, and interest.

Differences in perception of emotion may be accompanied by differences in behavior and subjective experience. Persad and Polivy (1993) observed that depressed participants had an increased tendency to freeze in response to facial emotions and had less tolerance for facial expressions. Depressed participants were also more likely to report that they would avoid facial expressions. They also reported less comfort with their own emotional reaction and had more desire to change their reaction than controls.

Some of these studies have attempted to identify regions of the brain that may contribute to emotion perception impairment in depression. Langenecker et al. (2005) included an inhibitory task in their study. Depressed participants had impaired performance on the difficult inhibitory task in comparison to controls which indicated problems with executive functioning and implicated the role of the limbic areas in perceptual difficulties. Performance of depressed participants is similar to the pattern of

performance exhibited by patients with right hemisphere lesions (Rubinow & Post, 1992), which is dominant in facial processing, particularly in processing of positive facial expressions (Mikhailova et al., 1996). However, Mikhailova et al. (1996) found that depressed participants were deficient in recognizing sad affect in both the right and left hemispheres of the brain but were deficient in recognizing happy affect in only the left hemisphere.

Several of the studies reviewed have provided evidence that impaired recognition of emotion may be a state-like feature of depression. Recognition of emotions in facial expression has been shown to improve after recovery from depression (Mikhailova et al., 1996) and the performance of formerly depressed participants that are currently euthymic is consistent with controls (Rubinow & Post, 1992). Furthermore, Gur et al.'s (1992) findings were more pronounced with increased severity of depression.

The relationship between depression severity and persistence has been thoroughly examined by a line of research that used schematic faces as emotion perception stimuli (Bouhuys, Geerts, & Mersch, 1997; Bouhuys, Bloem, & Groothuis, 1995; Bouhuys, Geerts, Mersch, & Jenner, 1996; Bouhuys, Geerts, & Gordijn, 1999a; Bouhuys, Geerts, & Gordijn, 1999b; Geerts & Bouhuys, 1998; Hale, 1998). The schematic faces are line drawings of 12 faces that consist of the same eye and nose types and vary by combinations of four eyebrow types and three mouth types to depict positive, negative, or ambiguous emotions. Ambiguous faces are those in which there are equal amounts of positive and negative features represented on a single face. Typically, each face was rated on a 5 point scale for six basic emotions (fear, happiness, anger, sadness, disgust, and surprise) and two self-referent emotions (invitation and rejection). These judgments

can be categorized as either positive (happy and invitation) or negative (fear, anger, sadness, disgust, and rejection). Bouhuys, Bloem, and Groothuis (1995) established that the faces did include representations of the target emotions which could be agreed upon by independent judges. Furthermore, they found that some of the faces depicted various emotions within one face. They also found that women tended to perceive more anger, fear, and disgust than men.

Consistent with previously reviewed studies that used pictures of facial expressions, Hale (1998) found differences between depressed and nondepressed participants' perception of emotion in the schematic faces. Specifically, he found that compared to controls, depressed participants perceived more sadness in both ambiguous and general faces. Overall, depressed participants judged ambiguous faces more negatively than did controls.

Bouhuys, Bloem, and Groothuis (1995) conducted a study in which participants rated the schematic faces after listening to either depressing or elating music. Results indicated that inducing a depressed mood led participants to perceive ambiguous faces as more rejecting and sad than when a euphoric mood was induced. The participants who were induced with a depressed mood also judged ambiguous faces as less happy and inviting.

Subsequent studies that examined depressed participants' perception of emotion in the schematic faces found a relationship between perception of emotion and persistence and/or severity of depression (Bouhuys et al., 1997; Bouhuys et al., 1995; Bouhuys et al., 1996; Bouhuys, Geerts, & Gordijn, 1999a; Bouhuys, Geerts, & Gordijn, 1999b; Geerts & Bouhuys, 1998; Hale, 1998). For example, Bouhuys, Geers, and Gordijn (1999) found that ambiguous faces were perceived more negatively during periods of depression than

during periods of remission. In addition, participants who relapsed had higher levels of negative perception of ambiguous faces than participants who did not. This finding was consistent with a previous study that indicated that negative judgment of faces was related to higher severity and persistence of depression (Hale, 1998). This study found that judgment of sadness in all faces (general and ambiguous) predicted depression persistence with judgment of sadness in ambiguous faces being the best predictor. It has been consistently shown that ambiguous faces are particularly susceptible to negative judgment during depression (Bouhuys et al., 1995; Bouhuys et al., 1996; Bouhuys, Geerts, & Gordijn, 1999a; Bouhuys, Geerts, & Gordijn, 1999b; Geerts & Bouhuys, 1998; Gur et al., 1992). This is consistent with Beck et al.'s (1979) cognitive theory of depression which implicates negative interpretation of ambiguous situations in the development and maintenance of depression.

Geerts and Bouhuys (1998) examined the role of personality variables in the relationship between emotion perception and depression. They found that higher levels of neuroticism were associated with more persistent depression. Notably, the tendency to perceive ambiguous faces negatively mediated the relationship between neuroticism and depression persistence.

Gender also appears to play a significant role in the relationship between perception of emotion and depression. Women, but not men, who perceived more negative emotion of ambiguous faces had poorer outcomes six weeks after treatment than did women who perceived lower levels of negative emotion (Bouhuys, Geerts, & Gordijn, 1999b). It should be noted that the men in this sample were significantly less depressed than the women. There was one study (Bouhuys et al., 1996) that was inconsistent with all other

studies in that perception of less sadness, rejection, and anger were associated with poorer outcomes at 6 and 30 weeks after treatment. Contrary to current speculation, the investigators posited that negative perception of emotion was a trait-like characteristic and indicated a hyposensitivity to emotion among people with depression. After subsequent studies contradicted these findings, the investigators conducted further analyses. They found that gender differences likely accounted for their findings, in that only females that initially reported negative perception had poorer outcomes whereas men exhibited the opposite relationship. Furthermore, high levels of negative perception of emotion were related to poorer outcomes only among female inpatients, but not among female outpatients.

Only one study directly analyzed the potential influence of medication on the relationship between emotion perception and depression (Bouhuys, Geerts, & Gordijn, 1999b). It was not significant. This study also showed that the relationship between negative emotion perception and depression persistence could not be explained by the initial level of depression.

A negative perceptual bias of emotion has also been demonstrated in a real world setting. Hokanson, Hummer, and Butler (1991) studied depressed college students' perceptions of their roommates. Depressed participants rated their roommates' behaviors toward them which produced an estimate of perceived hostility. The roommates rated their own behavior toward the depressed participants. It was found that the discrepancy between the participant's and the roommate's ratings of hostility was larger among depressed college students than nondepressed college students. Also, depressed participants underestimated their roommates' friendliness compared to nondepressed

participants. It is interesting to note that roommates of depressed participants did report higher levels of hostile responding than did roommates of nondepressed participants. This indicates that the depressed participants were exaggerating already elevated hostility.

Inaccuracy, particularly a negative bias, in perception of emotion has major implications for interpersonal functioning. Overall, depressed persons have been shown to have atypical social perceptions (Alloy & Abramson, 1988), and it is likely that inaccurate perception of emotion is an important aspect of impaired social perception. Evidence supporting a relationship between social factors and negative bias in emotion perception exists. For example, higher levels of extraversion were associated with less negative perception of ambiguous faces (Geerts & Bouhuys, 1998). Hokanson, Hummer, and Butler (1991) commented on depressed college students' perceptions of hostility in their roommates by writing "logic dictates that they probably contribute to problems in interpersonal relationships" (p. 454). Their finding that depressed college students' roommates respond with elevated hostility compared to nondepressed college students' roommates may provide evidence that negative perceptions interact with negative emotional responses to create unfavorable interpersonal relations. Whereas negative bias and interpersonal variables likely interact in some ways, it should be noted that studies have also found that personality variables, cognitions, and interpersonal variables all independently contribute to depression. Geerts & Bouhuys (1998) and Bouhuys, Geerts, and Gordijn (1999) found that among women, social distress related to poorer outcome after 6 weeks of treatment independently of perception of negative emotion.

Although diagnostic features of depression include socially relevant symptoms (e.g., social withdrawal; APA, 2000), social phobia is the psychological diagnosis most closely associated with interpersonal problems. Some research has been done to evaluate the role that anxiety may play in the socially relevant area of emotional perception in people with depression (Bouhuys et al., 1997; Suslow et al., 2004).

For example, Suslow et al. (2004) administered a face-in-the-crowd task to depressed patients with and without comorbid anxiety disorders, as well as to controls. Participants had to identify a single positive face among a series of neutral faces or a single negative face among a series of neutral faces. Trials in which only neutral faces were presented were also included. Participants' response times and error rates were analyzed. Results indicated that only depressed participants with comorbid anxiety disorders responded to positive faces slower than did controls. In addition, these participants' performance did not improve during periods of remission. However, all depressed participants responded slower to neutral faces. The investigators concluded that "automatic processes of facial emotion detection are intact in depression" (p. 63). An alternative approach to these findings might suggest that depressed participants' slowed response toward neutral faces is further evidence of impairment in processing of ambiguous emotional stimuli.

Also, Bouhuys, Geerts, and Mersch (1997) repeated a previously detailed procedure in which depressed participants rated schematic faces at admission, after six weeks of treatment, and after 30 weeks of treatment. They found that both anxiety and depression were related to negative perception of faces. However, when anxiety was controlled for the relationship between negative perception and depression disappeared. On the other hand, when depression was controlled for, the relationship between negative perception

and anxiety remained. These findings suggest that negative perceptual bias in depression may be a result of comorbid anxiety. Given the high degree of comorbidity between anxiety and depression, these results still implicate perception of emotion as a significant impairment among people with depression that may mediate negative interpersonal experiences.

Emotion-Related Attention & Memory

Various studies have examined attention-related processes in depression, predominantly by using the emotional Stroop task paradigm (Williams, Mathews, & MacLeod, 1996). The emotional Stroop task is a measure of selective attention toward emotion-related stimuli, and more specifically measures bias in preattentive processes. Although preattentive processes are largely considered automatic, it is unlikely that most automatic processes are entirely independent of attention control (Cohen, Dunbar, & McClelland, 1990).

In the original Stroop task (Stroop, 1935), participants were presented with words printed in various colors and asked to name the color of each word. To successfully complete the task, the participant must ignore the printed word and attend only to the word color. Participants identified the color of non-color words in less time than the color-words printed in incongruent colors, thereby indicating the prominent role of attentional processes in this task. More recently, researchers have become interested in variants of the Stroop task including examination of attention for disorder-related stimuli among people with anxiety and depression disorders (Williams et al., 1996).

Researchers have used variants of the Stroop task that included affect-related stimuli to investigate negative pre-attentive bias in depression (Gotlib & McCann, 1984; Gotlib

& Cane, 1987; Hill & Knowles, 1991; Hill & Knowles, 1991; Kerr, Scott, & Phillips, 2005; Klieger & Cordner, 1990; McNeil, Tucker, Miranda Jr, Lewin, & Nordgren, 1999; Mogg, Bradley, Williams, & Mathews, 1993; Williams & Nulty, 1986). Stroop stimuli were presented on either a tachistoscope (Gotlib & McCann, 1984; Gotlib & Cane, 1987), cards (Hill & Knowles, 1991; Kerr et al., 2005; Williams & Nulty, 1986), slides similar to cards (Klieger & Cordner, 1990), or a computer (McNeil et al., 1999; Mogg et al., 1993). Although differences exist among these methods (e.g., larger interference effects with cards than with tachistoscope or computer), they have all been shown to produce reliable results (Williams et al., 1996).

All reviewed studies' stimuli consisted at least partially of affect/emotion related words (Gotlib & McCann, 1984; Gotlib & Cane, 1987; Kerr et al., 2005; McNeil et al., 1999; Mogg et al., 1993; Williams & Nulty, 1986) or specified that all words were emotional/affective (Hill & Knowles, 1991; Klieger & Cordner, 1990). Two studies that were included in a review paper by Williams, Mathews, and MacLeod (1996) of Stroop effects in depression (Williams et al., 1996), were excluded from this review because affect-related stimuli were purposefully excluded (Segal & Vella, 1990; Segal, Gemar, Truchon, Guirguis, & Horowitz, 1995). The negative stimuli used in the reviewed studies included depression-related words (Gotlib & McCann, 1984; Gotlib & Cane, 1987; McNeil et al., 1999; Mogg et al., 1993), negative words (Hill & Knowles, 1991; Kerr et al., 2005; Klieger & Cordner, 1990; Williams & Nulty, 1986), anxiety-related words (McNeil et al., 1999; Mogg et al., 1993), and self-esteem threatening nouns (Hill & Knowles, 1991). Two of the studies using depression-related words used only self-descriptive depression-related words (Gotlib & McCann, 1984; Gotlib & Cane, 1987).

One of the studies using negative words specified using only negative *nouns* (Hill & Knowles, 1991). In addition to negative stimuli, studies included self-descriptive manic words (Gotlib & McCann, 1984; Gotlib & Cane, 1987) and positive nouns (Hill & Knowles, 1991; Kerr et al., 2005; Mogg et al., 1993). All reviewed studies included neutral stimuli, which were typically matched for length and language frequency with other stimuli. In addition, some studies included components of the standard Stroop task (Kerr et al., 2005; Klieger & Cordner, 1990; Mogg et al., 1993).

The majority of these studies have shown that depressed participants respond more slowly to negative words than to neutral words (Gotlib & McCann, 1984; Gotlib & Cane, 1987; Hill & Knowles, 1991; Klieger & Cordner, 1990; McNeil et al., 1999; Williams & Nulty, 1986). Nondepressed participants do not show greater interference based on stimuli negativity (Gotlib & McCann, 1984). These findings indicate that depressed participants may have a pre-attentional bias towards negative affective stimuli.

Furthermore, Gotlib and McCann (1984) found that induction of a depressed mood in normal participants did not result in a negative bias, indicating that mood alone is not sufficient to promote a negative bias. However, there is disagreement on whether the negative bias is a state-like or trait-like feature of depression. Williams and Nulty (1986) had participants perform the Stroop task during two sessions that were separated by one year. The largest Stroop effects were found for patients who were depressed during both sessions. Although participants with ‘unstable’ depression (depressed one of the two testing sessions) showed Stroop effects, they were less consistent than for the ‘stable’ depressed participants. In addition, they found that past depression was a stronger predictor of Stroop performance than was current depression. These results suggest that

Stroop interference of negative stimuli is a trait-like characteristic of depression. On the other hand, the study by Gotlib and Cane (1987) found greater interference for negative words compared to neutral words among depressive participants only at the time of hospital admission but not at discharge, indicating Stroop performance as a state-like characteristic of depression.

Stroop effects may also vary by depression severity. The first study to demonstrate that depressed participants had longer response times to depressed-content words but not other words defined their participants as depressed if they scored 9 or above on the Beck Depression Inventory (BDI). Similar results were found in a later study (Klieger & Cordner, 1990), but only among mildly dysphoric participants, those scoring between 9 and 16 on the BDI. Although moderately dysphoric ($BDI \geq 16$) participants' average response time to negative words was longer than to neutral words, this difference was insignificant.

Furthermore, initial analysis in a study that used participants with subclinical depression did not find greater interference from negative words compared to other types of words (Hill & Knowles, 1991). In addition, this study showed that there were no differences between depressed and nondepressed participants' average response time to any of the stimuli. However, a difference did emerge when anxiety was controlled for, in which case depressed participants were slower naming the colors of all types of words than were nondepressed participants. This finding suggests that anxiety may influence Stroop performance. Anxiety's influence is further supported by other studies of participants who were both depressed and anxious and failed to find a negative bias in depression (Kerr et al., 2005; Mogg et al., 1993). For example, the depressed participants

in Mogg et al's (1993) study did not differ in anxiety level from the anxious participants. Interestingly, the anxious participants did have longer latencies toward negative words (but not other word types) when the words were presented both supraliminally and subliminally. Also, Kerr, Scott, and Phillips (2005) found no interaction between group (depressed, bipolar, and control) and condition (negative, positive, or neutral word type). They reported that their depressed participants were more anxious than were both control and bipolar participants. Although they did not find a correlation between anxiety and Stroop performance, the authors suggested that anxiety may influence performance in a subtle manner that was not detected. Lastly, McNeil et al. (1999) conducted a Stroop study with participants with major depressive disorder, post-traumatic stress disorder, obsessive-compulsive disorder, and generalized anxiety disorder. They found that all patients showed slower responses to anxiety and depression words than to neutral words. The authors acknowledged that demonstration of a negative bias among the patients may be indicative of comparable levels of anxiety and depression across disorders.

Williams, Mathews, and MacLeod (1996) list three potential explanations, other than negative attentional bias, that may account for Stroop effects. The first of these explanations was that interference may be caused by priming effects. Their review of all studies that investigated psychopathology using the emotional Stroop led them to conclude that priming is not responsible for the interference observed on the Stroop task. It should be further noted that one of the reviewed studies (Gotlib & Cane, 1987) failed to find an effect from priming with negative words. The authors suggested that accessibility of negative constructs may not be susceptible to the influence of priming.

The second possible explanation provided by Williams, Mathews, and MacLeod (1996) implicated the influence of repetition of stimuli promoting Stroop effects. Their review of studies, which included two studies reviewed here (Gotlib & McCann, 1984; Gotlib & Cane, 1987) in which stimuli were not repeated, led them to their “provisional conclusion” that “repetition of items is not the critical factor causing the interference” (p. 7). In addition, one of the reviewed studies (Klieger & Cordner, 1990) directly compared repetition of stimuli with non-repetition and found no effect.

The last criticism of interpreting Stroop effects reported by Williams, Mathews, and MacLeod (1996) was that interference was caused by conscious attention to particular words. Although they reviewed studies that had found Stroop interference in subliminally presented material, only one of the reviewed studies included subliminally presented stimuli (Mogg et al., 1993). This study failed to find increased latency toward negative words among depressed participants.

Attentional processes, particularly visual attention, in depression have also been investigated using the dot-probe paradigm (Bradley, Mogg, Falla, & Hamilton, 1998; Bradley, Mogg, & Millar, 2000; Bradley et al., 1997; Gotlib et al., 2004; Hill & Dutton, 1989; MacLeod, Mathews, & Tata, 1986; Mathews et al., 1996; Mogg et al., 1995; Mogg, Millar, & Bradley, 2000) and its variants (Gotlib, McLachlan, & Katz, 1988; McCabe & Gotlib, 1995; Mogg, Mathews, May, & Grove, 1991). During the dot-probe task, emotion-related stimuli and neutral related stimuli are presented on two parts of the screen; either in the top half and bottom half (Bradley et al., 1998; Bradley et al., 1997; Hill & Dutton, 1989; MacLeod et al., 1986; Mathews et al., 1996; McCabe & Gotlib, 1995; Mogg et al., 1995), or in the left and right (Bradley et al., 2000; Gotlib et al., 1988;

Gotlib et al., 2004; Mogg et al., 1991; Mogg et al., 2000). A dot then appears in place of one of the stimuli and the participant must respond when the dot is perceived. It is assumed that when attention is on the stimuli in the same part of the screen preceding the dot probe that reaction times are faster than when attention is on stimuli in the opposite side of the screen. The dot probe paradigm has two advantages over the Stroop paradigm (MacLeod et al., 1986). First, it is thought to reduce potential response bias because participants respond to a neutral stimulus, the dot probe, rather than directly to affective related stimuli. Secondly, it measures attendance to as well as aversion from the same stimuli depending on where the subsequent dot appears.

The stimuli used in the dot probe task typically consists of affective words (Bradley et al., 1997; Gotlib et al., 1988; Hill & Dutton, 1989; MacLeod et al., 1986; Mathews et al., 1996; McCabe & Gotlib, 1995; Mogg et al., 1991; Mogg et al., 1995); however affective faces have also been used (Bradley et al., 1998; Bradley et al., 2000; Gotlib et al., 2004; Mogg et al., 2000). This is an important distinction, as there is evidence that processing of affective faces is superior to processing of affective words (Gotlib et al., 2004). When faces were used, they consisted of neutral, happy, sad, threatening and/or angry faces. When words were used they included physically and social threatening (MacLeod et al., 1986; Mathews et al., 1996), self-esteem threatening (Hill & Dutton, 1989), depression and anxiety related (Bradley et al., 1997; Mogg et al., 1995), or negative and positive words (Gotlib et al., 1988; McCabe & Gotlib, 1995; Mogg et al., 1991). Some of the studies matched positive and negative words on emotionality (Gotlib et al., 1988; McCabe & Gotlib, 1995; Mogg et al., 1991; Mogg et al., 1995). All studies also used neutral words which were matched with affective words for length and frequency.

Although there were some inconsistencies between studies, the majority of the studies found that depression was associated with increased vigilance for negative stimuli (Bradley et al., 1997; Gotlib et al., 2004; Mathews et al., 1996; Mogg et al., 1995) or avoidance of positive stimuli (Bradley et al., 1998; Bradley et al., 1997). Greater vigilance for negative stimuli was found in studies that included participants with major depressive disorder (Gotlib et al., 2004; Mathews et al., 1996; Mogg et al., 1995) and dysthymia (Mathews et al., 1996), as well as participants who were considered dysphoric (Bradley et al., 1997). In addition, one study found that induction of depressed mood was sufficient to provide a greater vigilance for depression-related words compared to induction of a neutral mood (Bradley et al., 1997). Mogg, Bradley, and Williams (1995) found that both anxious and depressed participants showed greater attention toward negative words than did controls when stimuli were presented supraliminally. However, when stimuli were presented subliminally, only anxious participants showed greater attention to negative words. Both of the studies found an avoidance of positive stimuli rather than vigilance for negative stimuli (Bradley et al., 1998; Bradley et al., 2000). In these studies, anxiety was the primary variable of interest, and dysphoria was simply measured. In addition, one of the studies (Bradley et al., 1998) used threatening and happy faces but did not include sad faces.

Several other studies found that depressed participants attended equally to all stimuli (positive, neutral, negative) whereas nondepressed participants avoided negative stimuli in the presence of positive or neutral stimuli (Gotlib et al., 1988; McCabe & Gotlib, 1995; Mogg et al., 1991). These studies used a variant of the dot-probe paradigm in which negative-neutral, positive-neutral and negative-positive word pairs were presented to the

left and right side of the screen. Red and green colored bars then appeared simultaneously in place of the stimuli. Participants were told that presentation of one bar slightly preceded presentation of the other and were asked to indicate which bar appeared first. McCabe and Gotlib (1995) suggested that depressed participants lack a protective bias to avert attention away from negative stimuli.

There were three studies that failed to find selective attention for negative stimuli (Hill & Dutton, 1989; MacLeod et al., 1986; Mogg et al., 2000). Analysis of these studies in conjunction with the others has led researchers to conclude that different attentional biases exist in depression and anxiety. An important aspect for identifying this difference is analysis of exposure times. When affective stimuli have been presented for 500 ms or less, vigilance for negative stimuli has not been observed among participants with depression (Bradley et al., 1997; MacLeod et al., 1986; Mathews et al., 1996; Mogg et al., 1995). Whereas anxious individuals show a negative bias upon minimal (500 ms or less) exposure to negative stimuli (Bradley et al., 1997; Mathews et al., 1996), depressed participants' response bias to words becomes distinctly apparent when exposure time is longer (Bradley et al., 1997; Mogg et al., 1995). The tendency to avoid happy faces as dysphoria increases even during short exposure intervals (500 ms) may be because affective pictures/images are easier to process than affective words (Gotlib et al., 2004). These findings have led researchers to conclude that anxiety and depression are related to impairment in attention at different stages. Whereas anxious individuals have a negative bias in initial orienting to stimuli, depressed individuals have impaired maintenance of attention, in which they have difficulty disengaging from negative stimuli (Bradley et al., 1997).

The last paradigm used by Wexler, Levenson, Warrenburgh, and Price (1994) to study emotion-related attention in depression was the dichotic listening task. In this task two words are simultaneously presented, one to each ear. The words are identical except for the first consonant, so the participant consciously hears only one word. In this particular study, one word was considered neutral whereas the other word was either positive or negative. All words were matched for frequency of use. The participant selected which word was heard from a list of four choices which included both words heard and two foils. Depressed participants heard fewer emotion-related words, both positive and negative, than controls. The authors suggested that depression may be related to an emotional hyposensitivity.

Deficits in emotional processing in depression are most consistently found in memory. For example, previous studies have found that depressed participants recall fewer pleasant words but do not differ in recall of unpleasant words (Blaney, 1986), which is consistent with their pattern of emotional responding. This finding was replicated by Sloan, Strauss, and Wisner (2001) in a study that measured emotional responsiveness and incidental recall of pleasant and unpleasant words. Review papers on memory bias (Dagleish & Watts, 1990; Matt et al., 1992) in depression consistently report a mood-congruent memory bias in depression. Mood-congruent memory bias refers to enhanced memory of material that is affectively similar to one's currently experienced affect. Accordingly, depressed people tend to recall negative material more than do nondepressed people. This effect has been demonstrated to a great extent with retrieval of autobiographical events and to a lesser extent with stimuli provided by the researcher. It has also been found to occur when depressed mood is induced, indicating

the retrieval processes are affected by mood-congruency effects. However, mood-congruency effects likely also occur during encoding, as there is especially enhanced recall for events that induced a negative mood state at that time.

Relation of Emotion Processing to General Processing

The emotion processing deficits observed in depression may reflect general cognitive deficits. A review of the literature on cognitive processing in depression by Hartlage, Alloy, Vázquez, and Dykman (1993) showed that depression has a negative impact on intellectual functioning, problem solving, general learning, effortful encoding, reading, and speed of performance, all of which diminish with severity of depression. A general pattern of deficits in effortful processes (as opposed to automatic processes) are found in people with depression, with deficits increasing with the degree of effortfulness of the task (Hartlage, Alloy, Vázquez, & Dykman, 1993) The differential impact of depression on effortful processing is likely due to the fact that effortful processing requires attention which relies on the limited capacity of cognitive resources, whereas automatic processing does not. There are two predominant explanations for this effect that can be differentiated by either its effect on capacity or its effect on attention. The cognitive-capacity-reduction hypothesis implicates the influence of depression on limited cognitive resources.

According to this theory, depression reduces the cognitive capacity, thereby reducing effortful cognitive processing. The narrowing-of-attentional-focus hypothesis implicates attention as the source of depression's impact on effortful processing. According to this theory, depression reduces one's ability to attend to neutral or positive stimuli, thereby decreasing effortful processing.

Difficulties with emotion response and perception and general regulation may contribute to the symptoms of depression. For example, the flattening of emotional responsiveness and diminished emotional perception may be related to common reports of feelings of emptiness reported by people with depression (Wexler, Levenson, Warrenburg, & Price, 1994) and is consistent with the experience of anhedonia during depression (Sloan et al., 1997).

Emotions in Depression

Emotional theorists have proposed a number of different organizational structures for emotion. These organizational structures range from the view that emotions vary along a single continuum to those that strictly see emotion as categorical. The leading continuous theory of emotion arranges various emotions along a continuous scale of positive to negative affect (Watson & Clark, 1992). There are a variety of categorical theories of emotion which identify the basic emotions from which complex emotions can be derived. Complex emotions are intensity variations of basic emotions. Some researchers further define complex emotions which include components of more than one basic emotion (Power, 2006). Researchers disagree on which emotions should be considered basic. For example, a list may include anger, sadness, surprise, disgust, happiness, anxiety, and contempt (Ekman, Friesen, & Ellsworth, 1972), whereas another may add guilt, interest, and shame (Izard, 1971). Attempts have been made to integrate the two concepts of dimensionality and categorical emotions. For example, Plutchik's model of emotion arranges the basic emotions around a circle and places complex emotions along a third dimension based on intensity (Plutchik, 1962; Plutchik, 1990).

While research on emotion and depression has largely focused on examination of the information processing of emotional stimuli, there is research on the presence and absence of particular emotions in depression. Empirical studies using confirmatory analyses to categorize emotions have shown support for the five basic emotions of sadness, anger, disgust, fear, and happiness (Power, 2006; Power & Tarsia, 2007), which are also acknowledged to be interrelated. Although not agreed upon by all researchers who have defined basic emotions, these five appear on almost all listings (Power, 2006) and have been supported by extensive linguistic analysis of emotion conducted by Johnson-Laird and Oatley (Johnson-Laird & Oatley, 1989). Most research on the experience of emotion in depression is focused on these emotions, particularly anger, as well as two disgust-related complex emotions, guilt and shame.

Studies on depression and emotion use self-report rating scales of emotional terms (Chaplin, 2006; Orth, Berking, & Burkhardt, 2006; Power & Tarsia, 2007; Scott, Ingram, & Shadel, 2003; Seidlitz, Fujita, & Duberstein, 2000; Thompson & Berenbaum, 2006) or questionnaires with emotion scales (Alexander, Brewin, Vearnals, Wolff, & Leff, 1999; Andrews, 1995; Ashby, Rice, & Martin, 2006; Brody, Haaga, Kirk, & Solomon, 1999; Brown, Schwartz, & Sweeney, 1978; Cheung, Gilbert, & Irons, 2004; Cox, Stabb, & Hulgus, 2000; Ghatavi, Nicolson, MacDonald, Osher, & Levitt, 2002; Gilbert, Gilbert, & Irons, 2004; Goldman & Haaga, 1995; Harder, Cutler, & Rockart, 1992; Jarrett & Weissenburger, 1990; Kashani, Dahlmeier, Borduin, & Soltys, 1995; Koh, Kim, & Park, 2002; Mook, Van der Ploeg, & Kleijn, 1990; Moreno, Fuhriman, & Selby, 1993; O'Connor, Berry, Weiss, & Gilbert, 2002; Pasquini, Picardi, Biondi, Gaetano, & Morosini, 2004; Pine, Cohen, & Brook, 2001; Riley, Treiber, & Woods, 1989; Tangney,

Wagner, & Gramzow, 1992; Troisi & D'Argenio, 2004; Winkler, Pjrek, & Kasper, 2005). Participants rate their experience at the present moment (Moreno et al., 1993), over the last day (Brown et al., 1978; Seidlitz et al., 2000), week (Power & Tarsia, 2007), month (Chaplin, 2006), year (Brody et al., 1999; Pine et al., 2001), 3 years (Brody et al., 1999), and/or in general (Alexander et al., 1999; Andrews, 1995; Ashby et al., 2006; Cheung et al., 2004; Cox et al., 2000; Ghatavi et al., 2002; Gilbert et al., 2004; Goldman & Haaga, 1995; Harder et al., 1992; Jarrett & Weissenburger, 1990; Kashani et al., 1995; Koh et al., 2002; Mook et al., 1990; Moreno et al., 1993; O'Connor et al., 2002; Orth et al., 2006; Power & Tarsia, 2007; Riley et al., 1989; Scott et al., 2003; Tangney et al., 1992; Troisi & D'Argenio, 2004; Winkler et al., 2005). Studies may include observer ratings in addition to self-reports (Brown et al., 1978; Chaplin, 2006; Seidlitz et al., 2000) or be solely based on professional ratings (Pasquini et al., 2004; Picardi, Morosini, Gaetano, Pasquini, & Biondi, 2004). Sometimes questionnaires are based on participants' emotional reactions to hypothetical (Jarrett & Weissenburger, 1990; Tangney et al., 1992; Thompson & Berenbaum, 2006) and real life dilemmas (Orth et al., 2006; Thompson & Berenbaum, 2006) or to a target person (Chaplin, 2006; Finman & Berkowitz, 1989). Lastly, four review papers have been written on anger and anger attacks in depression (Fava & Rosenbaum, 1999; Luutonen, 2007; Painuly, Sharan, & Mattoo, 2005; Winkler, Pjrek, & Kasper, 2006).

Sadness

Whereas sadness is a central aspect of depression, very little attention has been paid to sadness in depression (Seidlitz et al., 2000) outside of the reviewed literature on emotion processing. Research has shown that depressed participants report higher levels

of sadness than do control participants (Power & Tarsia, 2007; Seidlitz et al., 2000). Also, daily ratings of sadness correlate with daily depressive symptoms (Seidlitz et al., 2000). Interestingly, Seidlitz, Fujita, and Duberstein (2000) found that although depression was related to four emotions, the relationship of guilt, fear, and anger to depression when sadness was controlled for became insignificant. This finding lends support to the central role of sadness in depression.

Scott, Ingram, and Shadel (2003) compared two types of dysphoric participants: those who were predominately sad and those who were predominately hostile. They found differences in attributional profiles of these two groups of participants. Sad-dysphoric participants tended to make attributions that were more self-blaming, stable, and global. Unfortunately, there was disagreement among independent judges' characterization of the causal factors for the negative life event, thus making it unclear whether the attributions were realistic or biased.

Anger

The experience of anger and related phenomena such as hostility, aggression, and irritability has consistently been shown to be related to depression (Finman & Berkowitz, 1989; Luutonen, 2007; Painuly et al., 2005; Riley et al., 1989). For example, depressed participants tend to experience more anger than do controls (Power & Tarsia, 2007) and other patient populations (Koh et al., 2002; Picardi et al., 2004). In addition, the experience of increased irritability during depressive episodes have been reported in 75% of participants with depression (Winkler et al., 2005; Winkler et al., 2006). There is also support for a relationship between trait-anger and depression (Mook et al., 1990).

However, differences in anger based on which depression diagnosis a person has, major depression or dysthymia, have not been found (Koh et al., 2002).

The most prominent theoretical support for the relationship between anger and depression comes from psychodynamic theory. According to this theory, depression is anger toward inward. Accordingly, this theory predicts that people with depression have high levels of anger experience but tend to suppress their anger and display low levels of anger expression (Chaplin, 2006). Whereas evidence that a relationship exists between depression and anger is strong, evidence for this explanation has been inconsistent (Painuly et al., 2005). Support for the theory has been provided by Chaplin (2006), who had participants self-report on their anger experiences over the previous month. These participants then engaged in a frustrating task with a friend, and their expression of anger was observed. She found that higher levels of anger experience and lower levels of anger expression predicted depressive symptoms. These findings are particularly interesting in light of other findings that observation may produce higher levels of anger expression than do self reports that came from a study on interactions between depressed participants and their spouses (Goldman & Haaga, 1995). However, other studies' results show only partial support for the anger-turned-inward conceptualization. For example, one study Brody et al. (1999) found that recovered-depressed participants experienced more anger suppression and fear of anger than never-depressed participants, consistent with the anger-turned-inward theory. Furthermore, recovered-depressed participants showed higher levels of self-silencing in their intimate relationships. On the other hand, the two groups did not differ on anger expression, which is inconsistent with the theory. The theory also lacks support among children, as depressed children and psychiatric controls

did not differ in anger expression or anger suppression. However, this may have been because both samples were from an inpatient population (Kashani et al., 1995).

Researchers have begun to investigate how anger in depression develops. Family variables such as cohesion and adaptability have been potential targets because these variables are related to childhood depression as well as to expression of negative feelings. Contrary to the study's hypotheses, family variables of cohesion and adaptability did not mediate the relationship between depression and anger control among depressed child inpatients (Kashani et al., 1995). The authors speculated that depression may interfere with the child's ability to learn adaptive anger expression even if the general level of family functioning is good. Along similar lines, other investigators have targeted attachment style as a potential source of anger development (Troisi & D'Argenio, 2004). According to attachment theory, insecure attachment is related to difficulty with affect regulation. Troisi and D'Argenio (2004) predicted that insecure attachment would be related to increased anger. Consistent with their hypotheses, the sample of young men with depressive symptoms showed that anxious or avoidant (insecure) attachment styles predicted anger experience, even when controlling for level of depression. Anger in depression has also been explained by the evolutionary theory of depression, which indicates dysfunction of the flight/fight mechanisms (Gilbert et al., 2004). Dysfunction of these systems is based on findings that depressed people often feel trapped in their situations, which can be interpreted as disruption of the flight mechanism and depressed people also often report anger suppression, a disruption of the fight mechanism. In accordance with this theory, Gilbert, Gilbert, and Irons (2002) found that 88% of depressed participants reported a desire, but inability, to escape their current

circumstances. Also, fantasies of escape were common. Depressed participants also reported anger suppression at a high rate of 82%.

Another anger-related phenomenon that has been observed in depression is anger attacks (Fava & Rosenbaum, 1999; Painuly et al., 2005). An anger attack is similar to a panic attack and consists of palpitations, chest tightness, flush, vertigo, sweating, paresthesia, tremor, anxiety, and/or feelings of loss of control (Winkler et al., 2005; Winkler et al., 2006). Anger attacks occur more frequently in people with depression than in other patient populations such as those with anxiety disorders or somatoform disorders (Koh et al., 2002; Picardi et al., 2004). They also occur more frequently in recovered-depressed participants than in never-depressed participants, and seem to be related to fear of anger expression (Brody et al., 1999). Given that feeling out of control is an aspect of anger control, it is interesting that depressed children have been shown to have more difficulty controlling their anger cognitively than do psychiatric controls (Kashani et al., 1995). Perhaps this difficulty is a precursor to later inability to control anger in anger attacks.

Research on anger attacks and other increased anger experiences in some individuals with depression have led researchers to believe that anger may be a distinguishable feature of a subtype of depression. Picardi et al. (2004) reported three dimensions of unipolar depression: a depressive dimension, an anxious dimension, and an “activation” dimension. The activation depression consisted of anger, irritability, aggressiveness, hostility, and psychomotor activation. Depressed individuals experiencing high levels of anger, irritability, aggressiveness, and hostility may be experiencing a distinct subtype of depression sometimes referred to as activated depression (Pasquini et al., 2004). Anger

attacks are thought to be a product of serotonergic dysregulation, and people with this type of depression tend to respond well to treatment with SSRIs (Fava & Rosenbaum, 1999). Further support that angry depressed individuals may constitute a subgroup of depressed people is provided by studies that have found differences between participants with and without anger. For example, dysphoric-hostile participants have been shown to be other-blaming whereas dysphoric-sad participants were more self-blaming (Scott et al., 2003). These findings are particularly interesting because dysphoric-hostile participants made other-blaming attributions despite independent judges' view that the real negative life event was self induced.

Anger attacks have also been specifically considered to be a marker of another distinct presentation of depression, referred to as "male depressive syndrome," because anger attacks occur twice as frequently in depressed men compared to depressed women (Winkler et al., 2006). Based on other observations on the differences between depressed men and women, male depressive syndrome consists of anger, aggressiveness, irritability, and anger attacks as well as low impulse control, low stress tolerance, risk-taking, substance abuse, other-blame, and elevated suicide risk (Winkler et al., 2005; Winkler et al., 2006).

Although some studies on anger attacks have shown marked gender differences, other studies have failed to find consistent gender differences in anger experience and expression in depression. For example, Chaplin (2006) found that although females had more depressive symptoms than did males, levels of anger experience or expression did not differ by gender. Although differences in anger variables by gender have been observed in a study with children (Cox et al., 2000), in which girls scored higher than

boys on anger-control and anger-in, whereas boys scored higher on anger-out, regardless of age, girls were not more prone to depression than boys. However, this finding may be attributable to differences in ethnicity and emotion expression as the sample was predominately African American (41.6%) and these girls showed higher levels of self-esteem than girls from other racial groups.

Disgust

Whereas one study has shown that depressed individuals experience more disgust than did nondepressed individuals (Power & Tarsia, 2007), the majority of disgust-related depression research is on the experience of guilt and shame. The experience of excessive guilt is included in the diagnostic criteria for a major depressive episode (American Psychiatric Association, 1994); however, many have argued that shame is more relevant to psychopathology, including depression, than is guilt (Orth et al., 2006; Tangney et al., 1992). While guilt and shame are both considered self-conscious emotions, they are largely differentiated by the target of negative evaluation (Alexander et al., 1999; Orth et al., 2006). Shame refers to negative evaluation of the entire self, whereas guilt relates to negative evaluation of one's own particular aspects. Given this differentiation, shame, due to its global negative view, is considered to be more harmful to the core self. Although negative evaluation in guilt causes discomfort, the self is able to remain intact. Guilt and shame are also differentiated by their experiences. Shame promotes feelings of worthlessness and a desire to hide from others, whereas guilt promotes a sense of remorse and a desire for remedial action (Thompson & Berenbaum, 2006). While the emphasis on shame over guilt in depression has been theoretically supported and is largely based on psychodynamic theory (Lewis, 1986), empirical evidence has been

limited (Tangney et al., 1992). Orth, Berking, and Buckhardt's (2006) review of studies found that typically the relationship between depression and guilt disappears when shame is controlled for. However, there are many inconsistencies among studies.

One of the earliest studies on guilt in depression (Jarrett & Weissenburger, 1990) found that depressed outpatients reported more guilt in guilt-provoking situations than did nondepressed participants. Also, guilt increased as depression scores increased across all participants, but guilt showed no relation to other severity indicators such as length of illness, age of onset, or number of lifetime episodes. A family history of depression was associated with increased reports of guilt. Unfortunately, shame was not measured in this study, and the authors stated that it was unclear if the scale they used measured guilt or self-reproach. Although Siedlitz, Fujita, and Duberstein (2000) found that guilt was related to depression severity, their results were based on participants' ratings of emotion terms, and it is unlikely that participants were fully aware of the psychological definition of guilt. Furthermore, the relationship between guilt and depression disappeared when sadness was controlled for.

Based on these studies, appropriate measurement that shows divergent validity of shame and guilt seems to be a necessary facet of studies on these emotions in depression; this has generally been lacking (Orth et al., 2006). For example, Orth et al. (2006) criticized the measure used in a study that found that guilt, but not shame, was related to depression severity (Alexander et al., 1999). Alexander et al. (1999) explained that their results were due to their sample consisting entirely of moderately to severely depressed participants which caused a ceiling effect for shame. These results indicated that shame may correlate with depressive symptoms in non-clinical or sub-clinical populations but

guilt is useful in differentiating among people with higher levels of depression. This is potentially an important point to consider because most studies on shame and guilt in depression have only sampled from student (Ashby et al., 2006; Cheung et al., 2004; Harder et al., 1992; Seidlitz et al., 2000; Tangney et al., 1992; Thompson & Berenbaum, 2006) or other non-clinical populations (Orth et al., 2006). In comparison, few studies have used patient populations consisting of depressed inpatients (O'Connor et al., 2002), depressed outpatients (Ghatavi et al., 2002; Jarrett & Weissenburger, 1990), or people at risk for depression (Andrews, 1995).

Researchers have suggested that fusion of shame and guilt, referred to as “insoluble guilt,” has been observed in clinical populations (Alexander et al., 1999) and may account for studies that have found an association between guilt and depression. For example, depressed participants have shown increased survivor guilt and omnipotent responsibility compared to controls (O'Connor et al., 2002). Survivor guilt refers to guilt resulting from surviving the death of a loved one or from being better off than others. It is the unreasonable belief that by pursuing normal goals one is harming others. Omnipotent responsibility refers to excessive feelings of responsibility toward others. These definitions indicate the presence of a shame component, because shame infers a violation of social standards that the self is not meeting, whereas guilt refers solely to violation of moral standards and the self remains intact (Orth et al., 2006). Interestingly, depressed participants in this study also showed elevated empathic distress. The authors speculated that people with depression may not act empathically because they define themselves as being harmful to others, but may actually have heightened empathy.

Although there is some support that guilt found in depression may be a fused shame/guilt, at least one study has directly examined “shame-free” guilt and found no difference in prominence of shame and shame-free-guilt in depression (Ghatavi et al., 2002). This study also found that people with depression, both currently and in the past, had more state and trait guilt than did healthy controls and participants with chronic cardiac illness. This indicates that guilt in depression is not merely due to the presence of a serious, chronic illness. Furthermore, trait depression did not differentiate participants who were currently depressed from those that had a history of depression but were currently euthymic. However, these two groups did differ on state-guilt, with currently depressed participants reporting more state-guilt. These findings led authors to conclude that guilt is both a stable and fluctuating characteristic of depression.

Whereas the role of guilt in depression has been contended, research relating shame to depression has been more consistent. Quite a few studies have shown that shame, but not guilt, is related to depression (Harder et al., 1992; Orth et al., 2006; Tangney et al., 1992; Thompson & Berenbaum, 2006), or supported the relationship between shame and depression without examining guilt (Andrews, 1995; Ashby et al., 2006; Cheung et al., 2004). Both currently and previously depressed participants have reported more shame in response to scenarios (Thompson & Berenbaum, 2006). External shame, thinking others look down on you, has also been associated with depression (Cheung et al., 2004). Shame has been shown to mediate partially the relationship between perfectionism and depression in both men and women (Ashby et al., 2006). Also, bodily shame was found to mediate the relationship between early abuse and depression (Andrews, 1995).

The relationship between shame and depression is likely complex (Tangney et al., 1992). Studies have shown that shame and depression may be mediated by rumination (Cheung et al., 2004; Orth et al., 2006). However, shame also uniquely contributed to depression aside from its relation to rumination (Cheung et al., 2004). The mediation of shame and depression by rumination appears to be influenced by gender. Cheung, Gilbert, and Irons (2004) found that among people with low levels of shame, women ruminated more, whereas at high levels of shame, men ruminated more. Gender differences in the relationship between shame and depression are supported by Ashby, Rice, and Martin's (2006) finding of an apparent direct relationship between shame and depression in men but shame in women seemed to contribute to low self-esteem and feelings of inadequacy, which may increase vulnerability to depression (Ashby et al., 2006).

Researchers have been interested in the direction of the relationship between shame and depression. Using latent variable modeling, Orth, Berking, and Buckhardt (2006) found statistical support for shame causing rumination and depression more so than the inverse relationship. However, only one longitudinal study has been conducted (Andrews, 1995). Whereas this study supported the causal role of shame toward depression, it was criticized because they did not test for reverse causality (Orth et al., 2006). Researchers have proposed mechanisms by which shame may contribute to psychopathology in general (Tangney et al., 1992). Shame may cause disruptions in self-functioning and increase feelings of hopelessness, concepts which are relevant to depression. Shame may compound during psychopathology as patients experience shame about their psychological symptoms. Lastly, shame and psychopathology may share

common etiologies. Particular to depression, shame may activate schemas of the flawed-self within an individual and may also lead to withdrawals thereby increasing depression (Thompson & Berenbaum, 2006). Shame has also been associated with attributional styles which include global negative self evaluation and stable attributions of negative outcomes (Alexander et al., 1999) which may contribute to psychopathology, including depression (Tangney et al., 1992). There is still much work to be done to unravel discrepancies in the existing literature and for understanding the intricacies of depression's relation to shame and guilt. This will likely have important implications for understanding depression and applying appropriate treatments (Epstein, 2001).

Fear

Despite the high comorbidity of depression and anxiety disorders (American Psychiatric Association, 1994), the experience of fear in depression has received little attention in research. Depressed participants report experiencing more fear than do nondepressed participants (Power & Tarsia, 2007). Whereas overall fear ratings are positively correlated with overall depressive symptoms, daily fear levels are not related to daily depressive symptoms (Seidlitz et al., 2000). However, in this study fear covaried with other negative emotions, and its relationship to depression became insignificant when sadness was controlled for.

Other fear-related research in depression has not focused on particular experiences of fear, but rather has attempted to identify the nature of fear in depression. For example, fear of negative evaluations and fear of envy are associated with depression (O'Connor et al., 2002). Furthermore, adolescent fear of the dark, as well as overall level of fear, have been shown to predict adult major depression (Pine et al., 2001).

Happiness

Although anhedonia, impairment in the ability to experience positive affect or pleasure, is a core characteristic of depression (American Psychiatric Association, 1994), there is limited research on happiness and related emotions in depression. Depressed patients have reported experiencing less joy and interest than do control participants (Brown et al., 1978). Interestingly, on another measure in this study of inpatients, depressed participants reported experiencing more pleasure than did control participants even though observer reports found that depressed participants engaged in fewer pleasurable activities and expressed less pleasure. Disconnection between self-report and observed behavior was also found in a study with adolescents (Chaplin, 2006). In this study, depression was associated with low reported levels of happiness but high levels of observed happiness while engaging in a frustrating task. In addition, this study found that happiness was more related to depression than anger. The authors speculated that depressed adolescents may feel they need to be cheerful and tend to inhibit, rather than regulate, negative affect. This process could limit one's sense of autonomy, thereby contributing to depression.

Description of Feelings

Studies that have examined the experience of emotions in depression have typically focused on how frequently particular feelings are experienced. These studies typically have one of several purposes. Some of the studies seek to explain why a particular feeling occurs more often than others through psychological theories such as psychodynamic theory, attachment theory, or attributional theory. Other studies attempt to associate the experience of feelings with other psychological phenomena such as

rumination. The feeling's role in the development or maintenance of depression has also been the target of study as well as attempts to classify subtypes of depression based on particular feelings. Lastly, some studies have been interested in determining the types of events that will elicit particular feelings.

Whereas these purposes explain some aspects of feelings in depression, none of them have sought to accurately describe emotion experience in depression. Characteristics of feelings, such as their intensity, location, or accompanying physical sensations are not mentioned in the literature on emotions in depression. It seems that there is an assumption that everyone experiences a particular feeling in the same way. Unfortunately, this assumption has not been empirically supported by literature on feelings in depression. The lack of an understanding of the actual experience of emotion in depression leaves a significant void in our knowledge of this important condition.

Experience-Based Studies of Depression

Research that has focused on examining experience during episodes of depression has provided some insight into the emotion experience of people with depression. These studies range in method from personal accounts to systematic investigation and attempt to unravel the complexity of emotional experience during depression. Whereas some of these types of studies were directly aimed at investigating emotion experience in depression (Robbins & Tanck, 1997), the majority were not aimed at emotion experience.

Memoirs and a Psychobiographical Account

Many memoirs have been written about personal struggles with depression. These emotional portraits provide rich accounts of living with depression. They include *An Unquiet Mind: A Memoir of Mood and Madness* (Jamison, 2005), *Darkness Visible: A*

Memoir of Madness (Styron, 1990), *The Noonday Demons: An Atlas of Depression* (Solomon, 2001), *The Beast: A Journey through Depression* (Thompson, 1995), *Undercurrents: A Life Beneath the Surface* (Manning, 1994), and *Willow Weep for Me: A Black Woman's Journey through Depression* (Danquah, 1998). In addition, journalists and writers have pieced together personal accounts of depression in writing *Unholy Ghost: Writers on Depression* (Casey, 2001), *Speaking of Sadness: Depression, Disconnection, and the Meaning of Illness* (Karp, 1996), *On the Edge of Darkness: America's Most Celebrated Actors, Journalists, and Politicians Chronicle Their Most Arduous Journey* (Cronkite, 1994), and *The Deepest Blue: How Women Face and Overcome Depression* (Dockett & McKay, 2001). Along similar lines, a psychobiographical account of depression was developed after the family of a woman who had committed suicide donated her personal memoir and letters to a university (Kramer, 2002). Analysis of these materials uncovered a personal history of unresolved grief, disruptions in her sense of self, and frequent experiences of fatigue and a sense of futility. Other emotions that she frequently experienced were worthlessness, despair, loneliness, alienation, emptiness, and a sense of failure. There were also periods of empowerment and confidence and an enduring undercurrent of hope. Lastly, she recorded the contrast between her inner turmoil and her outward appearance.

Diary Studies

Diary studies of depression consist of structured questionnaires which are completed at the end of the day for a span of 7 (Hopko, Armento, Cantu, Chambers, & Lejuez, 2003), 10 (Robbins & Tanck, 1984; Robbins & Tanck, 1987; Robbins & Tanck, 1997), or 35 days (Hankin, Fraley, & Abela, 2005). The diaries include ratings of emotion

adjectives (Hopko et al., 2003; Robbins & Tanck, 1997), ratings of depressive symptoms (Hankin et al., 2005), attributional ratings for a daily negative event (Hankin et al., 2005), recording and ratings of daily activities (Hopko et al., 2003), and ratings of mood during different periods of the day (Robbins & Tanck, 1987). In addition, several of the studies also used a questionnaire with items that correspond to daily experience of physical complaints, interpersonal stress, depression-isolation, and positive social relationships (Robbins & Tanck, 1984; Robbins & Tanck, 1987; Robbins & Tanck, 1997). All diary studies of depression have been conducted with students, and only two of the studies (Hopko et al., 2003; Robbins & Tanck, 1987) reported how many of the students scored above the cut off for depression. One of the study's sample of 37 students included 14 mildly depressed participants (Hopko et al., 2003) and the other study's sample of 105 students consisted of 16% mildly depressed, 6% moderately depressed, and 2% severely depressed participants (Robbins & Tanck, 1987).

Only one study's primary findings were related to emotion (Robbins & Tanck, 1997). This study found that daily depression correlated with daily felt anger. However, anger was also related to increased tension on these days, indicating an overall dysphoric reaction when anger is experienced that may not be particular to depression. There was less support that anger is generally experienced more by people who experience depression. Only one index of depression, depression isolation, which was derived by diary questions, correlated with total number of days in which anger was felt. Tendencies to inhibit anger and increases in self-directed anger were found to be enduring characteristics of depression. In addition, daily experience of self-directed anger corresponded with daily reports of tension.

The other diary studies reported secondary findings related to emotion. For example, Robbins and Tanck (1984) found that depression scores correlated with self-reports of feeling trapped, lonely, depressed, tense, and defeated, as well as with decreased pleasure in social interactions. Other self-reported experiences that also correlated with depression scores included nausea, dizziness, weakness, having to defend oneself, being given a hard time, having unresolved problems, and seeking help. The authors noted that depressed persons may have difficulty relating to others and find themselves in confrontational social situations. Although they may want to interact with others, they may react defensively. Lastly, this study highlighted similarities in the depressive experience between males and females. Similar findings were found in another study (Hopko et al., 2003) in which positive affect was negatively correlated with depression scores whereas negative affect showed a positive correlation. In addition, depressed participants had higher negative affect scores than nondepressed participants. These findings were related to the primary purpose of this study, which was to investigate the influence of engagement in pleasurable activities. Depressed participants found daily activities less rewarding than did nondepressed participants.

Hankin, Fraley, and Abela (2005) suggested that a depressive attributional style with stressful events results in the experience of “strong and enduring emotions” (p. 673), however this was not directly tested. However, they did find that daily depressive symptoms, including feelings of sadness, were predicted by depressogenic cognitive style, neuroticism, and daily negative cognitions about stressors. Depressogenic cognitive style consisted of stable and global attributions for negative events and a tendency to believe that negative events will lead to other negative events. This pattern

of reacting to negative events also included negative self-evaluation in response to the negative event.

The final diary-based study of depression investigated how depressed mood fluctuates throughout the day (Robbins & Tanck, 1987). This study found that an increasingly depressed mood through the course of the day was the most common diurnal pattern of depressed mood. This pattern consisted of the least depressed mood in the morning and the most depressed mood in the evening. Furthermore, changes in depressed mood were more common than consistent depressed mood throughout the day. This differed from previous studies with hospitalized patients, indicating that diurnal patterns may be useful for differentiating depression severities. Further support for the uniqueness of consistent depressed mood throughout the day was offered by its relationship to frequency (number of days depressed mood is experienced) and intensity of the depressed mood.

Participants that experienced a consistent depressed mood throughout the day also had more physical complaints and experienced less pleasure in social relationships, even though they spent as much time with other people as participants with other diurnal patterns of depressed mood (e.g., depressed more in the evening than the morning).

Interviews

Interview studies have been conducted to explore qualitatively the experience of depression. Both semi-structured (Heifner, 1997; Lewis, 1995; Scattolon & Stoppard, 1999) and open-ended in-depth (Daughtry & Kunkel, 1993; Jackson, 1998) interviews have been conducted. The transcripts of these interviews have been analyzed using either combination of grounded theory and discourse analysis (Heifner, 1997; Lewis, 1995; Scattolon & Stoppard, 1999; Schreiber, 2001) or a similar phenomenological approach

(Daughtry & Kunkel, 1993; Jackson, 1998) in which the participants' statements were distilled into meaning units and analyzed for common themes. Concept mapping was also used in one study (Daughtry & Kunkel, 1993) in which the meaning units derived from interviews were used to create 81 qualitative descriptors of depression which were then organized by participants. Interviews have been conducted with a variety of populations including women (Lewis, 1995; Scattolon & Stoppard, 1999; Schreiber, 2001), men (Heifner, 1997; Lewis, 1995), gifted adolescents (Jackson, 1998), and college students (Daughtry & Kunkel, 1993). They have included participants that defined themselves as depressed (Jackson, 1998; Lewis, 1995; Scattolon & Stoppard, 1999) and/or were diagnosed with depression (Heifner, 1997; Lewis, 1995). It should be noted that one study specifically mentioned that the experience of depression was highly variable from one participant to the next (Lewis, 1995).

Whereas these studies provided rich accounts of personal experience and interpretations of depression, the primary purpose of these studies was to identify themes of depression rather than to describe emotional experience. However, knowledge of emotion in depression could be derived from some of the findings. For example, the concept map created by Daughtry and Kunkel (1993) was largely organized around emotion-related clusters. The clusters that were identified were: (1) Helpless/Hopeless (e.g., sad, incomplete, empty); (2) Burdened (e.g., loss of motivation, scared of future); (3) Internal Chaos (e.g., confused, betrayed, guilty); (4) Estrangement (e.g., alone, worthless, outcast); (5) Personal Inefficacy (e.g., self-pity, unable to compete, ugly); (6) Vegetative (e.g., tired, bored, stupid); and (7) Interpersonally Hostile (e.g., frustrated, bitter, irritable).

Although understanding depression in women has been the primary focus of some studies (Scattolon & Stoppard, 1999; Schreiber, 2001), and depression in men (Heifner, 1997) has been the focus of another, these studies showed remarkable similarities in the experience of depression in men and women. These studies found that depression was related to feeling that one had to live up to his/her respective gender roles and societal standards. Their perceived inability to live up to such expectations, as well as frequent experiences of emotional violence (Schreiber, 2001), seem to contribute to estrangement from one's true self, resulting in feelings of loneliness, inadequacy, abandonment, and isolation (Heifner, 1997; Jackson, 1998; Lewis, 1995; Scattolon & Stoppard, 1999; Schreiber, 2001). Other emotions that were expressed by participants included panic, fear, powerlessness, and emotionality, a term which referred to crying spells (Heifner, 1997; Lewis, 1995; Scattolon & Stoppard, 1999). More specific to men are Heifner's (1997) findings that men fear losing themselves through the process of therapy and that they are comfortable expressing anger, but not other emotions.

Communication and meaning were frequently discussed themes across studies (Heifner, 1997; Lewis, 1995; Scattolon & Stoppard, 1999; Schreiber, 2001). Participants described an inability to communicate depression and feeling pressure to not express their thoughts and emotions (Heifner, 1997; Jackson, 1998; Lewis, 1995). For some participants coping with depression meant ignoring or distracting themselves from their distressing emotional experiences (Scattolon & Stoppard, 1999). However, they also described a sense of relief and necessity of expressing their depressive experiences and emotion with others, even though doing so was painful or uncomfortable at the time (Heifner, 1997; Jackson, 1998; Lewis, 1995; Scattolon & Stoppard, 1999). Participants

also described a drive to find meaning for and explanations of their depression (Jackson, 1998; Lewis, 1995; Schreiber, 2001).

Momentary Sampling

Think aloud and thought sampling. Two methods of accessing the experience of depression are thought sampling and the think aloud method. Thought sampling studies of depression have asked participants to report their thoughts at the time of an external signal (Josephson, Rose, & Singer, 2000) or when they notice a change in their mood (Blackburn & Eunson, 1989; Kumari & Blackburn, 1992). During think aloud studies, participants speak their thoughts aloud as they occur. One variant of the think aloud method is articulated thoughts in simulated situations (ATSS; Davison, Robins, & Johnson, 1983; Davison, Navarre, & Vogel, 1995; White, Davison, Haaga, & White, 1992). ATSS involves participants reporting their thoughts as they occur under controlled circumstances that involve the participant's imagining living through a researcher-created scenario (Davison et al., 1983; Davison et al., 1995). Think aloud and thought sampling of depression has been conducted during an interpersonal problem-solving task (Mayo & Tanaka-Matsumi, 1996), while retrieving autobiographical memories (Barnhofer, de Jong-Meyer, Kleinpaß, & Nikesch, 2002), following performance feedback (Conway, Howell, & Giannopoulos, 1991), after presentation of affective stimuli (Josephson et al., 2000; White et al., 1992), or in naturalistic settings (Blackburn & Eunson, 1989; Kumari & Blackburn, 1992). Some studies have used psychiatric patients with depression (Barnhofer et al., 2002; Blackburn & Eunson, 1989; White et al., 1992) while others have used student samples that included dysphoric participants (Conway et al., 1991; Josephson et al., 2000; Mayo & Tanaka-Matsumi,

1996). Although primarily focused on thoughts in depression, emotion-related findings can be gleaned from these studies.

White, Davison, and Haaga (1992) presented participants with scenarios that were positive, negative and neutral and found that cognitive biases (arbitrary inferences, selective abstractions, overgeneralizations, magnifications, personalizations, and dichotomous thinking) following negative scenarios were exhibited more by depressed than by nondepressed participants. Although cognitive biases have been proposed to influence affective experience (Beck et al., 1979), this study did not directly examine reports of emotional experience. Another study (Josephson et al., 2000) failed to find a difference in affectivity of thoughts (positive, negative, or neutral) following sad film clips compared to neutral film clips. However, this study found that depressed participants' thoughts were more negative than those of controls regardless of the stimuli.

Depression may be related to other cognitive styles that potentially interfere with effective functioning. For example, during interpersonal problem solving, dysphoric participants used more emotion-focused coping, including disengagement, and less problem-focused coping self-statements (Mayo & Tanaka-Matsumi, 1996). They also generated more emotion-focused solutions and less problem-focused solutions than did non-dysphoric participants. Dysphoric participants also reported feeling that they did not have the power to solve the conflict, which may have promoted engagement in emotion-focused, rather than problem-focused, coping. Emotion-focused strategies are typically less effective than other strategies for problem solving, so it is not surprising that dysphoric participants viewed themselves as less effective problem solvers than non-dysphoric participants.

Another potential cognitive impairment related to depression is an increase in negative unwanted thoughts. Conway, Howell, and Giannopoulos (1991) found that dysphoric participants had more intrusive thoughts than did non-dysphoric participants following failure feedback, but fewer intrusive thoughts following success feedback. This finding supported the mood-congruent hypothesis in which depressed individuals are thought to have increased accessibility to negative material and use negative distracters; therefore they have more difficulty suppressing negative material than positive material. However, this study also found that during the final minute of the five minute think aloud task, dysphoric participants had more intrusions than did non-dysphoric participants regardless of whether they received failure feedback, success feedback, or were told not to think of the neutral target “white bear.” This finding supported the cognitive effort-hypothesis, in which people with depression are thought to have a limited ability to suppress unwanted thoughts. The authors concluded that “their unwanted thoughts are likely to be unpleasant and consequently worsen their mood” (p. 164), but the relationship between negative thoughts and transient mood was not directly examined.

The think aloud task has also uncovered emotion-related memory findings. During the think aloud task participants were provided positive (happy, safe) and negative (sad, lonely) cue words and instructed to remember autobiographical events (Barnhofer et al., 2002). Depressed participants recalled more categorical memories and less specific memories than did control participants. This type of retrieval is likely related to ruminative processes and is explained by the theory that depressed persons attempt to avoid specific negative autobiographical memories. To avoid specific memories, they

overgeneralize and retrieve categorical memories. Although an interaction of valence (positive, negative) x group (depressed, nondepressed) was found, further analyses were based on memory type and did not include reports of how depressed and nondepressed participants' retrieval were influenced by cue valence.

Thought sampling has shed some light on the thoughts of depressed individuals during their day to day lives. Nondepressed (Kumari & Blackburn, 1992) and depressed (Blackburn & Eunson, 1989) participants completed the Daily Record of Dysfunctional Thoughts form when their mood changed over a period of 2 weeks. The recorded thoughts were then rated on five dimensions, including emotions. However, the information on emotional experience was limited because all reported emotions were distilled into 3 categories; depression, anxiety, and anger. The accuracy of their classification of emotions is also questionable. For example, 'sick in the stomach' was categorized as a depressed emotion. They found that depressed participants reported experiencing depression and anxiety most frequently, whereas nondepressed participants' most frequently experienced emotions were anxiety and anger. In addition, depressed participants indicated higher degrees of belief (95.5%) in automatic thoughts than did nondepressed participants (66.2%). Lastly, depressed participants endorsed themes of self-depreciation, hopelessness, rejection, and illness whereas nondepressed participants endorsed hostile world. This finding may be further indication of differences in internal versus external attributional styles between depressed and nondepressed participants, respectively.

Experience sampling. Some researchers have used momentary sampling to investigate the experience of depression. The most frequently used method of

momentary experience sampling is the Experience Sampling Method (Csikszentmihalyi & Larson, 1987; deVries, 1992). During the ESM procedure, participants wear a device (wristwatch or pager) that emits a signal at quasi-random intervals as they engage in their normal daily lives. The signal indicates to the participant to report on his/her experience at that moment by completing an experience sampling form. Typically participants report on their current location, current context, and perceptions of that context. They may also answer questions or complete rating scales based upon the focus of the particular study. This method has several advantages over other experience-based studies in that it simultaneously promotes ecological validity, reduces potential memory bias, and allows for both idiographic and nomothetic data analysis, and is therefore useful for capturing variability within individuals and observing changes over time (Barge-Schaapveld, Nicolson, van der Hoop, & DeVries, 1995; Husky, Mazure, Maciejewski, & Swendsen, 2007; Swendsen, 1998). These characteristics of ESM may be particularly advantageous for the study of depression. Ecologically valid methods may provide new insights into phenomena, such as depression, that have been extensively studied using other methods (Peeters et al., 2006). Depression has also been directly related to specific memory bias which ambulatory methods such as ESM likely reduce (Barge-Schaapveld et al., 1995). Lastly, ESM is more likely to capture minor and/or transient symptoms of depression that questionnaire-based methods miss (Barge-Schaapveld et al., 1995). Overall, ESM has demonstrated its validity and reliability in the investigation of naturally occurring mood, behaviors, and cognitions (Peeters, Nicolson, Berkhof, Delespaul, & deVries, 2003; Swendsen, 1997).

ESM studies on depression have varied slightly in methodology. For example, some studies have signaled participants with a wristwatch (Barge-Schaapveld et al., 1995; Barge-Schaapveld et al., 1999; Myin-Germeys et al., 2003; Peeters, Nicholson, & Berkhof, 2003a; Peeters, Nicolson et al., 2003; Peeters et al., 2006; Silk, Steinberg, & Morris, 2003; Swendsen & Compagnone, 2000; Swendsen, 1998) whereas others have used a pager (Mokros, 1993; Swendsen, 1997) or handheld computer (Husky et al., 2007). Some studies have signaled participants 10 times per day for six consecutive days (Barge-Schaapveld et al., 1995; Barge-Schaapveld et al., 1999; Myin-Germeys et al., 2003; Peeters, Nicholson, & Berkhof, 2003a; Peeters, Nicolson et al., 2003; Peeters et al., 2006) or five times per day for seven consecutive days (Husky et al., 2007; Silk et al., 2003; Swendsen & Compagnone, 2000; Swendsen, 1997; Swendsen, 1998), although one study used eight signals per day (Mokros, 1993). Whereas one study had signals presented randomly throughout the entire day (Myin-Germeys et al., 2003), most studies quasi-randomly signal participants once during intervals of 90 minutes (Peeters, Nicholson, & Berkhof, 2003b; Peeters, Nicolson et al., 2003; Peeters et al., 2006), two hours (Mokros, 1993), or three hours (Husky et al., 2007; Swendsen & Compagnone, 2000; Swendsen, 1997; Swendsen, 1998). ESM studies of depression have been used to study adults with depression (Barge-Schaapveld et al., 1995; Barge-Schaapveld et al., 1999; Mokros, 1993; Myin-Germeys et al., 2003; Peeters, Nicholson, & Berkhof, 2003a; Peeters, Nicolson et al., 2003; Peeters et al., 2006) or have observed mood fluctuation in non-clinical student samples (Husky et al., 2007; Silk et al., 2003; Swendsen & Compagnone, 2000; Swendsen, 1997; Swendsen, 1998). Studies on depression have focused on participants who are receiving psychopharmacological treatment (Barge-

Schaapveld et al., 1995) and those who are not (Peeters et al., 2006). ESM has also been conducted with both clinical (Mokros, 1993) and non-clinical (Silk et al., 2003) adolescent samples. ESM studies typically use multilevel regression analysis (Barge-Schaapveld et al., 1995; Myin-Germeys et al., 2003; Peeters, Nicholson, & Berkhof, 2003a; Peeters, Nicolson et al., 2003; Peeters et al., 2006) and/or hierarchical linear modeling (Husky et al., 2007; Peeters, Nicolson et al., 2003; Silk et al., 2003; Swendsen & Compagnone, 2000; Swendsen, 1997; Swendsen, 1998) to analyze both within-subject and between-subject effects simultaneously.

Mood states have been compared between depressed and nondepressed individuals (Barge-Schaapveld et al., 1995; Barge-Schaapveld et al., 1999; Mokros, 1993; Myin-Germeys et al., 2003; Peeters, Nicholson, & Berkhof et al., 2003b; Peeters, Nicolson et al., 2003; Peeters et al., 2006) and between antidepressant responders and non-responders (Barge-Schaapveld et al., 1995) using ESM. These studies included current mood adjectives that were rated on a 7-point scale (1=*not at all*, 7=*very*) on the experience sampling form completed by participants at each signaled moment. Mood adjectives that these studies included in their various definitions of positive affect included energetic, enthusiastic, happy, cheerful, talkative, strong, satisfied, alert, relaxed, calm, and self assured. Negative affect included hostile, depressed, down, lonely, insecure, anxious, irritated, restless, tense, guilty, irritable, angry, easily distracted, harried, and agitated. The analysis of one of the studies (Mokros, 1993) was solely based on the presence or absence of sadness, irritability, and anhedonia which was derived from the participants' momentary ratings.

Momentary sampling of general mood states has indicated that depressed participants exhibit higher levels of negative affect and lower levels of positive affect than do healthy controls (Barge-Schaapveld et al., 1999; Myin-Germeys et al., 2003; Peeters et al., 2006) and other patient populations in remission (Myin-Germeys et al., 2003). Depressed participants also showed less enjoyment of their current activities than nondepressed participants (Barge-Schaapveld et al., 1999). Similarly, participants that responded to antidepressant medication showed increases in positive affect and decreases in negative affect during all types of activities (chores, active leisure, and social) except for passive leisure compared to non-responders (Barge-Schaapveld et al., 1995).

Depressed participants showed greater moment-to-moment variation in negative affect than did healthy controls, which was even more pronounced among severely depressed participants (Peeters et al., 2006). These depressed participants also had diurnal patterns of negative and positive affect that differed from healthy participants. The typical diurnal pattern of mood among participants with depression was depression-related mood being most prevalent early in the day and decreasing through the day. This is the reverse of the diurnal pattern found in the diary study by Robbins and Tanck (1987). This is likely due to differences in severity of depression of participants in these two studies. Decreasing levels of depression throughout the day seem to be related to severe depression, whereas increasing levels throughout the day are associated with less severe depression. Furthermore, the pattern of decreasing depression throughout the day is consistent with diagnostic criteria associated with melancholic/endogenous type depression (American Psychiatric Association, 1994). However, another ESM study questions the accuracy of information reported in a diagnostic clinical interview as actual

experience. Mokros (1999) found that different profiles emerged from ESM data compared to a clinical interview. For example, ESM data revealed that three of the seven depressed adolescents did not report more sadness than healthy adolescents and one depressed adolescent's level of sadness was less than half of average sadness in healthy participants. Both irritability and anhedonia were also found less often in the ESM reports than were reported in clinical interviews for some depressed adolescents. Overall agreement between presence of symptoms from the clinical interview and ESM reports were 57% for sadness, 29% for irritability, and 43% for anhedonia.

Momentary sampling studies of mood states in response to negative events, which are reported as frequently by nondepressed participants as depressed participants (Peeters, Nicolson et al., 2003), have been somewhat inconsistent. For example, one study (Myin-Germeys et al., 2003) revealed greater increases in negative affect following stressful events in depressed participants than nondepressed participants. Another study (Peeters, Nicolson et al., 2003) found that depressed participants responded to negative events with less positive affect and less negative affect, an overall blunted emotional response. However, this study also found that negative affect lasted longer after the event in depressed participants. Additionally, negative affect in response to negative events was associated with a family history of depression and a longer duration of the current depressive episode. This was the only study that also examined depressed individuals' responses to positive events. Interestingly, depressed participants showed greater increases in positive affect and greater decreases in negative affect than healthy controls following positive events. However, depressed participants reported experiencing fewer positive events.

Reactions to negative events are largely tied to the ability to regulate one's emotions. One ESM study (Silk et al., 2003) directly examined emotion regulation in depressed adolescents and found that both internalizing (e.g., depression) and externalizing disorders were related to problems with emotional regulation. In particular, depression was associated with two ineffective emotion regulation strategies: disengagement (e.g., denial) and involuntary engagement (e.g., rumination).

ESM studies that included saliva sampling at times of experience sampling reports have also found that nondepressed participants, but not depressed participants, react to negative events with increased cortisol levels (Barge-Schaapveld et al., 1995; Peeters, Nicholson, & Berkhof, 2003a). This indicates that depressed persons have blunted responsiveness from the neuroendocrine system that responds to stress (i.e., hypothalamic-pituitary-adrenocortical axis) to negative events.

Some ESM studies' findings are relevant to overall quality of life and its associations in depression. Depressed participants have been found to have lower momentary ratings of quality of life than have nondepressed participants (Barge-Schaapveld et al., 1999). Consistent with findings on the variability of negative affect, depressed participants also show greater moment-to-moment variation in quality of life ratings than do healthy controls (Barge-Schaapveld et al., 1999). In addition, depressed participants report more physical complaints, activity-related stress, and social stress (Barge-Schaapveld et al., 1999; Myin-Germeys et al., 2003). Lastly, depression may be related to differential allocation of time to particular activities. For example, depressed individuals who responded to medication increased the time they spent on chores and decreased the time they spent on passive leisure relative to non-responders (Barge-Schaapveld et al., 1995).

Another ESM study (Wang et al., 2004) that specifically examined depressions' impact on work performance also found decreases in productivity as well as difficulty with task focus associated with depression.

Several ESM studies have examined attributional style in depression (Husky et al., 2007; Swendsen & Compagnone, 2000; Swendsen, 1997; Swendsen, 1998). When signaled, participants in these studies reported an event that they were most affected by since the last sample. Follow-up questions were used to obtain ratings of the degree to which the cause of the event was global, stable, and internal. These studies showed that overall attributional style predicted the type of causal attributions that were made for specific negative events. In addition, the specific causal attributions of negative events as global, stable, and internal predicted immediate depressed mood. However, overall attributional style's ability to explain fluctuations in either immediate or enduring depressed mood has not been supported. These findings have been cross-culturally replicated in samples of French students (Swendsen & Compagnone, 2000). Analysis of perception of control of negative events has shown a pattern of findings that is very similar to that of attributional style (Swendsen, 1998).

These findings were used to support Abramson, Metalsky, and Alloy's (1989) helplessness-hopelessness theory of depression (Husky et al., 2007; Swendsen, 1998). The helplessness-hopelessness theory was developed in part to explain the frequent co-occurrence of depression and anxiety. According to this theory, individuals who experience frequent negative events that are unpredictable and uncontrollable begin to develop a sense of helplessness, which is related to anxiety. Over time, some individuals begin to develop attributions of negative events that are global, stable, and internal,

resulting in a sense of hopelessness, which is related to the development of depression (Husky et al., 2007). The unique relationship of these types of causal attributions to depression was further supported by ESM findings that failed to find a relationship between anxious moods, lending further support to the helplessness-hopelessness theory (Swendsen, 1998). Comparison of the helplessness-hopelessness theory of depression to the sociotropy-autonomy theory of depression using ESM data provided more support for the helplessness-hopelessness theory in explaining depressed mood overall (Husky et al., 2007). However, reactions to particular types of situations can be better accounted for by personality dimensions in accordance with the sociotropy-autonomy aspect of Beck's cognitive theory of depression (Beck, 1987). According to this theory, people who are high on sociotropy will experience a greater impact from a negative interpersonal event than from other types of events. People who are more autonomous will experience a greater impact from negative achievement related events. Consistent with this theory, sociotropy explained more variance in depressed mood following interpersonal negative events than was explained by attributional style. However, inconsistent with the sociotropy-autonomy theory, autonomy did not explain a significant amount of variance in depressed mood following an achievement related negative event.

Description of Emotions

Although one might expect that experience-based studies would provide insight into how particular emotions are actually experienced, this literature has added very little in the realm of describing emotion experience. In accordance with studies that have focused on emotions in depression, the purpose of experience-based studies on depression are often frequency based, seek to determine the types of events that lead to particular

feelings, and seek to explain how the occurrence of various feelings related to other psychological constructs such as attributional style. Despite the use of qualitative methods in some of the experience based studies, little is offered on the qualitative experience of feelings in depression.

Descriptive Experience Sampling

Descriptive Experience Sampling (Hurlburt, 1990; Hurlburt, 1993; Hurlburt, 1997; Hurlburt & Akhter, 2006) is a method specifically designed to explore inner experience. During the DES procedure, participants carry a small signaling device and wear an attached earpiece. The device is programmed to emit a random signal within intervals of one hour. When the participant receives the signal, he or she is to recall his/her experience just before the moment of the beep. Unlike most other experience-based methods, DES is concerned only with observing the participant's ongoing inner experience at a precise moment (i.e., fraction of a second) before the signal. The target of interest is the experience at the last moment of awareness before the participant was disturbed by the beep. The participant collects six of these moments of experience and is interviewed by a trained DES interviewer within 24 hours of sampling. Guidelines for the appropriate execution of the method have been extensively addressed in various publications (Hurlburt, 1997; Hurlburt & Akhter, 2006; Hurlburt & Heavey, 2006). The primary goal of a DES expositional interviewer is for the interviewer to gain high-fidelity apprehension of what was in the participant's awareness during the target moment. A great deal of effort is spent developing the participant's ability to recall the moment, and the interviewer works hard to avoid including experience that is based on the participant's ideas of him or herself and what they believe typically occurs in his or her

inner experience. Instead, the interview aims solely on the content of inner experience at the moment of the beep, without preconceived notions on what that experience should or should not be like.

There are several advantages that DES shares with other sampling methods in comparison to traditional cross-sectional designs. Primarily, DES acknowledges severe limitations on memory. Like other ambulatory techniques, DES seeks to reduce memory errors by having participants report on their experience as it is occurring. DES improves upon other ambulatory designs by restricting its target of interest to the smallest practical moment of time. Other ambulatory methods range in their target of recall. For example, diary studies have participants reflect on their entire day. This scope of diary methods has been criticized by proponents of ESM (Barge-Schaapveld et al., 1995). However, although the time frame of focus on ESM studies covers less than a day and is therefore an improvement on diary studies, ESM still often requires participants to report on an event or events that have occurred since their last sampling. Given intervals of three hours in some cases, this may be a sufficient amount of time to be influenced by memory errors. Even if intervals are much shorter, there is still the requirement of retrospection which allows for the possibility of memory bias. DES attempts to reduce the target of recall to a split second before a participant is asked to observe his/her inner experience, thereby requiring the least amount of retrospection as possible and subsequently reducing the likelihood of contamination of reports due to memory bias. This issue is particularly important in the study of depression, as the reviewed literature has indicated that depression is strongly associated with mood-congruency effects (Dalglish & Watts, 1990; Matt et al., 1992).

Another advantage that DES shares with other ambulatory methods is increased ecological validity compared to cross-sectional designs (Husky et al., 2007). Participants observe their inner experience as they go about their typical daily activities, rather than in contrived laboratory settings. In addition, the interview process of DES trains participants to be accurate observers and reporters of their inner experience. Better preparation of participants reporting their inner experience has been endorsed by proponents of thought sampling techniques (Josephson et al., 2000). The aim of DES is always to push the participants to the limits of what they are able to report on their inner experiences, while recognizing those limits. This approach increases the integrity of the participants' reports.

Another consideration of DES is reduction of response bias. During a DES expositional interview, questioning is very open-ended and the interview is largely led by the participants' experiences. For example, the interview for each sampled moment typically begins by the interviewer's asking, "What was in your experience at the moment of the beep?" If the participant lists several aspects of their experience, the interviewer might ask the participant which of them were most present and begin discussing those aspects first. DES interviews are trained to limit their expectations and assumptions about what may or may not be in someone's experience and are continuously monitoring themselves to limit demand characteristics and the potential influence of presuppositions on the interview. Other methods using questionnaires, target driven questioning, adjectives checklists, etc. have been criticized because they may inadvertently influence the participants' response, thereby degrading the truthfulness of their response (Josephson et al., 2000; White et al., 1992). DES minimizes this potential

problem. Methods such ESM have claimed their ability simultaneously to measure mood, cognitions, and behaviors as an advantage over other methods (Peeters, Nicolson et al., 2003). Given that the DES interview is guided by experience itself rather than from presumed targets of study, it is likely that DES's ability to capture these various aspects of consciousness is equal to and perhaps better than ESM.

DES can be used simultaneously as an idiographic and nomothetic measure, a strength has been used to support the ESM method (Barge-Schaapveld et al., 1995). DES allows access into an individual's inner world. Over repeated sampling, a portrait of the person typically develops. In this way, variability that may exist within a group of people, as well as within a particular person, can be examined. The relevance of this has been demonstrated in DES studies that highlighted the extensive variations of experience that can occur among people that would typically be grouped together in a study. For example, Lefforge (2007) found that the three participants who had initiated antidepressant treatment differed significantly in symptom profile, the nature of their inner experience, and the pattern of change in experience over the course of treatment. This study also showed that fluctuations in experience within an individual can be observed across time. Despite DES's conception as a primarily idiographic method, DES has been successfully used to compare experience across groups (Hurlburt, Koch, & Heavey, 2002). However, these types of studies are limited because the extensive amount of time dedicated to each participant makes collection of data from large samples difficult.

The interobserver reliability of DES has been established by a study that had two interviewers separately interview participants about the same moments (Hurlburt &

Heavey, 2002). Each interviewer then coded each moment for the absence or presence of 16 forms of inner experience. Analysis of five of the most frequently occurring forms of inner experience (images, inner speech, unsymbolized thinking, feelings, and sensory awareness) indicated consistency between raters. Percentage of agreement ranged from 83% for sensory awareness to 97% for images. The raters' percentage agreement for the presence of feelings was 92%.

The validity of DES is supported by a study that linked DES findings to observable external behavior (Hurlburt et al., 2002). The inner experience of individuals with fast speech rates was compared to those with normal speech rates. Individuals who were observed to speak fast were found to have more complex inner experience, including for example, fewer instances of simple inner speech. The investigators interpreted that the fast speech was related to the necessity of communicating more information than people with simpler inner experience.

Whereas DES is a promising method for obtaining accurate reports of inner experience, some of its limitations should be kept in mind. While ecological validity is increased by having participants observe their experience in naturalistic settings, lack of control over when the participant chooses to collect their samples may cause problems. For example, some participants may choose to wear the beeper only at particular times or during particular activities. This is limiting in two ways: 1) the portrait produced by DES samples may not accurately represent that participant's typical experience, but rather illustrates their experience in particular situations or at particular times, and 2) comparison of that participant to another participant who collects beeps at different times or in different situations may not be accurate. However, instructing the participant on

when to wear the beeper to standardize the procedure across participants may also produce inaccurate profiles. In addition, this may increase the strain on the participant to perform an already time demanding task, potentially decreasing participant and compliance.

DES is also limited in its ability to ensure that participants are reporting on all sampled moments at the time that they are sampled. Some ESM studies have used handheld computers which record the latency between sampling and report of experience. However, the DES beepers are not designed to do this and replacement of the beepers with handheld computers would be costly. During the orientation to DES, the participant is told that they are free to withhold talking about sampled moment. However, a participant's presenting a sampled moment that he or she does not wish to discuss happens very infrequently. Although this may be evidence that such moments are infrequent, it is also possible that participants simply skip observing such moments and replace them with other sampled moments or avoid engaging in sampling during activities that they anticipate not wanting to openly discuss.

To promote accuracy, the target of DES interviews is only the experience that was in the participant's awareness at the moment of the beep. This may be a limited approach in that there is evidence that people process aspects of experience outside of awareness. For example, it is not infrequent to have participants report on their experience while driving but say that seeing the road or other cars was not in their awareness at the moment of the beep. The fact that these participants are able to drive safely indicates that visual aspects of driving are present. While aspects such as seeing the road may be inconsequential in understanding a person, it is possible that some processes have more impact on overall

experience than DES is able to capture. For example, sometimes participants will report that an emotion was experienced until the beep signaled them to observe their inner experience. Once signaled, the participant may report with confidence that the emotion had been present but was not experienced. It is difficult to ascertain the extent to which such experiences occur and are relevant and important in understanding inner experience.

The purpose of DES's focus on very small intervals of time is to reduce retrospective bias. However, the focus on such short moments of awareness may miss other more important events in one's awareness. It is likely that important aspects of inner experience are repeated frequently, and therefore are more likely to be captured by random sampling. However, important but infrequent events in inner experience are likely to be missed by DES.

The final limitation of DES, found in all studies that seek to understand human experience, is the limitation of communication. DES interviewers are trained to recognize that many words may be used with an inaccurate assumption of shared meaning. They attempt to handle this by asking the participant what he or she personally means when they say things like "I was saying to myself..." or "I was feeling confused..." However, the shared understanding of one's experience must ultimately be communicated through language which has limitations.

Feelings in Depression Related Findings

Several studies have been conducted on depression using DES (See Table 1 for a summary). The first study to examine depression with DES was conducted by Hurlburt (1993) with four participants who ranged from dysphoric to mildly depressed to deeply depressed. Each participant was sampled during times of dysphoric/depressed mood and

times of euthymic mood. Hurlburt examined their collected moments of experience for commonalities of experience that occurred during depressed moods within a particular individual and for similarities in experience during depressed mood between participants. The primary findings of this study were not directly related to the experience of feelings, but were marked instead by a lack of symbolization in inner experience during depressed moods. For example, participants experienced less images and inner speech during depression. Instead, depressed mood was associated with an increase in unsymbolized thought. The participants had a harder time observing and communicating the characteristics of their inner experience during their depressed periods. During periods of depression, even when their experience was presented in symbolized thoughts such as words or images, they had difficulty describing characteristics of them.

Perlotto (2001) reported differences in emotional experience between depressed and nondepressed participants. Depressed participants experienced a higher frequency of feelings as well as a higher ratio of negative to positive feelings (4:1) compared to nondepressed participants (1:1). In addition to feelings, depressed participants also frequently experienced sensory awareness and unsymbolized thinking. Lastly, depressed participants experienced fewer images, but more multiple experiences during a single moment than did nondepressed participants. The findings of this study were limited by a small sample size of three depressed and five nondepressed participants.

Depression's association with negative experiences was replicated by Cavenagh (2003), whose study included two participants at risk for depression. Consistent with Perlotto (2001), participants at risk for depression experienced more feelings than did less depressed participants. These two participants were also found to have a tendency for

negative-valence experiences. The primary purpose of this study, however, was to examine cognitive styles in depression. Although questionnaire data supported the relationships among depression, attributional style, and rumination, DES results did not support the relationship between depression and negative attributional style or the negative cognitive triad. Again, this study was limited by a small sample size of six participants.

Increased frequency of feelings was replicated by again by Gunter (2007). This study also found that depressed participants had a higher ratio of negative experiences to positive experiences than nondepressed participants, in accordance with previous findings by Perlotto (2001). Gunter (2007) also contributed new information on feelings in depression. Depressed participants tended to experience feeling sad, hopeless, despondent, dread, or disappointment most frequently. They also tended to have moments that were affective, either positive or negative, in contrast to the neutral moments experienced by nondepressed participants. Perhaps the most descriptive finding of emotion in depression was also provided by this study. Depressed participants experienced a higher rate of negative physical sensations than did nondepressed participants and these unpleasant sensations were often accompanied by an emotion. This may indicate that part of emotional experience in depression is accompanying physical sensations. This finding is consistent with somatic complaints which are common in depression (American Psychiatric Association, 1994).

Lefforge (2007) studied the inner experience of three participants with depression that had initiated antidepressant treatment. The most noteworthy result of this study was that the profile of each participant greatly differed from the others. Elevated frequency of

feelings was found in only one of the three participants. However, the results were consistent with the other studies that found a high ratio of negative feelings compared to positive feelings, as this occurred in all three participants. Interestingly, participants were asked to indicate their current level of depression on an analog scale at each sampled moment. After the first week, participants no longer endorsed momentary awareness of depression. Lefforge (2007) posited several possible reasons for this; 1) anxiety was a more salient feature of the individuals included in the study than depression, 2) depression is a diffuse experience that is not experienced in momentary awareness, 3) the training participants received on observing their inner experience changed what they reported as in their awareness, and 4) antidepressants had an immediate effect on treatment. The second and third speculations will be important to consider in interpretations of the findings of the present study.

Potential for Describing Feelings

No previous study has used DES to specifically examine the experience of feelings in depression. However, DES has been used to provide a rough estimate of the frequency of emotion experiences in normal populations (Heavey & Hurlburt, 2008). This study found that feelings occurred in approximately one quarter of sampled moments. More importantly, this study found that emotion experience, as well as other inner phenomena varied greatly among participants. Thus studies that assume that experiences of particular feelings are the same for everyone are likely missing important details of the subjective experience. Knowing that there is variation in the experience of depression among nondepressed individuals highlights the importance of conducting an investigation

Table 1

Depression Related DES Findings

	Population	Frequency of Feelings	Negative vs. Positive Feelings
Hurlburt (1993)	Dysphoric vs. euthymic mood	Not reported.	Not reported.
Perlotta (2001)	Depressed vs. Nondepressed	Depressed > Nondepressed	Depressed had higher ratio of negative: positive feelings
Cavenagh (2003)	At-risk for depression vs. less depressed	Depression-risk > Less depressed	Depressed tended to have negative-valence experiences
Gunter (2007)	Major Depression vs. Nondepressed	Depressed > Nondepressed	Depressed had higher ratio of negative: positive feelings
Lefforge (2007)	Depressed & initiating treatment with antidepressants	1 out of 3 participants had increased higher than average frequency of feelings	All 3 showed high ratio of negative to positive feelings

of the experience of feelings among individuals with depression. Although DES studies have provided some information on the experience of feelings in depressed and normal populations, the method has the potential to provide much richer descriptions of feelings in depression than are currently available.

Present Study

Most research on emotion during depression has been generated from an information-processing perspective. Experience-based investigations of depression have observed the frequency of various emotions or have focused on aspects of depression that are minimally related to emotion, such as attributions. Very little research has been conducted that directly examines the actual experience of emotion. Other than memoirs describing personal experiences with emotion, there are no careful studies of how feelings are experienced during depression and whether or not they differ from typical feelings. Therefore, the primary purpose of the current study was to describe emotion experiences in depression and examine the extent to which feelings during depression differ from normal feelings.

Using the Descriptive Experience Sampling method I examined the inner experience of 5 depressed and 4 nondepressed participants. Accordingly, participants wore a random signal generator (beeper) during their typical daily activities that signaled them to observe their inner experience. Participants were instructed to collect six samples of inner experience on each of four days. They participated in an expositional interview in accordance with Descriptive Experience Sampling guidelines following each day of sampling so that the interviewer gained an understanding of the participants' inner experience during the sampled moments. The first day was considered a training day and data was not included in the final analyses. The characteristics of naturally-occurring feelings, such as valence, intensity, accompanying physical sensations, as well as any other salient features, were observed. Feelings were compared between depressed and

nondepressed participants for similarities and differences. In addition, within group variability of emotion experience was explored.

Consistent with previous DES studies (Cavenagh, 2003; Gunter, 2007; Perlotto, 2001), I predicted that depressed individuals would experience feelings more frequently than would nondepressed participants. Also, previous experience-based studies on feelings in depression have found that depressed participants experience more negative feelings and fewer positive feelings than nondepressed participants, which I expected to find in the current study.

This study adds to existing experience-based studies by investigating previously unaddressed aspects of emotion experience. Due to the fact that this aspect of the study was largely exploratory, moments with feelings were generally examined for patterns that occurred within and across participants. These patterns are presented in terms of effect sizes (Cohen's *d*) as exploratory pointers due to the small sample size resulting in low power. In addition, depressive content, which is largely feeling based, was examined for all moments. Feelings and depressive content also were evaluated in terms of their relationships with questionnaire data. As part of the exploratory process, other aspects of experience (form, content, time orientation) were also analyzed.

CHAPTER 3

METHODOLOGY

This study consisted of four phases; a screening phase, a qualification phase, an experience sampling phase, and a controlled sampling phase. During the screening phase, I identified suitable candidates for participation in the study. During the qualification, I ensured that participants met the criteria for the depressed or nondepressed group. During the experience sampling phase, I used the Descriptive Experience Sampling (DES) method to explore the inner experience of participants in their naturalistic situations. During the controlled experience sampling phase, I used the same interviewing technique to explore inner experience in response to several emotionally evocative and neutral film clips.

Phase I: Screening

Participants

Participants included 224 students who were currently enrolled in an introductory psychology course at the University of Nevada, Las Vegas. Students under the age of 18 were excluded from participation. Students who completed the screening phase of the study were awarded research credits for a course requirement.

Measures

Demographic Form. The demographic form was created for this study and included basic participant information. This information consisted of participants' name, address, phone number age, race, marital status, educational level, and current employment status.

CES-D. The Center for Epidemiological Studies – Depression Scale (CESD-D; (Radloff, 1977)) is a 20-item self-report measure of depression that is intended for

research with general populations. Items on the measure address various aspects of depression (depressed affect, positive affect, psychomotor retardation, and interpersonal disturbance), but are primarily focused on depressed affect. In addition, it measures current (i.e., within the last week) depressive symptoms. Scores on the CES-D range from 0 to 60, with higher scores indicating higher levels of depressive symptomatology. Cut off scores are not provided, as the measure is not intended for diagnostic use. However, the use of an arbitrary cut off score of 16 chosen by Radloff was shown to discriminate fairly well between patient and non-patient populations, as 70% of patients but only 21% of non-patients scored above 16. This measure has been shown to have good internal consistency ($\alpha = .85$) and acceptable test-retest reliability (correlations vary from .67 to .51 for retesting at 2, 4, 6, and 8 weeks). Test-retest reliability may be lower than typically desired because the measure was created to measure current level of depression, which is susceptible to change over time. The CES-D's sensitivity to change has been demonstrated by findings that CES-D scores change substantially following major life events and decrease during treatment (Radloff, 1977). The validity of the CES-D has been demonstrated by its correlations with other self-report measures, clinical ratings, and depression-related variables (e.g., negative life events; Radloff, 1977).

Procedure

Investigators solicited instructors of introductory psychology courses to allow entry of an investigator into their classes. Students were invited to remain after class to complete a brief survey. At this time, the investigator obtained informed consent from those who wished to proceed. The investigator administered participants a demographic

questionnaire and the CES-D. Students who completed any of these forms were awarded research credit.

Phase II: Qualification

Participants

Participants were selected for the qualification phase based on their scores on the CES-D. Participants who scored high on the CES-D (scored above 29 or scored between 20 and 29 with a 2 or 3 on Item 6: “I felt depressed”) and those who scored very low on the CES-D (6 and lower) were contacted to participate in this phase. Thirty-three high scorers were contacted; 24 completed the qualification, 3 declined participation, and 6 never responded to requests to participate. Twenty-two low scorers were contacted; 11 completed the qualification, 4 declined participation, and 7 never responded to requests to participate. Of the 24 high-scoring participants who completed the qualification phase, 14 did not meet criteria for Phase III and 1 declined further participation. Nine high-scoring participants met criteria for the depressed group and were advanced to Phase III. All of the 11 low-scoring participants who completed the qualification phase met criteria for Phase III; 2 declined further participation. Nine of the lowest-scoring participants met criteria for the nondepressed group and were advanced to Phase III.

Measures

The Structured Clinical Interview for DSM-IV Axis I disorders (First, Gibbon, Spitzer, & Williams, 1997) is a semi-structured interview intended for psychiatric diagnosis by researchers and trained interviewers. This measure is largely considered to be the standard for diagnosing axis I disorders such as depression (Zanarini & Frankenburg, 2001). It contains ten modules which correspond to DSM-IV diagnoses.

The mood disorders module and the psychotic screening module were used in this study. The mood disorders module covers diagnosis of major depressive episode, manic episode, hypomanic episode, dysthymic disorder, mood disorder due to a general medical condition, and substance-induced mood disorder. The psychotic screening module was used to establish presence of psychotic symptoms. The full version of the SCID-I can take up to two hours for someone with psychiatric diagnosis and between 30 and 90 minutes for someone who does not. The administration time for the selected modules is typically between 30 and 60 minutes.

Procedure

Participants selected for the qualification phase were contacted by phone and/or email to schedule a one-hour meeting with a graduate-level investigator. At this meeting, the investigator obtained informed consent from participants and administered the mood disorders module and the psychotic screening module of the SCID-I. The mood disorders module of the SCID-I was used to determine if the participant was experiencing symptoms of depression. The psychotic screening module was used to exclude participants who were experiencing psychosis. Participants who met diagnostic criteria for depression (major depressive episode and/or dysthymia) and were not currently experiencing psychotic symptoms or other mood disorders (manic episode, hypomanic episode, mood disorder due to a general medical condition, and substance-induced mood disorder) were invited to continue in the depressed group of Phase III. Participants who did not endorse non-somatic symptoms of depression, were not experiencing psychotic symptoms, and were not experiencing other mood disorders were invited to continue in the nondepressed group of Phase III. Participants who were selected and wished to

continue began Phase III minutes after the interview. Participants that met diagnostic criteria for depression or appeared to be at-risk for mood disorders were referred to the university counseling center for free services.

Phase III: Experience Sampling

Participants

Of the nine depressed participants, five were included in this study while the other four participants were interviewed by a colleague for inclusion in another study. Of the 11 nondepressed participants, four were included in this study while the other five were interviewed by a colleague for inclusion in another study. The final sample for this study included five depressed participants and four nondepressed participants; their demographic information is presented in the next section. The nondepressed participants consisted of individuals who reported the lowest levels of depressive symptomatology on the CES-D. The depressed group consisted of five participants who met the diagnostic criteria for depression and were not experiencing psychotic symptoms during Phase II. The nondepressed group consisted of four participants who did not endorse non-somatic symptoms of depression or psychotic symptoms during Phase II. All participants who began Phase III completed four sampling days. Participants' demographic information is summarized in Tables 2 and 3. Participants were awarded research credit for each sampling interview they completed.

Measures

Symptom Checklist 90-R. The Symptom Checklist 90-R (SCL-90-R; Derogatis, 1994) was used to obtain an overall measure of general psychopathology type and severity. It is a 90-item measure in which participants rate the severity of a variety of

Table 2

Demographics of Participants By Condition

	Depressed (<i>N</i> = 5)		Nondepressed (<i>N</i> = 4)	
	Range	Mean	Range	Mean
Age	18 – 30 years	20.8 years (<i>SD</i> = 5.17)	18 – 27 years	21.8 years (<i>SD</i> = 4.50)
	<i>n</i>	Percentage	<i>n</i>	Percentage
Gender				
Female	3	60%	1	25%
Male	2	40%	3	75%
Ethnicity				
White	1	20%	3	75%
Hispanic	2	40%	1	25%
Asian	1	20%	0	0%
Biracial	1	20%	0	0%
Year in School				
Freshman	3	60%	2	50%
Sophomore	1	20%	0	0%
Senior	0	0%	1	25%
Unknown	1	20%	1	25%
Employed	2	40%	2	50%
Marital Status				
Never Married	4	80%	3	75%
Married	0	0%	1	25%
Divorced	1	20%	0	0%

Table 3

Depression Related Information of Depressed Participants (N=5)

	<i>n</i>	Percentage
Diagnosis from Phase II		
Major Depressive Disorder	4	80%
Dysthymia	1	20%
Have received psychotherapy	3	60%
Currently taking psychotropic medication	0	0%
Number of previous episodes of depression		
1	2	40%
2	1	20%
7	1	20%
20	1	20%

psychological symptoms that have been experienced during the previous week on a scale from 0 (*not at all*) to 4 (*extremely*). This measure produces a Global Severity Index score which indicates the general level of distress currently experienced by participant. It also includes nine symptom dimensions (Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism) which indicate the types of psychological symptoms that are being experienced. The SCL-90-R has demonstrated good reliability, with internal consistency of symptom dimensions ranging from .79 to .90, with Depression having an internal consistency of .90 with both psychiatric outpatients and non-clinical populations. Test-

retest reliability of the symptom dimensions has ranged between .78 and .90 over a one week period and between .68 and .83 over a 10 week period. The validity of the SCL-90-R has been supported through demonstrations of its convergence with the Minnesota Multiphasic Personality Inventory, the General Health Questionnaire, and the Beck Depression Inventory. It has also demonstrated divergent validity with other expected measures and has been shown to be a sensitive and specific measure of various disorders (Groth-Marnat, 2003).

Positive and Negative Affect Schedule. The Positive and Negative Affect Schedule – Expanded Form (PANAS-X; Watson & Clark, 1994) consists of 60 mood-related adjectives which are rated on a scale from 1 (*very slightly or not at all*) to 5 (*extremely*). Scales indicating mood valence of positive affect and negative affect are each derived from ratings of 10 items. The measure can also be used to assess specific emotion states from other subscales (Fear, Sadness, Guilt, Hostility, Shyness, Fatigue, Surprise, Joviality, Self-Assurance, Attentiveness, and Serenity). The instructions of the PANAS-X can be varied depending on the time interval of interest. Time intervals of interest have included: at the moment, today, during the past few days, during the past week, during the past few weeks, during the past month, during the past year, or in general. Consistent with the other measures being used (CES-D and SCL-90-R), the current study focused on the past week. The Positive Affect and Negative Affect scales have shown high internal consistency reliabilities which range between .83 and .90. Most of the specific emotion state subscales also show good internal reliability with median alpha reliabilities which range between .83 and .93, with the exception of the less reliable scales of Attentiveness (.78), Serenity (.76), and Surprise (.77). The convergent validity

of the PANAS-X as a state measure of mood as well as its ability to measure change across time have been demonstrated (Watson & Clark, 1994).

CES-D. Described in Phase I above.

Descriptive Experience Sampling Codebook Manual of Terminology. Hurlburt and Heavey's (2006) *Descriptive Experience Sampling Codebook Manual of Terminology* describes Inner Speech (IS), Partially Worded Speech (PWS), Unworded Speech (UWS), Worded Thinking (W), Image (I), Imageless Seeing (XI), Unsymbolized Thinking (U), Inner Hearing (IH), Feeling (F), Sensory Awareness (SA), Just Doing (JD), Just Talking (JT), Just Listening (JL), Just Reading (JR), Just Watching TV (JW), and Multiple Awareness (M). In addition, Perceptual Awareness (PA) has been coded and in more recent work, the experience originally called Image is now referred to as "Inner Seeing". The most frequently occurring forms of inner experience are inner seeing, inner speech, unsymbolized thinking, feelings, and sensory awareness (Heavey & Hurlburt, 2008). Inner speech is when one experiences him or herself speaking internally. The inner spoken words are not actually spoken out loud but often have similar characteristics of outer speech. Unsymbolized thinking is the experience of thinking that is not represented by visual imagery, words, auditorily, or other symbolization. A thought is experienced, but not in any symbolized form. Feelings are the experience of an emotion and may include the experience of physical sensations related to emotion. Sensory awareness is the focus on the sensory aspect of something either internal (e.g., experiencing the pressure of a pin as the finger pushed on it) or external (e.g., visually noticing the pinkness of a sweater) without concern for or attention to the meaning or significance of the sensory experience (reference to Sensory Awareness paper). For more detailed

description of each type of code and methods for discriminating among codes, the reader is referred to the codebook. Hurlburt and Heavey (2002) demonstrated high interobserver reliability for the most frequent codes.

Equipment

Random signal generator. Each participant was given a random signal generator (beeper; Hurlburt, 2010) and an earpiece. The beeper is programmed to emit a 700Hz tone at a random point within a one-hour interval. On average, a tone is emitted every 30 minutes. The beeper is small enough to be worn on the waist or in one's pocket. The volume level is adjustable, allowing participants to determine an appropriate tone volume for their current surrounding noise levels.

Notebook. Each participant was provided with a 3 x 5 inch notebook. The participants were able to jot notes concerning their momentary experience in this notebook. The notebooks were not collected from participants; they were only used for their personal reference.

Procedure

After a participant completed the SCID-IV and had been qualified for the current phase, the investigator continued the meeting by obtaining informed consent for Phase III: Experience Sampling, administering questionnaires (CES-D, PANAS-X, SCL-R-90), and explained the sampling phase in detail. The investigator scheduled the next interview meeting with the participant, allowing time for the participants to collect six moments of experience during the 24 hour period preceding the scheduled interview.

The participants wore the random-signal beeper as they engaged in their daily activities. Participants were instructed to wear the beepers at any time of their choosing,

as long as it was within the 24 hours preceding the interview. The participants were randomly signaled by the sound of a tone to observe their inner experience in the brief (i.e., fractions of second) moment before they were disturbed by the sound. At these moments, participants jotted down notes about their experience to facilitate recall of the moment during the interview. Participants were instructed to collect six of these moments of experience.

On the first interview day the investigator conducted an expositional interview with the participant in which participants were questioned about their inner experience at each of the sampled moments according to the Descriptive Experience Sampling method. These interviews lasted up to 60 minutes. The purpose of the interview was iteratively (Hurlburt, 2009) to train participants to apprehend experience as it was ongoing at the moment of the beep. The moment of the beep was considered to be the last undisturbed moment before the tone sounded. The investigators had been trained to bracket presuppositions, reduce demand characteristics, and accurately identify experience that was and was not present precisely at the moment of the beep. Within a day following the interview the investigator wrote summaries of each moment of experience discussed during the expositional interview. The first day of sampling was considered a training day and collected data was excluded from analysis. This process was repeated for three subsequent sampling days. For each of these days, participants were again asked to collect six moments of experience and these moments were discussed during the expositional interview. On several occasions participants collected fewer than six moments of experience. Thus, the final analysis included 186 sampled moments.

Participants were asked to complete the CES-D at the beginning of each expositional interview.

Following DES interviews, I wrote descriptions of each moment which summarized the participant's inner experience at the moment of the beep. I then coded each beep according to the DES codebook for forms of inner experience. When feelings were coded as present, I also judged whether or not the feeling was positive, negative, or neutral based as outlined by the PANAS-X positive versus negative subscales. Then I conducted additional coding to determine whether or not features related to depression were present in the beep description. These determinations were based upon DSM-IV (APA, 2000) diagnostic criteria for major depressive episodes. Primary symptoms were considered the critical diagnostic criteria of depression (i.e., depressed mood and/or loss of pleasure). Secondary symptoms referred to the other symptoms of depression (e.g., changes in sleep or appetite, guilt). Lastly, other features associated with depression in common presentations of the illness were considered correlates of depression (e.g., anxiety). Lastly, I provided coding of time orientation. If awareness was focused only on the aspects of the present moment, the moment was considered present-focused. If any aspect of the beep included awareness of the future, it was coded future-focused. Likewise, if any aspect of the beep included awareness of the past, it was coded past-focused. Details are provided throughout the results to provide an adequate portrayal of the types of experience that were included within each coding.

Phase IV: Controlled Experience Sampling

Participants

The participants were the same as in Phase III: Experience Sampling. They were given course 1 research credit for completion of this phase.

Materials

A DVD containing four brief video clips was made for use in this study. The video clips were selected for their ability to evoke emotion or their neutrality based on the work of Rottenberg, Ray, and Gross (2007). Each clip was approximately two minutes long and contained at the end the same tone that was emitted by our random signaling devices as a cue that the participant was to capture and record his or her experience. At the sound of the tone, the screen turned black.

The video clip selected to elicit negative emotion, particularly sadness, is from the popular movie, *The Champ*, a scene in which a boy is told his father has died. The video clip selected to elicit positive emotion, particularly amusement and/or happiness, is a scene from the popular film, *When Harry Met Sally*. During this scene Meg Ryan shows that she can fake having an orgasm. The neutral clips are from a screen saver that shows colorful lines appearing and disappearing across the screen.

Procedure

Each participant watched two affective video clips and two neutral clips in the order of negative, neutral, positive, neutral. Each video clip was interrupted by a tone identical to that produced by the beeper and the screen became blank. The participants were provided an opportunity to jot down notes about their inner experience at this sampled moment. The investigator interviewed the participants at the end of each film clip in the

same manner as previous interviews regarding their momentary experience just before the tone. The procedure was repeated for each of the four video clips, in which the participants viewed the first video clip, was interviewed regarding that sampled moment, then watched the next video clip, was interviewed regarding the second sampled moment, and so on. Again, the investigator wrote summaries of these moments within a day of collection. These written descriptions were coded and rated in the same manner as the previous phase. In addition, each experience was also rated as related or unrelated to the preceding negative or positive stimuli.

CHAPTER 4

RESULTS

A total of 36 sampling days and 9 controlled sampling days were conducted. The number of moments collected by each participant is shown in Table 4 and summarized in Table 5.

Table 4

Number of Moments Sampled per Participant

Depressed ¹					
	Edward	Paul	Sam.	Violet	Elissa
Sampling Day 1	4	5	6	6	5
Sampling Day 2	5	6	6	5	3
Sampling Day 3	5	5	6	6	5
Sampling Day 4	5	6	6	5	6
Controlled	4	4	4	4	4
Total¹	15	17	18	16	14
Nondepressed					
	Carlos	Vicki	Jason	Triston	
Sampling Day 1	6	6	6	6	
Sampling Day 2	6	6	6	6	
Sampling Day 3	6	5	6	6	
Sampling Day 4	6	6	6	6	
Controlled	4	4	4	4	
Total²	18	17	18	18	

Note. ¹Depressed Participants are ordered by highest to lowest average CES-D Score.

²Total excluding first sampling day and controlled sampling.

Table 5

Number of Moments Sampled By Group

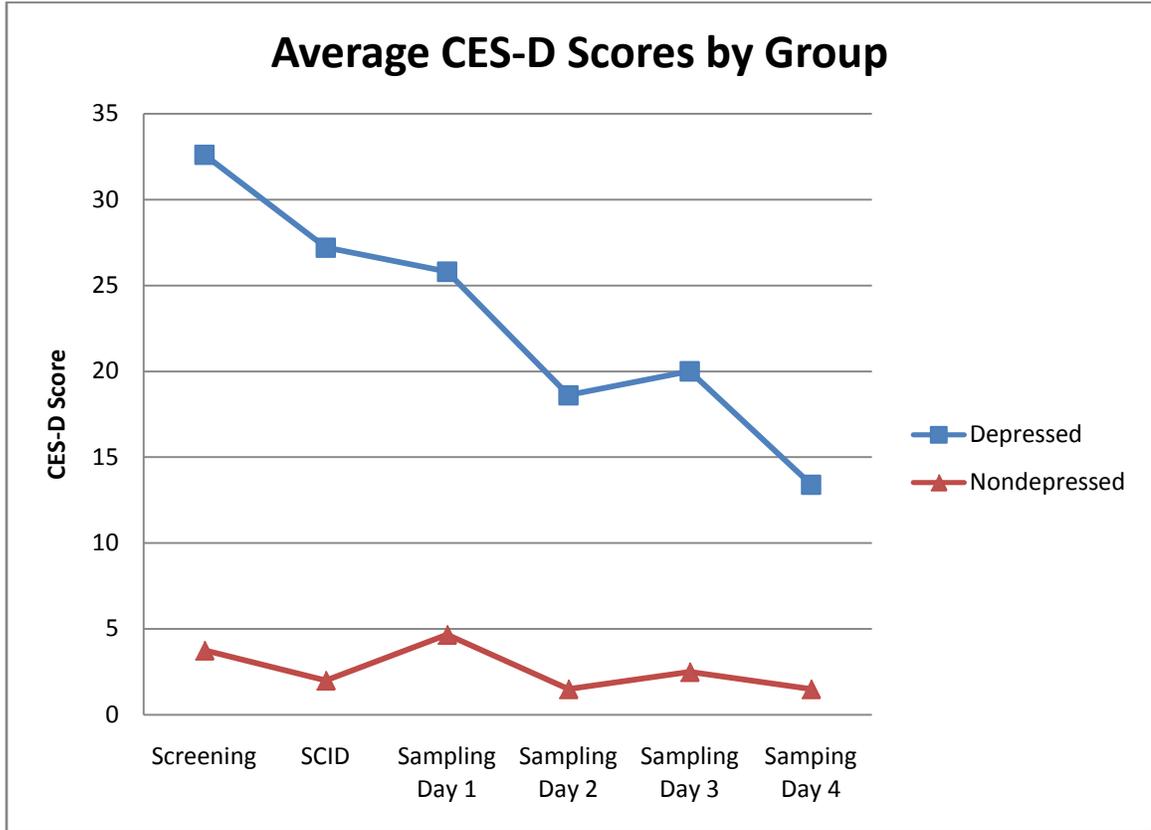
	Depressed	Nondepressed	Total
Sampling ¹	80	71	151
Controlled Sampling	20	16	36
All Samples ¹	100	87	187

Note. ¹Total excluding first sampling day

Manipulation Check

The grouping of participants as depressed or nondepressed was supported by between-group differences in CES-D scores throughout the study. A repeated measures ANOVA test of between subject effects found that the CES-D scores of nondepressed participants ($M = 2.62$, $SE = 1.088$) were significantly lower than those of depressed participants ($M = 22.9$, $SE = .973$), $F(1,7) = 193.44$, $p < .001$. Furthermore, a significant interaction of testing day by condition (depressed or nondepressed) was significant, $F(5, 35) = 4.815$, $p < .001$. Depressed participants' CES-D scores showed significant change over the course of the study, $F(5, 20) = 8.576$, $p < .001$, whereas nondepressed participants' CES-D scores did not change, $F(1.778, 5.334) = 1.878$, $p = .240$. Depressed participants' CES-D scores significantly decreased from screening ($M = 32.6$, $SD = 3.78$) to the last day of sampling ($M = 13.4$, $SD = 2.97$), Mean Difference = 19.2, $SE = 1.93$, $p = .009$. Average CES-D scores for depressed and nondepressed participants are shown in Figure 1.

Figure 1



Depressed Participant Profiles

Edward

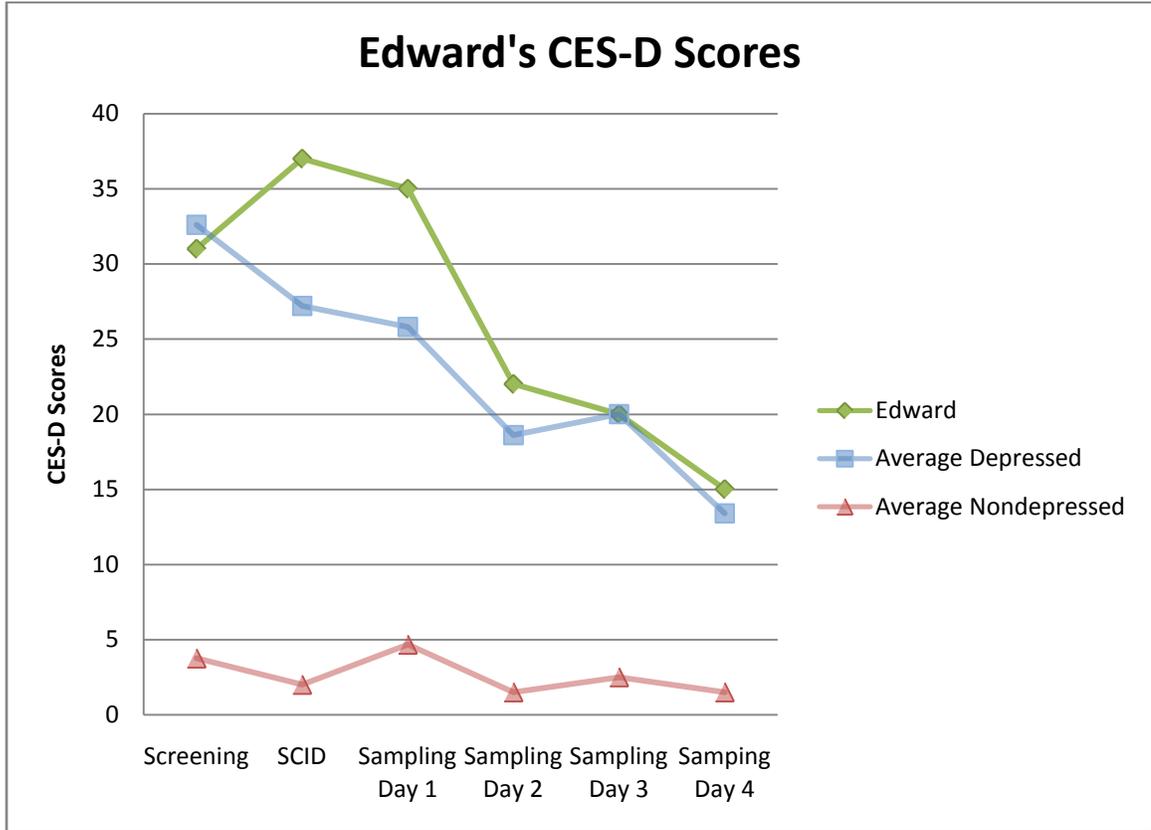
Edward was a 30 year old, bi-racial (Caucasian and African American), heavy set male. He identified as gay. He was divorced from a heterosexual marriage. He was experiencing a major depressive episode at the time of qualification. He reported having numerous (approximately 20) previous depressive episodes. He had previously been in psychotherapy but was not receiving treatment at the time of qualification. He attributed his depressive symptoms in part as a reaction to the death of his father. At the qualification interview he was casually dressed. He was polite, humorous, and somewhat emotionally labile. His tone of voice was somewhat dramatic. He admitted that he was

often apprehensive about attending sampling interviews because it he felt that he would have to discuss difficult topics while describing his inner experience, such as the loss of his father. There were several times during the interviewing in which he became teary.

CES-D. Edward's CES-D scores were indicative of clinically significant depression throughout the study with the exception of his last sampling day. On his last sampling day, his CES-D score of 15 was just below the value of 16 which typically discriminates patient from nonpatient populations. However, this cutoff score is somewhat arbitrary. Edward's level of depression as measured by the CES-D shifted between the first and second sampling days. Prior to this shift, Edward's CES-D scores were particularly elevated at 31 (screening), 37 (qualification), and 35 (first sampling). Then his scores dropped to 22, 20, and 15 for the second, third, and fourth sampling days respectively. Overall Edward showed the largest range within his scores with a maximum score of 37 and a minimum score of 15. Edwards's CES-D scores over the course of the study are shown in Figure 2.

Feelings in momentary inner experience. Edward frequently experienced feelings as they were present in 14 (93%) of his samples. Of these 14 feelings, seven (50%) were positive-valence and six (43%) were negative-valence. In addition he had one experience of feeling sympathy which is not clearly positive-valence or negative-valence, but likely is an integration of both (the positive-valence portion consisting of feeling connected to another and the negative-valence for feeling badly for the other). The positive-valence feelings Edward experienced were "horniness," two experiences of humor, missing his boyfriend (which he stated had a positive-valence), excitement, amazement, and happiness/euphoria. The negative-valence feelings he experienced were

Figure 2



sadness/hopelessness, sadness, irritation/aggravation, exhaustion, nervousness/anxiety, and anxiety. There were four feelings (29% of his feelings) which were experienced without sensations in awareness. These moments included feelings of sadness/hopelessness, missing his boyfriend, sympathy, and happiness/euphoria. During these moments, the feeling was clearly in his awareness but there were no reportable characteristics of the feeling beyond its presence. He had two experiences of humor with laughter and he had an experience of sadness with his eyes tearing up (which was only in his awareness after the beep).

Excluding these moments of laughter and tearing up, Edward experienced feelings with bodily sensations with seven of his 14 feelings (50%). He had three moments in

which he experienced bubbling in his abdomen area. Repeated efforts to clarify the sensation of bubbling were unsuccessful, so the amount of detail provided in these descriptions is indicative of his limit reached in this regard. One of the experiences occurred while he was feeling “horniness.” During this moment he experienced a mild bubbling in the center of his abdomen. The two other sensations of bubbling in his abdomen occurred with anxiety. For anxiety in particular, the intensity of the sensation seemed to correspond with the intensity of his anxiety, which had increased from one sampled moment to the subsequent sampled moment. During the first of these moments he experienced nervousness/anxiety. He experienced “bubble guts,” a sensation of warmth and turning in his stomach area. During the next moment he was experiencing anxiety as intense “bubble guts,” an exploding sensation of heat all over his body and intense turning and warmth in his stomach area. He experienced the one moment of irritation/aggravation as a spreading sensation of warmth throughout his body and the one moment of exhaustion as cloudiness in his head. Edward experienced the one moment of excitement as a burst of energy throughout his body with particular bubbiness and tingling in his arms. His experience of amazement included a sensation of warmth through his body.

Three of Edward’s 14 feelings (21%) included a mental component. He characterized his experience of happiness/euphoria as a mental feeling. His experience of irritation/aggravation and his feeling of amazement were experienced as a feeling fused with a thought.

Depression in momentary inner experience. There was some depressive content captured by Edward’s sampling. Of the 15 sampled moments, a primary depressive

symptom (depressed mood or loss of interest or pleasure) was distinctly present during two (13%) samples. He experienced a feeling of sadness and of sadness/hopeless during these two moments. Secondary depressive symptoms (e.g., exhaustion, irritability) were present in two (13%) samples. Lastly, a correlate of depression (anxiety) was present in two (13%) samples. Both primary depressive experiences occurred on the second sampling day, both secondary depressive experiences occurred on the third sampling day, and both moments of anxiety occurred on the fourth sampling day.

Forms of momentary inner experience. Edward experienced unsymbolized thought during five (33%) samples. The content of his unsymbolized thoughts ranged from fairly simple concepts (Anderson Cooper is hot/has gorgeous eyes, I'm going to take off this beeper), to more elaborate (Hoping he would not get in trouble as he passed a police car on the way to court to deal with a speeding ticket; while watching a commercial that referred to the recession, he was thinking I'm sick and tired of hearing about the recession/of these commercials advertising to recession; while listening to the song, *Sober*, he was thinking it's one hell of a coincidence that the song was playing/that I'd gotten the meaning around the same time I decided to be sober). These elaborate thoughts were experienced in the form of an integrated thought and feeling.

There were three forms of Edward's inner experience in which his thought process was symbolized. These three forms were inner seeing (27%), inner speaking (20%), and talking to himself (20%). It was very common for Edward's symbolization to represent only a fragment of a much larger/more complex underlying thought. For example, in terms of inner seeing, there was one moment when he was innerly seeing his upcoming art show as he imagined it would look like. He could see the wall where his pieces would

be hanging in the show. He could clearly see the large middle picture, the focal point of his inner seeing, and he could just see representations of the surrounding pictures. This inner seeing represented his thinking about how he was really accomplishing something with the art show. He was thinking about all the negative things that he had gotten through and how he had made it so far.

An example of symbolized thought in the form of inner speaking occurred as he was watching *Frasier*. He was innerly saying, "Poor Frasier." He was thinking about how Frasier lived with his father longer than any other relationship in his life and he was relating Frasier's experience to his own experience with his roommates; that he was typically associated as related to his roommates rather than anyone he has been in a relationship with. Lastly, an example in terms of talking occurred during a moment in which he was saying out loud to himself, "Oh God, I'm so gay." He was thinking about how he was going to have to report his previous beep (thinking that Anderson Cooper was hot) in the following sampling meeting and how he would be embarrassed talking about Anderson Cooper.

Another aspect of Edward's symbolized thought was a moment of multiple inner seeing. During this moment he was thinking about his stepmom. (He had found out a couple days before that she had died about 8 months ago). He was innerly seeing a collage or rapid cycling of images related to his stepmom. He had difficulty articulating which images were present, which seemed to be related to both them quickly coming in and out of awareness and the presence of multiple images at once. The images were related to various ideas of his stepmom; that he wasn't going to have another chance to

talk to her; remembering laying on the couch watching TV with her; putting flowers on her grave when he goes to visit his family. At the same time, he innerly smelled her.

Edward also experienced some other forms of inner experience. He was reading during one (7%) moment and doing in another (7%; pulling up the covers and reaching to turn the dial on the beeper). As just mentioned, he had one (7%) moment of inner smelling. Lastly, he experienced laughter during two (13%) moments.

Edward experienced perceptual awareness moderately frequently; it was captured in four (27%) of his samples. He experienced perceptual awareness of seeing a police car and watching Anderson Cooper, particularly seeing his eyes to define them as gorgeous, on television. Lastly, he had two experiences of perceptual awareness which occurred at a lower level of awareness than other forms of experience. They included holding a dish and visually scanning a parking garage for suspicious activity. Along with perceptual awareness, Edward's awareness included watching television during three (20%) samples. (*Family Guy*, TV commercial, *Frasier*).

Content of momentary inner experience. There were several content descriptors that appeared more than once in Edward's inner experience. Self-reflection was an apparent theme that included moments of him thinking that he would not have a chance to talk with his stepmother again, comparing his lack of relationships to Frasier's, thinking about how his relationship with his boyfriend would have to come to an end, hoping he would not get into trouble, reflecting on his choice to pursue sobriety, and thinking about the negative things in life he had to overcome. There were two moments which captured self-commentary on his being gay. During one moment he was innerly saying, "Oh God, I'm so gay" and during another he was innerly saying, "Oh God, I'm such a fag." When

he communicated both of these inner sayings, he used an inflection of humor rather than self criticism. Humor and/or laughter were also captured in two additional moments.

Time orientation in inner experience. Edward's time orientation was primarily present focused (53%) or future focused (47%). Past orientation (13%) was also represented in his samples. However, it should be noted that the two moments which included aspects of both past and future focus. Present focused moments tended to consist of Edward thinking about some aspect of his environments. For example, thinking Anderson Cooper was hot/had gorgeous eyes, reading a joke texted by his boyfriend and having a related thought, or comparing himself to Frasier as he watched the show. Sometimes he was just experiencing something in his environment, as in a moment when he was just experiencing the humor of *Family Guy*. Edward's future moments included his thinking about how he would be embarrassed discussing his inner experience the next day, his thinking about how his relationship would eventually have to stop, his wondering how he could convince a judge not to give him a ticket, and his thinking about stopping in Chicago on his way to Detroit during the following week's spring break trip. He was thinking about his stepmom who he had recently found out had died eight months previously during a moment that contained both past and future focus. It was past focused in the sense that he was having various memories of her and future focused in the sense that he was thinking about how he would never have a chance to talk with her. The other combined moment occurred as he was thinking about his art show. The moment's past focus content included reflection on the negative things he had overcome to get to this point and the moment's future focus included an inner seeing of how he imagined his art would look on the wall in the art show.

Relationship between questionnaire data and inner experience. Edward's CES-D scores decreased with each sampling day. This pattern corresponded to presence of depressive content. Primary depressive symptoms were captured only on the second sampling day, when his CES-D score was the highest. On the third sampling day, as his CES-D score decreased, only secondary depressive symptoms were captured. Finally, on the fourth sampling day, corresponding to his lowest CES-D score, only correlates of depression were captured.

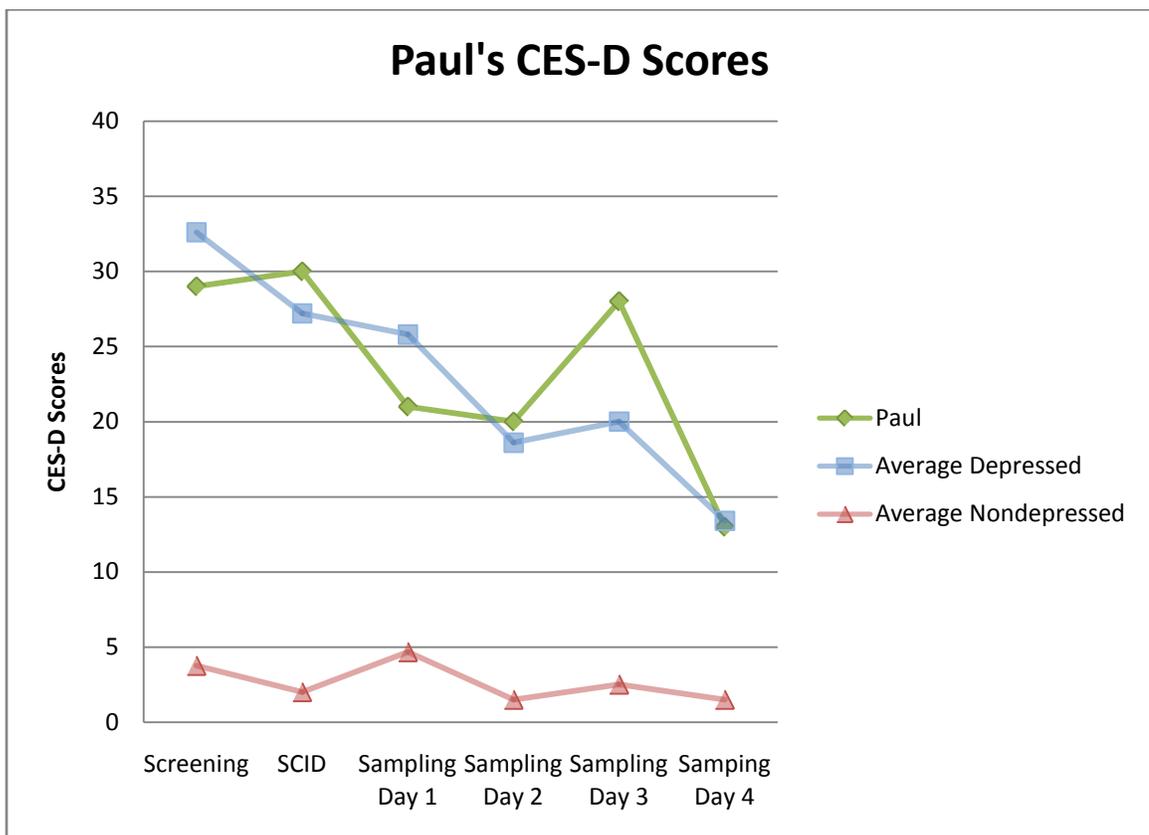
Forms of inner experience did not tend to follow a pattern coinciding with his CES-D scores with the possible exception of experiencing feelings. There was only one day in which Edward had a moment not containing a feeling, which occurred on the fourth sampling day, when his CES-D score was the lowest. However, given the high frequency of feelings for Edward, it is difficult to determine if there is a true relationship.

Paul

Paul was an 18 year old, Filipino-American male. He participated in the study from late January to early March of 2009. He met criteria for experiencing a major depressive episode at the time of his participation in the qualification phase. He reported seven previous episodes of major depression episodes, but he had never received psychological treatment. In addition to attending university, he worked a part-time job. At the qualification meeting he was dressed casually and presented with flat affect, but was well-groomed. He attributed his depressed mood to recently losing driving privileges and related conflict with his parents. Throughout the study he seemed somewhat restrained and, at times, somewhat disinterested during interviews.

CES-D. Paul's CES-D scores were indicative of clinically significant depression from screening to the third sampling day. However, his CES-D score of 13 on the last sampling day is below the value of 16 which typically discriminates patient from nonpatient populations. Paul's CES-D scores were most elevated at screening (29), qualification (30), and on sampling day three (28). Although in the clinically significant range, Paul's CES-D scores on sampling days one and two were relatively low at 21 and 20 respectively. Paul's CES-D scores over the course of the study are shown in Figure 3.

Figure 3



Feelings in momentary inner experience. Paul experienced three moments out of (18%) that contained feelings, all which occurred on the fourth sampling day. All the

feelings that Paul experienced had a negative-valence. They included feeling tired, hurried, and annoyed. He experienced tiredness and annoyance without any experiential details. A component of his experience of feeling hurried was warmth throughout his torso and legs and his heart beating faster. Feeling hurried was experienced as a mixture of a feeling and inner speaking (i.e., feeling hurried integrated with innerly saying “I need to hurry up”).

Depression in momentary inner experience. Depressive content was not prominent in Paul’s momentary experience. Of the 17 sampled moments, primary depressive symptoms (depressed mood or loss of interest or pleasure) were never present (0%), and a secondary depressive symptoms (fatigue) was present in only 1 moment (6%). Potentially relevant to depression, Paul’s inner experience did often seem self-evaluative and there was evidence of rumination.

Forms of momentary inner experience. Paul’s inner experience most frequently included moments in which he was innerly speaking, present in 47% of his sampled moments. Most often, he was innerly speaking as a commentary on what he was doing (“I’ll let myself win, ha ha ha” while playing a videogame with a friend; “I suck at cooking” while playing a cooking videogame; “How am I supposed to look for this answer?” while studying for an exam; and “I need to hurry up” while leaving for school) or contemplating what he should do (“Should I let her win?”; “Should I call her?”; “Should I be aggressive with this endeavor?”). The wording of his inner speaking, “Should I be aggressive with this endeavor?” was atypically stilted. He innerly spoke in an other-focused way during one experience (“I wonder what she’s doing”). During each

of these moments he was innerly speaking in his own voice as though he would say it out loud.

Unsymbolized thinking was also relatively common in Paul's inner experience, occurring in 29% of his sampled moments. Similar to his moments of inner speaking, Paul's unsymbolized thinking was typically commentary on what he was doing or should be doing. For example, during one moment he was thinking that he should call his friend, in another he was thinking that he would let his friend come to him instead of pursuing her, and in another he was thinking that he was not going to call his friend (the friend in all of these moments was the same person). Paul also had a moment while exercising in which he was thinking he would do one more set. Lastly, he had a moment in which he was reaching for the remote control and thinking that he needed to change the channel. Experiential details other than the content of unsymbolized thinking were absent except for one moment when he was physically experiencing the thought in the back of his head.

Paul also experienced other forms of inner experience. Paul was talking during three (18%) sampled moments. In each of these moments, he was talking to himself rather than to another person. He also experienced one (6%) moment each of inner hearing and just doing. Additionally, Paul experienced sensory awareness during one (6%) moment on the third sampling day. He was experiencing the sensation of urinating. Paul's awareness included watching television during one (6%) moment.

Paul's moments contained experience that is not typically coded into DES forms. Paul's inner experience also frequently contained perceptual awareness, present in 35% of sampled moments. All of these moments were experienced visually. For example, he

was in one moment he was looking for a word and in others he was seeing the phone, the remote control, the clock, and his leg. During one moment he was perceptually aware of playing a videogame which he had difficulty describing but seemed to have a visual component. He described one (6%) moment which contained a sense of agreeing with himself. During this moment he was thinking that he would let his friend come to him instead of pursuing her. There was a sense that he was agreeing with himself, that he was making a good decision. He did not experience this as a thought, but it was in his awareness. He was also nodding his head, but he was unsure if nodding his head was in his awareness. Another moment seemed to contain an element of rumination. He had been debating whether or not to call his friend. At the moment of the beep he was thinking that he was not going to call her, but there seemed to be a lingering of the debate still in his awareness. Lastly, he experienced a moment of hunger.

Content of momentary inner experience. The most prominent theme in Paul's awareness seemed to be related to a friend he was considering pursuing romantically. His awareness was on this friend during nine sampled moments (53%). During eight of these moments Paul was evaluating what he was doing or should be doing regarding the status of their relationship. During the ninth moment he was just wondering how she was doing. Paul's activities captured by sampling included playing videogames, studying, exercising, watching television, driving, and cleaning.

Time orientation in inner experience. Paul's momentary experiences were primarily present-focused (57%), which often contained inner commentary on what he was doing. In some instances the inner commentary was symbolized, as innerly speaking, and at others it was unsymbolized thought. Future-focus was also prevalent in Paul's inner

experience (38%). These moments typically contained consideration of what he would or should do and were also often present as either inner speech or unsymbolized thought.

Paul had one past oriented moment. The past oriented moment occurred as Paul was leaving a class that he had rushed to campus to catch. The class had ended early. At the moment of the beep, he was innerly saying, “Why did I go to class” and feeling annoyed.

Relationship between questionnaire data and inner experience. Paul’s questionnaire data showed the greatest elevation on the third sampling day. This coincided with Paul’s only experience of sensory awareness and his fewest experiences of innerly speaking during any of the sampling days. In addition, a moment that seemed to contain rumination was captured on this day. Paul’s questionnaire indicated the lowest level of depression on the fourth sampling day. This was also the only sampling day during which Paul experienced feelings. These feelings were all negative-valence.

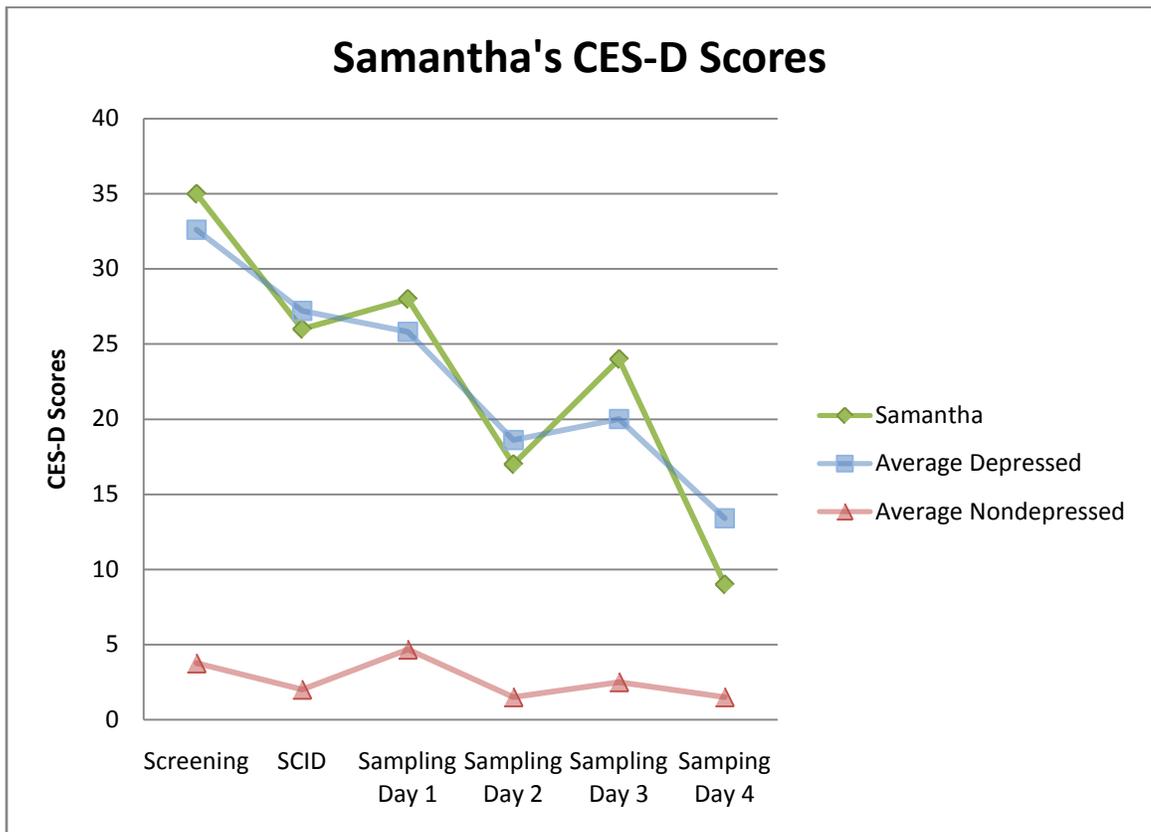
Samantha

Samantha was an 18 year old, Hispanic female who met criteria for dysthymic disorder at the time of qualification. She participated in the study from mid-February to late March of 2009. She reported previously experiencing one major depressive episode and she had received psychological treatment. She was attending the university full time during her participation. At the qualification meeting, she was dressed casually and somewhat trendy, was well kempt and was cooperative but reserved. She was also particularly inquisitive about her participation in the study.

CES-D. Samantha’s CES-D scores were indicative of clinically significant depression at screening, qualification, and sampling days one through three. However, her CES-D score of 9 on the last sampling day was below the value of 16 which, although

somewhat arbitrary, typically discriminates patient from nonpatient populations. Her scores fluctuated among the days of her participation with an overall trend of lessening depression scores. Samantha's CES-D scores over the course of the study are shown in Figure 4.

Figure 4



Feelings in momentary inner experience. Samantha experienced feelings in 10 of 18 or 56% of her sampled moment, making feelings her most frequent form of inner experience. She reported the experience of 12 distinct feelings in 10 of her 18 samples (there were two samples that contained two distinct feelings).

Her feelings were simultaneously positive-valence and negative-valence. For example, she had one sample in which she was experienced a feeling she called a “buzzing neutral state.” During this moment she was innerly seeing two potential emotional reactions she could have in response to finding her lost wallet. She was imagining one scenario in which she was throwing the wallet, representing anger and frustration. She was also imagining another scenario in which she was putting her wallet away which represented relief. She was feeling a “buzzing neutral state” in which she was experiencing with a sensation of buzzing tension on the surface of her forearms and in her chest.

Another simultaneously negative and positive moment occurred when she experienced what she described as a “aww-poor-me-type-pouty-sadness.” She had been listening to a song whose title contains her sister’s name. Prior to the beep she had noted that there are not songs that contain her own name. Prior to the beep she explained that she had been feeling genuinely sad, but at the moment of the beep she was experiencing a more playful-type sadness.

There was one more example of Samantha’s tendency to simultaneously experience one distinct positive-valence feeling and one distinct negative-valence feeling. She was experiencing both excitement and anxiety. Her dad and brother had just gotten home. She was feeling excitement related to them arriving which she experienced in the tone of her inner speaking, “They’re here!” She was also experiencing a feeling of anxiety related to knowing that her brother was sick and she would have to avoid being near him so she wouldn’t get sick.

She was also simultaneously surprised and bothered in one moment but these feelings seemed related. During this moment, she had heard her mom on the phone gossiping about work. And realized her mother was perpetuating workplace gossip, that she liked it and stays involved with it, thereby continuing it and causing herself stress. She was bothered by this realization which was experienced as part of the thought. To a lesser degree, she was also feeling surprised.

She did have one entirely positive-valence feeling in which she was experiencing happiness. She had four entirely negative-valence feeling samples in which she experienced fatigue, worry, guilt, and nervousness.

There was evidence of an emotional process ongoing but no feeling in experience during four of Samantha's 18 samples (22%). For example, there were three moments where the tone of Samantha's inner speaking conveyed affect. In particular, she had a moment of inner speaking in which the tone of her inner speech was self-reprimanding tone and another in which the tone was self-critical tone. These moments are particularly interesting because there emotion was present but a feeling was not. The third moment was previously described (her excitement in the tone of innerly speaking, "They're here!"). There was also a moment in which Samantha experienced laughter that had an ironic nature.

Depression in momentary inner experience. Sampling did not capture any primary symptoms of depression (depressed mood or loss of interest or pleasure). She did experience sadness during one moment, but it was more of a playful-type sadness. Of the 18 sampled moments, secondary depressive symptoms were potentially present in 6 moments (33%). During one such moment she was bothered, which may be related to

the depressive symptom of irritability. During two others she was experiencing exhaustion and a lack of energy. She also experienced a moment of worry and another of guilt. She also exhibited slowed inner seeing and slowed inner hearing which may be evidence of psychomotor retardation. Potentially relevant to depression, Samantha's sampling did capture her feeling anxious and nervous. In addition, she experienced emotional states of being self-critical and self-reprimanding that were not directly felt.

Forms of momentary inner experience. Samantha's most commonly experienced form of inner experience was feelings, present in 56% of her sampled moments. Her experience of feelings is described further in a later section.

Samantha innerly spoke frequently, in 50% of her sampled moments. Her inner speaking typically occurred with a particular tone. For example, during particular moments she innerly spoke with purposeful, reprimanding, dramatic, excited, and firm tones.

Samantha experienced inner seeing in 33% of her sampled moments and included some particularly noteworthy characteristics. These moments frequently consisted of Samantha's innerly seeing herself from a third-person perspective. These experiences included innerly seeing herself on MySpace typing to her sister, innerly seeing herself put nail polish on her desk, and innerly seeing herself pushing grocery cart while looking tired. She also simultaneously was innerly seeing herself putting away her wallet and throwing her wallet (previously described with the feeling of a "buzzing neutral state"). During one moment the lessened opacity/partial translucence of the inner seeing represented that she was just starting to have a thought. She had the sense that if the beep had caught this thought later it would have been more opaque. This may be evidence of a

slowed inner seeing process relevant to psychomotor retardation. In this moment she was innerly seeing her sister on the phone. Lastly, during one moment she was innerly seeing the words that she was also innerly saying. She was innerly seeing the words a few inches in front of her and they were rainbow colored, particularly reds, yellows, and blues. She was innerly seeing the words close together and blurred around the edges.

Unsymbolized thinking was present in 22% of Samantha's sampled moments. Several of her moments of unsymbolized thinking seemed related to things that she needed to do or should do. For example, she was thinking that her writing was awful and she should sit at her desk, that she needed to find her phone before falling asleep, and that she did not have enough energy to go shopping. During another moment she knew that her friend, who normally sends one text message at a time, had sent her multiple text messages.

There were several forms of inner experience which Samantha experienced infrequently. Samantha experienced two moments of sensory awareness (11%). During one moment she was experiencing the tactile sensation of the stickiness of hair gel on her fingers. During the other moment she was experiencing a sharp, burning pain in a small area of her middle finger. Samantha had two moments of inner hearing. One of the moments consisted of partially formed thoughts or "half ideas" of her thought that her friend was too young to be getting a job. She experienced hearing herself say, "I wasn't like that" and "he's only 16." This form of thought may be further evidence of psychomotor retardation.

In terms of forms phenomenon outside of the DES coding, perceptual awareness was also common, present in 50% of her sampled moments. Eight perceptual awareness

experiences were visual, seeing some aspect of her environment and one was auditory. Samantha always experienced another form of inner experience with perceptual awareness. She also had a moment of laughing. She was laughing ironically when she was logging into a computer account she had not logged into for several days despite logging into her other accounts. Lastly, during a moment when she was trying to remember where she had put her nail polish she was moving her arm slightly which was experienced as a physical memory of putting the nail polish on her desk.

Content of momentary inner experience. There did not appear to be a theme in the content of Samantha's inner experience. Sometimes her experience was related to what she was doing, such as chatting online or via text messaging, washing her hands, and thinking of a question to ask in class. Other experiences were related to awareness of things that she needed to do, such as feed her rabbit, go grocery shopping, and find her phone before taking a nap. Other times she was imagining something happening, such as chatting with her sister, reacting to finding her lost wallet, and putting away her nail polish. Other moments captured her thinking about others, such as considering her friend was too young to get a job, considering her mother's role in perpetuating gossip, knowing her brother was sick and had just gotten home, and wondering why her sister was not responding to her text messages.

Time orientation in inner experience. Present-focus was most prominent in Samantha's awareness with 66% of her sampled moments being exclusively present-focused. Future-focus was represented in 22% of Samantha's inner experience. During these four moments she was considering how she would react to finding her lost wallet, considering if she had enough energy to go grocery shopping, telling herself to cut up

carrots for her rabbit later, and considering when would be a good time to go to an aquarium. Past-focus was represented in only two sampled moments (11%). In one of these moments she was thinking about how she was when she was her friend's age, and in another she was trying to remember where she had placed her nail polish.

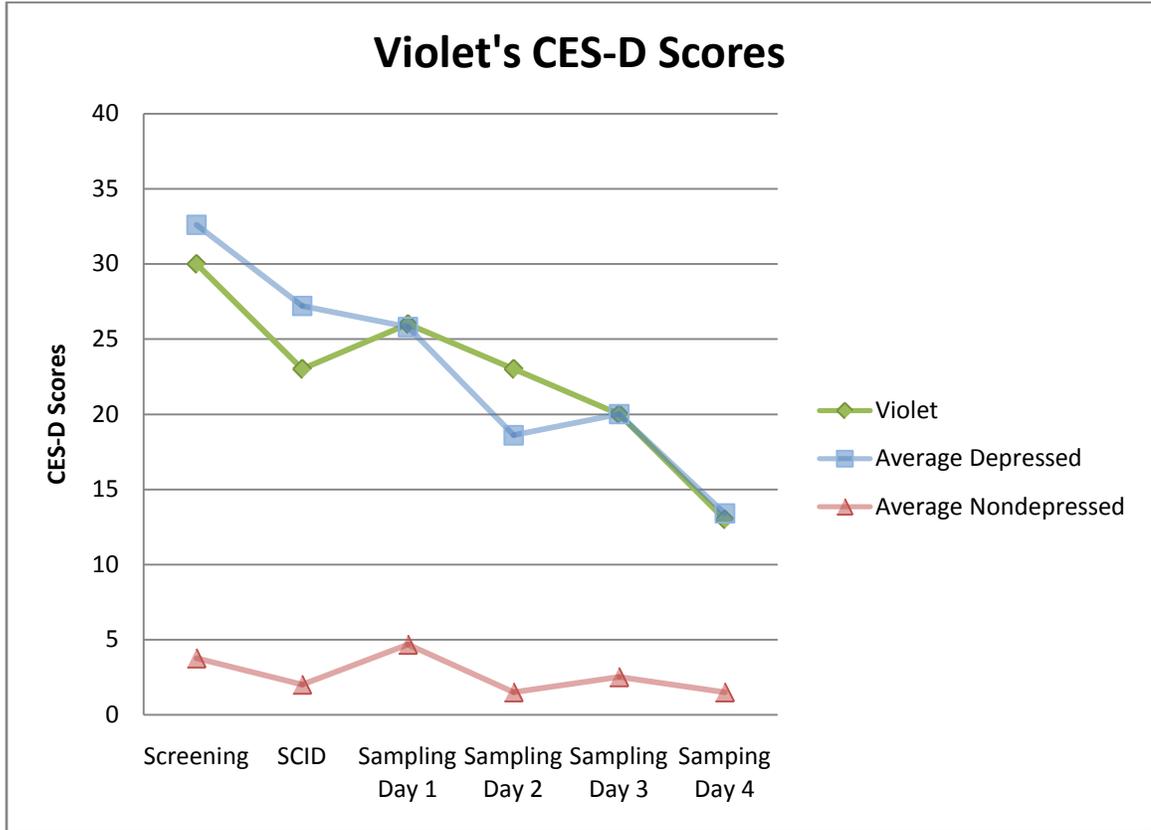
Relationship between questionnaire data and inner experience. Samantha's inner experience did not seem to coordinate with her questionnaire data in recognizable ways. Contrary to expectations, she experienced exclusively negative-valence feelings on her last sampling day, the day that she had the lowest score on her CES-D.

Violet

Violet was a 19 year old, Caucasian female. She participated in this study during March of 2009. At the time of qualification, she was experiencing a major depressive episode. She reported experiencing one previous depressive episode and she had been in psychotherapy prior to participation in the study. At the time of qualification, she was not receiving psychiatric treatment. Violet's dress was trendy and youthful. Her affect was surprisingly cheerful. She reported having a wonderful relationship with her parents and knowing that she had a wonderful life but experienced depression inexplicably.

CES-D. Violet's CES-D scores were indicative of clinically significant depression from screening through the third sampling day. However, her CES-D score on the last sampling day (13) is below the value of 16 which typically discriminates patient from nonpatient populations. However, it should be noted that this cutoff score is somewhat arbitrary. Violet's CES-D score was highest on the screening day (30) and seemed to gradually decline over the course of the four days of sampling from 26 to 23 to 20 to 13 respectively. Violet's CES-D scores over the course of the study are shown in Figure 5.

Figure 5



Feelings in momentary inner experience. Violet experienced four (25%) samples which each contained one feeling. Three of these experiences were of happiness and one was of sadness. She was unable to provide experiential details of her experiences of happiness. Happiness occurred along with smiling in one moment and laughing in another. Her feeling of sadness was partially experienced as a physical sensation of emptiness in her stomach.

Depression in momentary inner experience. Very few depression related experiences were captured in Violet's samples. Of the 16 sampled moments, a primary depressive symptom (depressed mood or loss of interest or pleasure) was distinctly present once (6%) and potentially present once (6%; she was thinking she did not like what she was

doing and did not want to be doing it). Lastly, a correlate of depression (thinking she was bored) was present in one (6%) sample. Both primary depressive experiences and the moment she was unable to report occurred on the third sampling day. She experienced thinking she was bored on the second sampling day.

Forms of momentary inner experience. Inner seeing was captured in four (25%) of Violet's sampled moments. These moments contained inner seeing of 1) a slice of pepperoni pizza, 2) Common (a rapper) singing a song, 3) her psychology exam Scantron, and 4) her friend wearing a work uniform. She experienced the inner seeing of the pepperoni pizza as having a location in her head. Each of her experiences of inner seeing corresponded with another aspect of her inner experience. She was innerly seeing the pepperoni pizza as she experienced hunger; she was innerly seeing Common seeing a song as she was watching him sing the song in a commercial; she was innerly seeing the Scantron as she was telling her parents that she had done well on the exam; and she was innerly seeing her friend in a work uniform as she was telling her parents she would be working with this friend.

Sensory awareness occurred in three (19%) of Violet's sampled moments. All of these moments were in the form of sensations. Two of them were sensed in her mouth and consisted of 1) the physical sensation of brushing her teeth and 2) the smoothness, butteryness, and warmth of mashed potatoes in her mouth. The third sensation was experienced as feeling the softness of her dog's fur against her hand as she petted the dog.

Violet experienced unsymbolized thinking in three (19%) of her sampled moments. Her unsymbolized thoughts seemed to contain inner commentary on some aspect of what

she was doing: 1) while eating mashed potatoes, she was thinking that they were really good, 2) while reading she was thinking that she did not want to be reading and was not enjoying what she was doing, and 3) while petting her dog she was thinking her dog is cute.

Violet experienced inner speaking during two (12%) of her sampled moments. During one of these moments she was innerly saying, "I'm so bored," and during the other she was innerly saying, "I hope I don't get any more cavities."

Violet experienced some other forms of inner experience that are represented within existing DES codes. She had two (12%) moments in which her awareness included watching a movie and/or television. She had one (6%) moments each of reading, talking, and doing. During the doing moment she was seeing a magazine picture and cutting it out.

Violet also had a variety of experiences which were not represented within existing DES codes. Violet frequently experienced perceptual awareness, present in five (31%) of her sampled moments. Her experience included two moments of listening to a song. During one of these moments she was also singing along with the song. During three moments she was seeing 1) her mom, 2) her dog, and 3) a magazine picture she was cutting out. These experiences included two moments each of hunger and experiencing a sense of intention along with another form of inner experience (i.e., cutting out a picture with the intention of doing so correctly or reading with the intention of processing the information). She experienced one moment each of smiling and laughing. Lastly, she experienced one moment that she was unable to report. She stated that a lot was going on at that particular moment. She had been struggling to jot down notes to capture this

moment when she was interrupted by a phone call. Therefore, she was never able to capture or report the momentary experience.

Content of momentary inner experience. The most frequently occurring theme in the content of Violet's inner experience was that her awareness tended to include self-observations and/or commentary. Some examples include her innerly saying, "I'm so bored," her innerly saying, "I hope I don't get any more cavities," and her thinking that she did not like doing the task that she was engaged in. Although some of her awareness was innerly focused, she also frequently had inner experience related to aspects of her environment. Awareness related to her environments included moments in which she was just having the experiencing something (watching a movie, laughing at a joke, several moments of listening to music, cutting out a magazine picture) as well as moments in which she was having an experience and thinking about it (eating mashed potatoes, petting her dog, watching a commercial, and reading).

Time orientation in inner experience. Violet's time orientation was clearly present-focused. Of the 15 sampled moment for which time orientation could be determined (excluding a moment she was unable to report on) her awareness was present-focused during 13 (87%) moments. She experienced one moment of past focus when she was thinking about how she had done well on her psychology exam and she experienced one future-focused moment when she was talking about how she would work with a friend when she started her new job.

Relationship between questionnaire data and inner experience. Violet's CES-D scores were similar on sampling days two and three and the lowest on the fourth sampling day. The only form of her inner experience which coincided with this pattern

was in her frequency of perceptual awareness. Violet experienced only one out of five moments of perceptual awareness on the second day and two out of six moments of perceptual awareness on the third sampling day. She showed an increase in frequency to four out of five on the fourth sampling day which corresponds with her decreasing CES-D score. There is some evidence of a relationship between depression in momentary experience and CES-D scores for Violet. Signs of depression were found on the second and third sampling days but not on the fourth.¹

Elissa

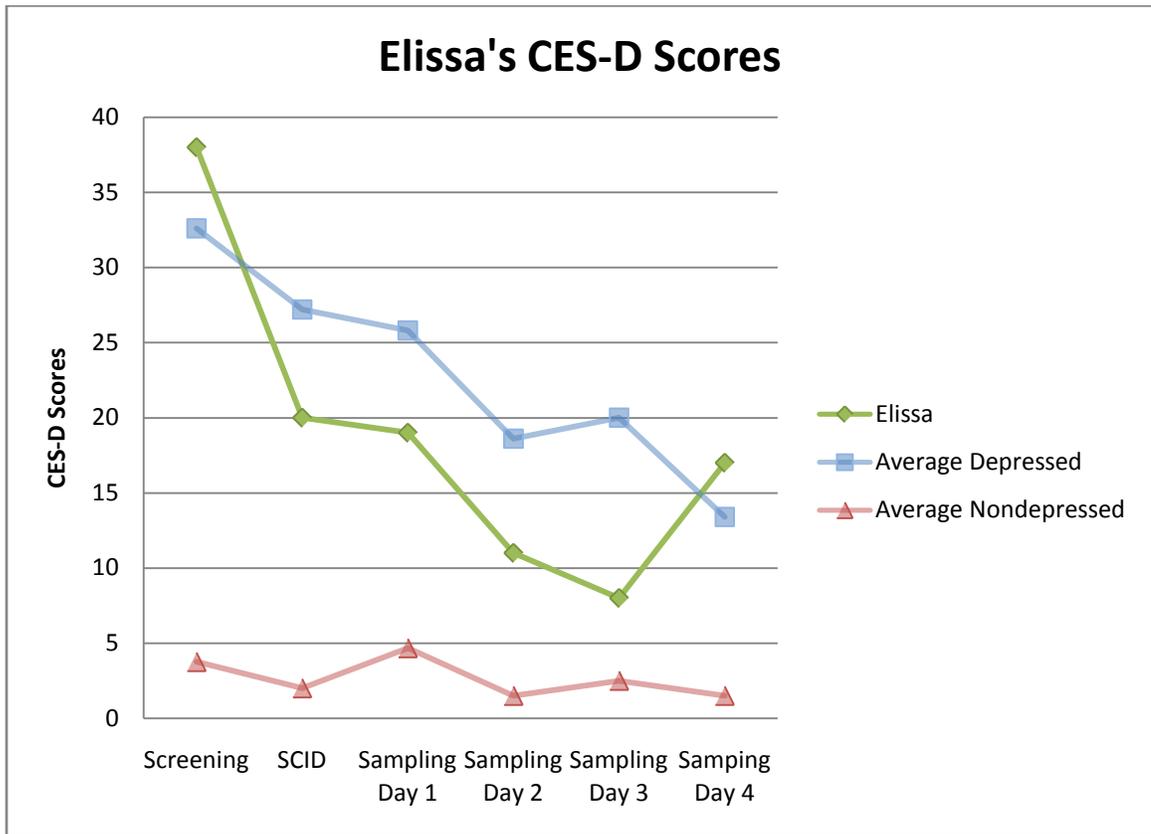
Elissa was a 19 year old, Hispanic female. She participated in the study from early February to mid-March of 2009. At the time of her participation in the qualification phase, she met criteria for experiencing a major depressive episode. She reported previously experiencing two other major depressive episodes, but she had never received psychological treatment. In addition to attending university, she worked a full-time job. Her busy schedule seemed to cause frequent rescheduling of our meetings resulting in her participation stretching over a longer period of time than the other participants. At the qualification meeting, she was dressed casually, was somewhat unkempt and presented with depressed affect. However, during the duration of the study, she came to meetings professionally dressed, well-groomed, and with a cheery affect.

CES-D. Elissa's CES-D scores were indicative of clinically significant depression at screening, qualification, and on the first sampling day. However, her CES-D scores of 11 and 8 during sampling days 1 and 2 respectively are below the value of 16 which typically discriminates patient from nonpatient populations. Her score returned to a

¹ However, the overall low frequency of depression in momentary experiences warrants caution toward establishing this relationship.

clinically significant score of 17 on the last sampling day. Elissa's CES-D scores over the course of the study are shown in Figure 6.

Figure 6



Feelings. Feelings were present in three (21%) of Elissa's samples. She experienced only negative-valence feelings. She experienced worry during one moment and she was tired in two others. Feeling worried occurred as a mixture of a feeling and inner speaking. Other potentially affect-related experiences included the experience of an unpleasant smell and a sense of being rushed, which occurred in separate moments on the second sampling day, and smiling on the fourth sampling day. These feelings were

clearly in her awareness but there were no reportable characteristics of the feelings beyond their presence

Depression in momentary inner experience. Depressive content was not prominent in Elissa's momentary experience. Of the 15 sampled moments, primary depressive symptoms (depressed mood or loss of interest or pleasure) were never present (0%), a secondary depressive symptom (fatigue; lack of concentration) was present in four (29%), and a correlate of depression (worry) was present in one (7%). The secondary depressive symptoms were all experienced in the fourth sampling day when she reported again being in the depressed range on the CES-D. Fatigue was experienced the most, in three sampled moments, and one moment indicated possible lack of concentration. The correlate of depression experienced on the third sampling day was a sense of worry.

Forms of momentary inner experience. Sensory awareness was prevalent for Elissa, occurring in 50% (7 of 14) of her sampled moments. Within these moments were 10 distinct sensory awareness experiences with three moments including two distinct sensory awarenesses. Her sensory awareness typically involved a bodily sensation. Bodily sensations were present in eight of her experiences of sensory awareness and included the sensations of smiling, pressure on her forehead and mouth, hunger, coughing, breathing, and heavy eyelids. She experienced three sensations of touch; the pressure on her finger of a mouse as she clicked it, the feeling against her upper palms of bumps on her steering wheel, and the feeling on her hand of the smoothness of the Wii remote. Lastly, she had one olfactory awareness in which she smelled the unpleasant scent of a Sharpie marker and one moment in which she was visually focused on the pinkness of a submission box on her computer screen.

Elissa was innerly speaking during seven of the 14 sampled moments, which represented half of her sampled moments. Typically, inner speaking occurred as part of a verbally-based task she engaged in at the sampled moment; she was innerly saying words as she read them during four moments and she was innerly saying a letter she was about to write at one moment. Two samples included inner speaking representing her thought at the moment of the beep. In one of these moments, she was innerly saying, “I wonder if I left it in there?” with a component of worry as she was looking at her purse to try to remember where she had left her checkbook. In the other, she was innerly saying, “Wait, what did that say?” after having seen a box of text flash on the TV screen. All of moments of her innerly speaking were tied to some visual awareness. While reading, she was seeing the words on the page as she innerly said them; while writing she was seeing the paper as she innerly said the next letter; and when her thoughts were represented by innerly speaking, it was connected with something she was looking at or had just seen.

Unsymbolized thoughts were somewhat common in Elissa’s experience, occurring in four of 14 (29%) of her sampled moments. These moments were often integrated with other aspects of her awareness. Similar to Elissa’s moments of innerly speaking, they were most frequently integrated with some sort of sensory or perceptual experience. For example, in one moment she was sensing the pressure of a marker against her lips and simultaneously thinking that she needed to keep hold of the marker. Similarly, in another moment she was sensing her cough and trying to keep her cough in her sleeve. The third example that portrayed this relationship occurred when she was hearing a song and thinking about where she knew the song from. The last unsymbolized thinking experience was integrated with a feeling (she was feeling tired and knew that she was

tired). Lastly, Elissa experienced just talking during one moment of sampling. During this moment she was talking to her roommate about what she needed him to do while.

In addition to the DES codes of inner experience, Elissa's momentary experiences also included perceptual awareness. Perceptual awareness refers to awareness of some sensory aspect of the internal or external environment in which the focus is its meaning or significance rather than its sensory characteristics (e.g., looking at a green light as a signal to go rather than being absorbed in its greenness). She experienced 19 distinct experiences of perceptual awareness contained within 13 of her 14 sampled moments (93%). Most commonly, these experiences were visual in nature. Her 12 visual experiences included seeing her computer screen, seeing words on a screen or page, and seeing other objects (i.e., purse, planner, book, and pen). She had seven experiences of auditory awareness which all involved listening to songs. When auditory awareness was present, it was not a central aspect of her awareness.

Content of momentary inner experience. Elissa's experience typically related to an activity she was engaged in and most often she was engaged in solitary activities. These activities commonly included using a computer (36%) or video game console (7%) or reading (29%). Other activities represented in her inner experience were working on a sign for work, driving, coughing, looking for her checkbook, and talking with her roommate. Her inner experience related to others on sampling days three (talking with roommate) and four (two moments of instant messaging).

Time orientation in inner experience. Elissa's momentary experiences were primarily present-focused (13 of 14 samples; 93%). This is in accordance with her high prevalence of sensory and perceptual experiences. She did have one future-focused moment (7%) on

the third sampling day in which she was thinking about what she needed her roommate to do the next day.

Relationship between questionnaire data and inner experience. Elissa only had a clinically significant score on the depression scale on the last (fourth) sampling day. The increased depression indicated by the questionnaire on the fourth sampling day coincided with an increase in Elissa's experience of feeling tired. Elissa's inner experience on the fourth sampling day did not appear markedly different from the previous sampling days in any other discernable way.

Nondepressed Participant Profiles

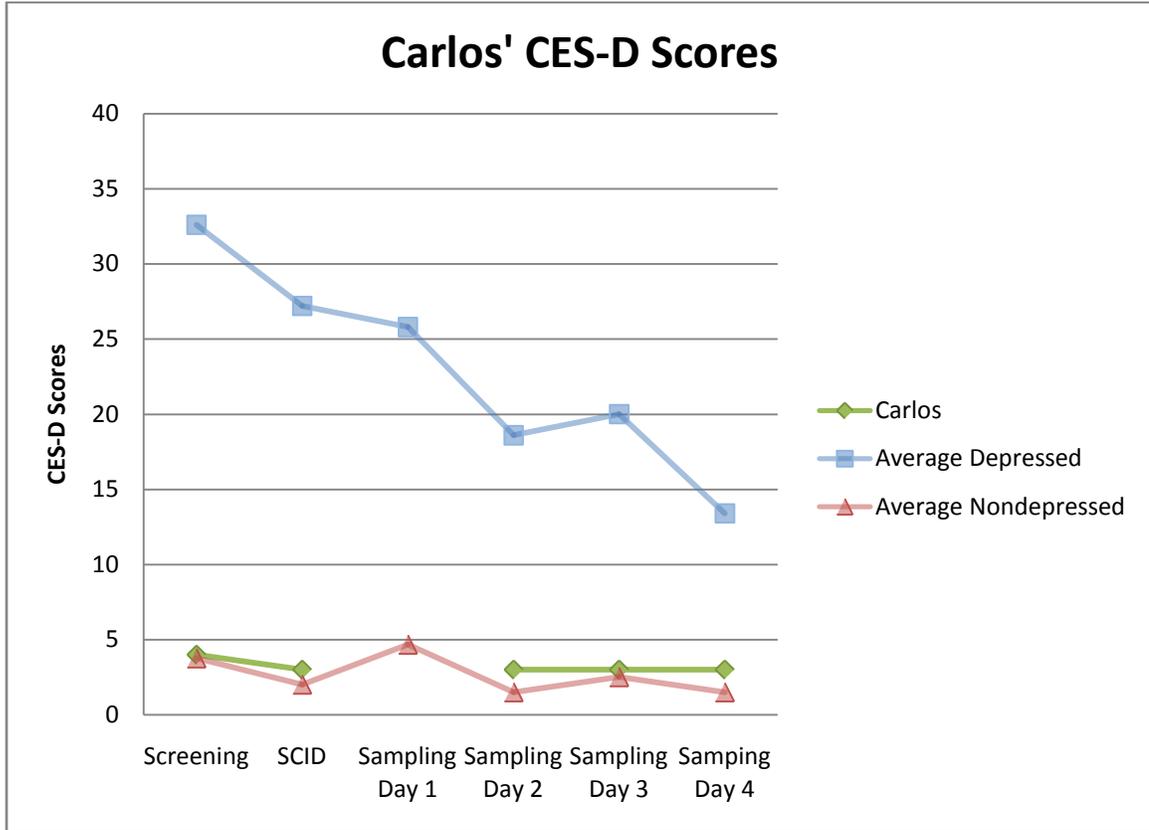
Carlos

Carlos was a 19 year old, Hispanic male. He participated in this study during late January to early February of 2009. At the qualification interview he was dressed casually but trendy. He was tall and lanky. He seemed to have a laid-back disposition and was pleasant. He had no psychiatric history.

CES-D. Carlos's CES-D scores throughout the study were comparable to individuals who are not experiencing depression. His scores were consistently very low. Carlos's first sampling day CES-D is considered missing data, but given the consistency among his other CES-D scores it is likely it would have fallen in a similar range. Carlos's CES-D scores are displayed in Figure 7.

Feelings in momentary inner experience. Carlos experienced a thought/feeling of stress and worry during one (6%) sample. He was walking to the library to work on papers that were due an hour from then. His awareness at the moment of the beep consisted of thinking about how it would be possible to get the papers done which was

Figure 7



integrated with a sense of stress and worry. Carlos experienced one other affect related moment. He was smiling. Smiling in this moment was experienced as an integration of the sensing the smile on his face and knowing that he was smiling.

Depression in momentary inner experience. Carlos' inner experience lacked depressive content. Of the 18 sampled moments, primary depressive symptoms (depressed mood or loss of interest or pleasure) were never present (0%), secondary depressive symptoms were never present (0%), and a correlate of depression (worry and stress) was present in one (6%).

Forms of momentary inner experience. Carlos experienced just doing as his most frequent form of inner experience. There were nine (50%) of his samples in which he

was just doing an activity (e.g., writing, typing, taking out the trash) with no other awareness.

The way that Carlos experienced most of his other forms of inner experience was very similar to just doing in that he was typically just focused on the activity he was engaged in. However, these experiences were better categorized as other forms of inner experience (i.e., perceptual awareness, reading, smiling). There were two moments in which Carlos was seeing the videogame he was playing and one in which he was just listening to his friend. Carlos experienced two moments (11%) in which he was just reading and one (6%) in which he was smiling. Lastly, Carlos experienced one moment (6%) of videogame playing in which he was particularly seeing the colors of the bubbles on the screen which was classified as a sensory awareness.

Engaging in an activity with the intention of doing it correctly/successfully was a theme across forms of inner experience for Carlos. This intention was captured in moments of just doing (cracking an egg), reading, and playing videogames.

Carlos experienced one moment (6%) of unsymbolized thinking. He had been watching the weather forecast which had predicated rain the next day. He was thinking about his girlfriend's talking about going to dance and thinking it was unfortunate that it would likely rain.

Content of momentary inner experience. Carlos' inner experience often reflected absorption in the task at hand. He was typically just engaged in the task that he was doing. These tasks included playing a videogame (three moments), writing (three moments), typing (three moments), reading (two moments), cracking an egg, taking out the trash, and making sure his water bottle did not fall from between his legs while he

was driving. Similarly, in other moments, he was just experiencing smiling and listening to a friend. Thinking was captured in only two moments of Carlos' inner experience. During one of these moments he was experiencing a thought/feeling of worry and stress and during the other he was thinking about his girlfriend talking about going to a dance and thinking it was unfortunate that it would likely rain.

Time orientation in inner experience. In concordance with Carlos' prevalence of just doing and perceptual awareness, his time orientation was most often present-focused (89%). He also experienced two moments which were future-focused. During one of these moments he was thinking it was unfortunate that it would likely rain during a dance his girlfriend wanted to attend and during another he was thinking about how he would be able to complete his papers that were due in an hour.

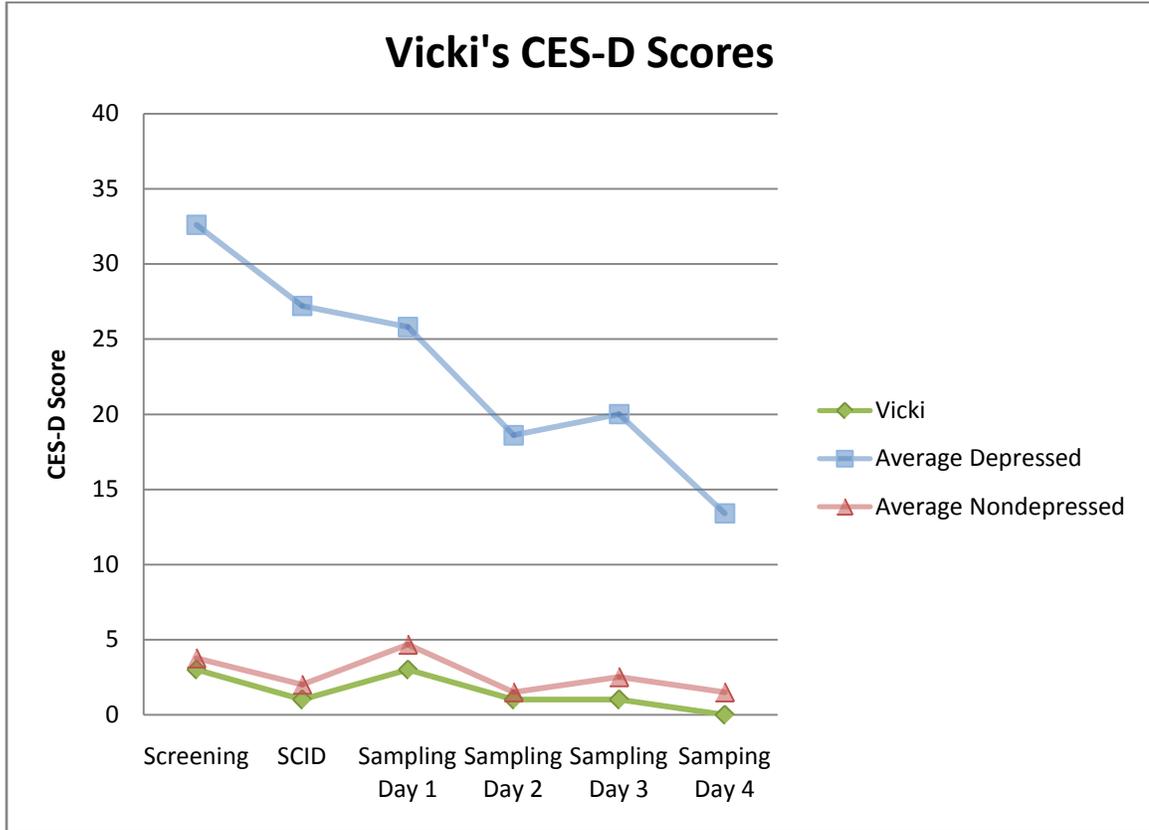
Vicki

Vicki was a Caucasian female in her late teens. She had no history of depression or psychiatric treatment. Vicki's experience sampling occurred during February 2010. Vicki presented as cheerful, pleasant, and well kempt at the qualification interview. She also reported being religious.

CES-D. Vicki's CES-D scores are consistent with individuals who are not experiencing depressive symptoms. Throughout the study her scores were consistently in at minimal levels (0 to 3 points). Vicki's CES-D scores are displayed in Figure 8.

Feelings in momentary inner experience. Vicki directly experienced feelings in two (12%) of her samples. One of these moments had a positive-valence and occurred after she had gotten a good grade on an exam. During this moment she was experiencing mostly shock as well as excitement and happiness. The other moment had a negative-

Figure 8



valence and occurred while she was thinking about telling her mom she had received a traffic ticket. During this moment she was experiencing a feeling of worried/nervousness.

Vicki experienced several other moments that were related to affect. She sensed cold wind during one moment, and coughing in another; both experiences had an unpleasant characteristic. There was another moment in which she was in class and her professor was preparing to show a video that she was uncomfortable with. Her experience at the moment of the beep contained an aspect of anger/frustration/negative tone; however she denied these feelings were directly in her awareness.

Depression in momentary inner experience. Vicki's 17 samples may have captured one primary symptoms of depression (depressed mood or loss of interest or pleasure). During one moment she did not want to go to school which could be indicative of anhedonia. Secondary depressive symptoms were not present in her samples. Potentially relevant to depression symptomatology, Vicki's sampling did capture her experiencing unpleasantness on two occasions, somatic complaints on two occasions, worry on one occasion, and angry during another occasion.

Forms of momentary inner experience. Vicki's most common form of inner experience was unsymbolized thinking which occurred in eight (47%) of her samples. There were three moments in which Vicki experienced only unsymbolized thinking. There was one moment each in which unsymbolized thinking was paired with sensory awareness, perceptual awareness, talking, feeling, and reading. During most of these moments her thought involved consideration of something she was going to be involved in. These unsymbolized thoughts included: 1) thinking about where to get food, 2) thinking that she did not want to go to school, 3) thinking about telling her mother she had gotten a traffic ticket and it not going well, and 4) wondering which question her professor would choose to ask the class. A couple moments were more reflective and included thinking about how cold her hike the day before had been and thinking that she had done better on exam than she had expected. Lastly, while she was doing her homework she was thinking about solving a problem related to humidity.

Vicki experienced inner seeing during five (29%) of her samples. Vicki tended to experience what she was innerly seeing as being located in front of her. Sometimes the object she innerly saw was inanimate (a spray paint can and a lab booklet) and at other

times she saw herself, either with a group of people (memory of a group trip abroad and of her hiking with a group) or alone (herself eating). During one moment she was innerly seeing her lab booklet and simultaneously but distinctly, she was innerly seeing her lab instructor.

Sensory awareness was present in four (24%) of Vicki's samples. During two of these moments she was experiencing only sensory awareness. These samples included her sensing cold wind on her face and sensing dryness in her throat as she coughed. She had another moment of sensory awareness in which she experienced uncomfortable throbbing in her right temple. Lastly, she has a moment in which she experienced achiness in her stomach.

Vicki had several other forms of inner experience which were each represented only once in her inner experience. These forms include: 1) just reading (her answer to a question), 2) inner hearing (herself saying, "Am I going to be a stay-at-home-mom?" in her own voice), and 3) just talking (saying to a friend, "Would she get mad if I left?" with a tone of angry/frustrated/negativity). In terms of forms not represented by DES codes, she had one perceptual awareness in which she was skimming a paper.

Content of momentary inner experience. Vicki's inner experience was most frequently related to her academics. Overall these academically related experiences occurred in 8 moments (47%) and included awareness of 1) something related to a class that she was attending at the moment of the beep, 2) doing homework, 3) reacting to a grade on an exam or paper. Other minor themes included experiencing unpleasant physical sensations (i.e. hunger, achiness, unpleasantness, pain, coughing) which was

present in five (29%) of her sampled moments. Lastly, she was remembering or anticipating trip she had/would take during three (18%) of her sampled moments.

Time orientation in inner experience. Future-focused time orientation was most common for Vicki, present in 8 (47%) of her sampled moments. During these moments she typically was focused on something that she intended to do (i.e., eat lunch, buy spray paint, complete homework) or anticipating how something might happen (i.e., wondering if she would be a stay-at-home mother, wondering how her professor would react if she left class, imagining a hike she was planning for the weekend, how her mother would react to her traffic ticket). Present-focus was also common for Vicki, occurring in six (35%) of her samples. Her present-focused moments tended to consist of awareness in the form of sensory or emotional experience and/or unsymbolized thoughts. Past-focus was present in three (18%) of her samples. During these samples she was remembering how cold it had been on a hike, remembering her trip abroad, and thinking that she needed to eat a better lunch than the one she had the previous day.

Jason

Jason was a 24 year old, Caucasian male. During the course of the study he became engaged to his girlfriend. He participated in the study during March of 2009. He was not experiencing symptoms of depression nor did he have a history of psychiatric illness. In addition to attending university, he worked in technical related customer service. At the qualification meeting, he was polite and cooperative. He was dressed casually and well-groomed.

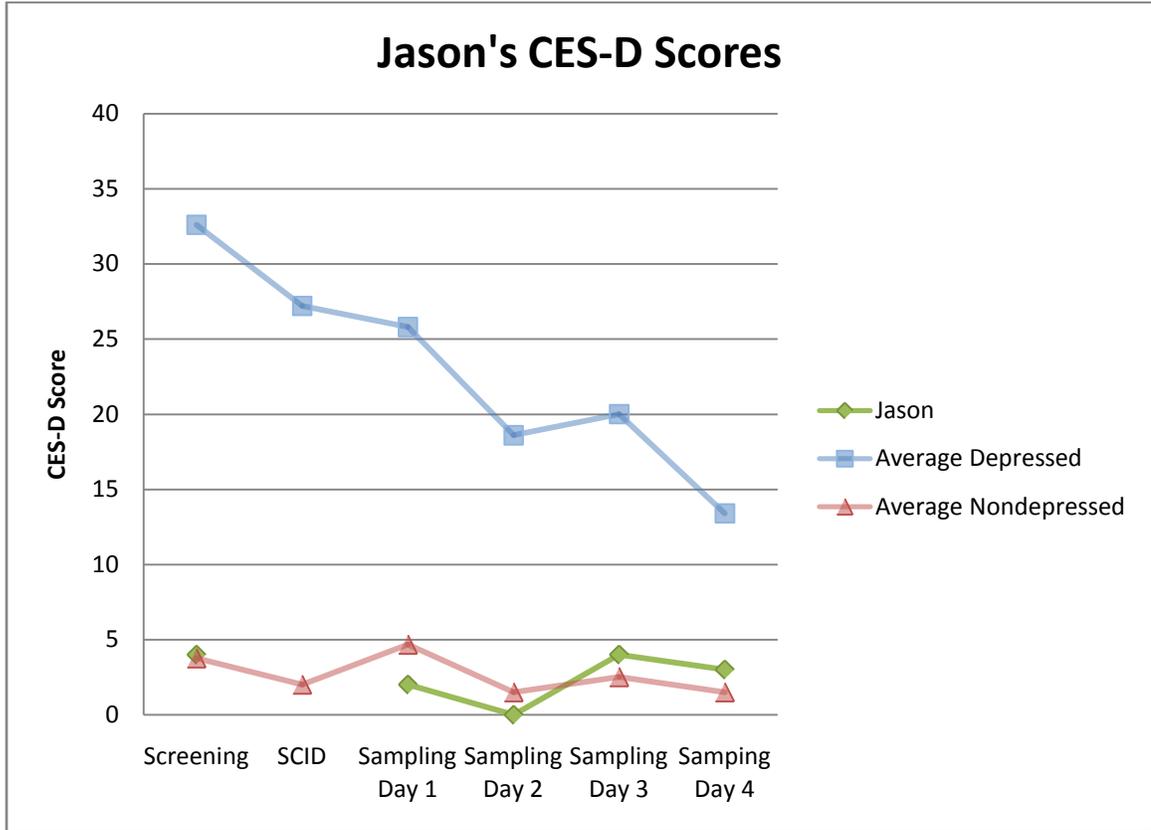
CES-D. Jason's CES-D scores are consistent with individuals who are not experiencing depressive symptoms. His scores were below five throughout the course of the study. Jason's CES-D scores are displayed in Figure 9.

Feelings in momentary inner experience. Jason experienced feelings or thought/feelings during four (22%) of his samples. This included one experience of a thought/feeling in which his experience of thinking he was lucky and feeling appreciative/humble were intertwined. His other experiences of feelings were also of positive-valence feelings. They included feeling happy and relieved (simultaneously) and happy/joyful (blended together). He experienced only one negative-valence feeling once, anger. In addition to directly experiencing a feeling, he had one other affect related moment. He also experienced unsymbolized thinking with a skeptical tone.

Depression in momentary inner experience. Experience related to depression was not captured in Jason's inner experience. He did experience anger during one moment.

Forms of momentary inner experience. Sensory awareness was also highly prevalent, occurring in 13 (72%) of Jason's samples. During four of the moments Jason experienced more than one distinguishable sensory awareness including one moment when he experienced three. Altogether, there were 18 experiences of sensory awareness in Jason's experience. Most often (89%) these experiences were tactile sensations. Jason had tactile sensations related to temperature (coldness, warmth, cool), pressure, texture (rubbing), itchiness, and dryness. The other two experiences were taste sensations. Overall Jason experienced separate sensations in 20 parts of his body (there were two sensations which were experienced in/on multiple body regions). Jason most commonly (40%) experienced sensations in/on his fingers/hands followed by his mouth/teeth (30%

Figure 9



including tastes). He experienced two sensations each on his face and shoulders. Lastly, he experienced one sensation on each of his eye, stomach, and back.

Other forms of inner experience occurred relatively infrequently. Jason experienced unsymbolized thinking during five (28%) samples. The contents of these five moments were: 1) his dreams are not interpretable and dreams in general may not be interpretable, 2) it feels good to have his eyes closed (in that moment it felt good), 3) he has a good chance of getting the condo that he had put an offer on, 4) disagreeing with the pope's stance on condom use, that condoms are bad for America and would not help with HIV/AIDS, and 5) the dent (that he was seeing) was particularly bad.

Jason innerly spoke during three (17%) of his samples. All three of these moments occurred on the last sampling day. Each of these moments seemed to capture an inner commentary on observations of his surroundings. For example, as he was listening to an alarm sound at his work, he was innerly saying, “Alarms are useless; when they go off no one care.”

Jason experienced inner seeing during just one (6%) of his samples. During this moment Jason was innerly seeing a crude, black and white sketch of a lion wearing a sweater vest. This inner seeing was understood as an accurate recreation of a scene from a television show.

Perceptual awareness was very common in Jason’s inner experience, present in 15 (84%) of his sampled moments. During six of these moments Jason was experiencing more than one perceptual awareness (e.g., hearing the sound of the faucet and seeing his coworker brushing his teeth). During two moments Jason simultaneously experienced three perceptual awarenesses. All together Jason’s experience contained 23 distinguishable experiences of perceptual awareness. The majority (78%) of Jason’s perceptual awareness occurred to a lesser degree of his awareness than some other aspect of his awareness at that moment. Jason had 13 experiences of auditory awareness and 10 experiences of visual awareness. Other forms of inner experience also occurred infrequently. Jason experienced reading during two (11%) of his samples. He was reading a text message both times but could not remember the exact words. He had one moment each of talking, movement (dancing around, nodding his head along with moving his upper torso and tapping his feet along with the music), intention (an intention

to scratch an itch), and effortful physical restriction (to restrict the range of his hand gestures to keep a cup of water he was holding from spilling).

Content of momentary inner experience. Jason's inner experience was often focused on sensory or perceptual experiences, in line with his abundance of perceptual and sensory awareness forms of inner experience. The predominant portion of Jason's awareness was often on tactile sensory experiences. Very often, a smaller portion of his awareness included perceptual awareness (seeing or hearing). Concrete, observational awareness was also reflected in other forms of inner experience, such as moments of innerly speaking, which contained internal observations of external stimuli he was encountering at the moment of the beep. There were a few moments in which he experienced more abstract thought processes. In these moments he was thinking about the interpretability of dreams, thinking he had a good chance of getting the condo he had put a bid in on, reflecting on a quote about appreciating life, disagreeing with the Pope's view of condoms, and remembering a scene from a television show.

Time orientation in inner experience. Jason's experience was typically focused on the present. Exclusively present-focused awareness occurred in 15 (83%) of his samples. This awareness was typified by perceptual and sensory awareness occurring in the sampled moment. Jason experienced two (11%) past-focused moments. During one of these moments he was remembering a television show he had watched and during the other he was remembering a conversation he had with a friend regarding the parking at the university. His only future-focused moment contained thinking that he had a good chance to get the condo he had put an offer on.

Triston

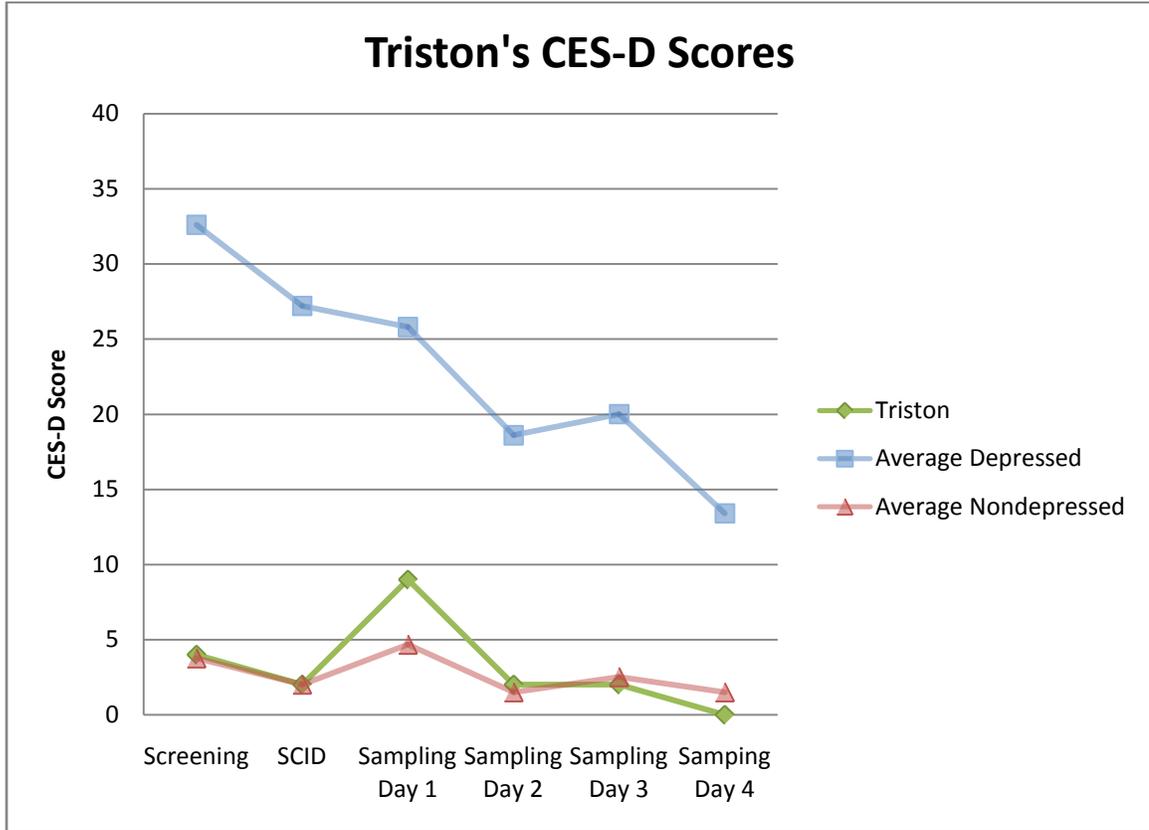
Triston was a 27 year old, Caucasian male. He was married and had an infant daughter. In addition to attending the university full-time, he served in a branch of the military on reserve. He participated in the study between late March and late April of 2009. At qualification he presented as well-groomed, respectful, pleasant, and polite. He was notably mature and professional in a way that reflected his somewhat older age for a college population and military experience. He had no history of depression or psychiatric treatment.

CES-D. Triston's CES-D scores throughout the study were comparable to individuals who are not experiencing depression. His scores were typically very low, between zero and four points. However on the first day of sampling, his score was relatively elevated at nine, which is still well below the cut-off for depression of 16. Triston's CES-D scores are displayed in Figure 10.

Feelings in momentary inner experience. Triston experienced feelings in seven (39%) of his samples. Of these moments, there were two which were experienced as thought/feelings (motivated and discontent). One of his feelings was a blended feeling (anxiety/excitement). Triston experienced both positive-valence and negative-valence feelings. His positive-valence feelings were anxious/excited (he reported this as a positive-valence feeling), relaxed, mildly excited, and motivated. Triston's negative-valence feelings were frustrated, mildly annoyed, and discontent.

Only two of his feelings were experienced with physical sensations. One of these physical sensation experiences was vague and occurred with the thought/feeling of

Figure 10



motivation. He was experiencing a sense of being physically energized. During another moment he was feeling relaxed with the sensation of butterflies in his stomach.

In addition to experiencing feelings, Triston has other moments that were related to affect. In one of these moments Triston's wife had asked him to change clothes. At the moment of the beep, he was experiencing an unsymbolized thought that consisted of thinking about why he could not wear what he wanted to and something that could be represented by the word, "you've got to be kidding me." Only the thought was in his awareness but he described the thought having a tone of mild annoyance. Similarly, he experienced an unsymbolized thought with a valence during another moment. He was attempting to feed his daughter who was being fussy about eating. At the moment of the

beep he was wondering why she was being difficult and trying to think of reasons she might be difficult. He described this thought as having an overall negative-valence undertone.

Depression in momentary inner experience. Triston's experience that was most relevant to depression occurred during one moment in which he felt discontent. Other experiences that could be related to depression consisted of thinking that a mistake he had made was "stupid," lacking motivation, and feeling annoyed.

Forms of momentary inner experience. The most common form of inner experience that Triston experienced was unsymbolized thinking which occurred during 10 (56%) of his samples. Often his unsymbolized thinkings were related to homework and/or studying he was engaged in at the time of the beep. These instances consisted of thinking about the process of figuring out equation for an exam, factoring an equation for exam, wanting to go downstairs but having to finish a practice problem, thinking it was stupid to have made a mistake on a problem, thinking there was a reason to study harder, considering whether an author was being overly liberal/one-sided, trying to remember where he had seen a quote in his paper, and attempting to write a blog for a course in a way that matched its title's moderateness. Other thinkings indicated a response to someone else. These instances included him questioning why he could not wear what he wanted after his wife asked him to change, thinking about his father-in-law's television watching, and wondering why his daughter was being difficult. Lastly, sometimes his thinking reflected some decision making process. During one moment he was considering if it would be worth getting up to get water and during another he was thinking about whether or not he wanted wheat crust pizza.

Triston experienced inner seeing in five (28%) of his sampled moments. During three of these moments Triston was only experiencing inner seeing. During the other two moments inner seeing occurred along with other forms of inner experience. The content of Triston's inner seeing occurred in such a way that it seemed to expand on his understanding of what was occurring at the moment of the beep. For example, as he was trying to figure out the property of an equation he was working with, he was innerly seeing a table in a book with blank spaces representing the values he needed to know to figure it out but could not remember. Similar experiences consisted of innerly seeing a scene from a book he was reading, innerly seeing the patio view in Hawaii that his father-in-law was describing, and innerly seeing a university website to figure out his final exam schedule.

Experiences of doing were also somewhat common in Triston's experience, present in three (17%) of his samples. These experiences always occurred along with another form of inner experience, but some of his awareness was on doing some activity in these moments. The three moments of doing included the activities of factoring an equation, working on a problem, and stirring his daughter's food. It is interesting to note that two of these examples (factoring the equation and working on a problem) are somewhat complex cognitive tasks. Yet Triston described engaging in these activities in a somewhat automatic way.

The other two common forms of inner experience were each represented once in Triston's inner experience. He experienced sensory awareness when he sensed the coldness of his drink in his hand. He innerly spoke during another moment when he was innerly saying, "Why can't you just do it?" In this moment, the inner speaking partially

represented his wondering why his wife could not change their daughter's diaper, that it was going to be uncomfortable for him to do it (because he was sore), and that he was tired and had not had much sleep. Other forms of inner experience only occurring once in Triston's sampled moments were reading, curiosity, doubt, and feeling hurried.

Perceptual awareness was present in six (33%) of Triston's sampled moments. During five of these moments Triston was experiencing the perceptual awareness at a lower level of awareness than some other form of inner experience. During one moment Triston was simultaneously experiencing two perceptual awarenesses (both seeing and hearing). Half of Triston's experiences of perceptual awareness were visual (seeing an equation, seeing dark outside, seeing the baseball score, seeing the page turning) and the other half were auditory (hearing the dialogue in a movie, hearing his wife talking on the phone, hearing his father-in-law talking, and hearing static on baby monitor).

Content of momentary inner experience. Awareness related to academic activities were frequent in Triston's awareness, occurring in 61% of his samples. His awareness included working on a math-related problem during four samples and working on an online course related blog during three samples. Other examples of academic related awareness included reading for class, considering his final exam schedule, attempting to motivate himself to study, and reflecting on a "stupid" mistake he had made on a problem. The second theme in Triston's inner experience was related to his family, his daughter, daughter, or father-in-law. Awareness of these family members occurred in 56% of his samples. Often his awareness was related to domestic affairs (planning what to do with his daughter, figuring out what to wear to a family dinner, figuring out why his daughter was being fussy about eating, etc.). In two samples, Triston was having a

negative reaction to his wife and in two others he was hurrying his work so that he could see his daughter.

Time orientation in inner experience. Triston's time orientation was most commonly present-focused, occurring in eight (44%) of his sampled moments. During these moments his awareness was typically related to a task he was engaged in (e.g., solving a math problem, feeding his daughter). Future-focus was also common for Triston, occurring in six (33%) of his samples. Typically these moments included awareness of something he wanted to do next (join his family for dinner) or was thinking about doing at a later time (imagining visiting his father-in-law in Hawaii, arranging childcare around final exam schedule, figuring out what to do with his daughter after her nap). Future-focus also represented a decision he was considering for future action (whether or not he wanted wheat crust pizza, whether or not it would be worth it to get up for water). Past-focus was present in four (22%) of his samples. One of these moments contained awareness of a very recent past event; during this moment he was reflecting on how a mistake he had made in a math problem was "stupid." During another moment he was remembering failing an interview the previous week. Two moments of awareness captured Triston's reflection on historical events in the past. These moments included an inner seeing representing his reading of the Battle of Dorchester Height and thinking about someone else's comment on the takeover of the Philippines during the Spanish-American War.

Overview of Naturalistic Sampling

Feelings in Inner Experience

A summary of the participants' experience of feelings is displayed in Table 6. As expected, depressed participants had a greater percentage of moments containing feelings than did nondepressed participants (Cohen's $d = 0.88$). The two participants with the greatest frequency of feelings were both in the depressed group and the two participants with the least frequent feelings were both in the nondepressed group. However, it should

Table 6

Overview of Feelings in Inner Experience

	% of Moments with Feelings	% of Positive- Valence Feelings	% Negative- Valence Feelings
<i>Depressed</i>			
Edward	93%	50%	43%
Paul	18%	0%	100%
Samantha	56%	25%	50%
Violet	25%	75%	25%
Elissa	21%	0%	100%
Depressed Average	43%	30%	64%
Depressed SD	32.0	32.6	34.5
<i>Nondepressed</i>			
Carlos	6%	100%	0%
Vicki	12%	50%	50%
Jason	22%	75%	25%
Triston	39%	57%	43%
Nondepressed Average	20%	71%	30%
Nondepressed SD	14.4	22.3	22.3
Effect Size (d)	0.88	-1.41	1.14

be noted that removing the depressed participant who experienced feelings most frequently, Edward, reduces the average feeling frequency of the depressed group to 30%.

Of the total feelings experienced by each participant, depressed participants had a lower percentage of positive-valence feelings than did nondepressed participants ($d = -1.41$) and a higher percentage of negative-valence feelings ($d = 1.14$). Two depressed participants experienced exclusively negative-valence feelings and one nondepressed participant experienced exclusively positive feelings. Even though CES-D scores of depressed participants decreased over time, there was no decrease in negative feelings across sampling days. Neither was there an increase in positive feelings across the sampling days for depressed participants.

Depression and Time Orientation in Inner Experience

Table 7 provides an overview of the depressive content and time orientation in the sampled moments of inner experience. The primary observation related to the frequency of depressive content in inner experience was that there was little of it in either the depressed or nondepressed group. There were only a few instances of primary depressive symptoms evident in the sampled moments of the depressed participants and almost none in the nondepressed participants. There was somewhat more evidence of secondary depressive symptoms in the depressed participants and again almost none in the nondepressed participants. The depressed and nondepressed participants had very similar levels of evidence of the correlates of depression in their momentary experience. This may suggest that casting too wide a net in looking for actual evidence of depression in momentary experience results in finding experiences that are not specific to depression.

Table 7

Overview of Depressive Content and Time Orientation of Sampling

	Depressive Content			Time Orientation		
	Primary Symptoms	Secondary Symptoms	Correlates	Past	Present	Future
<i>Depressed</i>						
Edward	13%	13%	13%	27% ^a	47%	41% ^a
Paul	0%	6%	29%	6%	57%	38%
Samantha	0%	33%	22%	11%	66%	22%
Violet	12%	0%	6%	7%	87%	7%
Elissa	0%	29%	7%	0%	93%	7%
Depressed	5%	16%	15%	10%	70%	23%
Average						
<i>Nondepressed</i>						
Carlos	0%	0%	6%	0%	89%	11%
Vicki	6%	0%	35%	18%	35%	47%
Jason	0%	0%	6%	11%	83%	6%
Triston	0%	6%	22%	22%	44%	33%
Nondepressed	2%	2%	17%	13%	63%	24%
Average						
<i>Note:</i> ^a These percentages add up to more than 100% because there were two moments which contained aspects of both past and future orientation.						

Depressed and nondepressed participants experienced very similar patterns of time orientation. Most often, momentary awareness was related to the present. The lack of between group differences on time orientation suggest that time orientation is not a substantial component of depression's influence on momentary experience.

Forms of Momentary Inner Experience

Each participant exhibited a unique profile in terms of forms of inner experience. Their experiences are summarized in Table 8 along with the group averages and the effect sizes (Cohen's *d*) for the differences between groups in the relative frequency of

Table 8

Overview of Forms of Inner Experience

	Sensory Awareness	Inner Speaking	Unsymbolized Thinking	Inner Seeing
<i>Depressed</i>				
Edward	0%	20%	33%	27%
Paul	6%	47%	29%	0%
Samantha	11%	50%	22%	33%
Violet	19%	12%	19%	25%
Elissa	50%	50%	29%	0%
Average	17%	36%	26%	17%
SD	20%	18%	6%	16%
<i>Nondepressed</i>				
Carlos	6%	0%	11%	0%
Vicki	24%	0%	47%	29%
Jason	72%	17%	28%	6%
Triston	6%	6%	56%	28%
Average	27%	6%	36%	16%
SD	31%	8%	20%	15%
Effect Sizes (Cohen's <i>d</i>)	.40	2.0	.72	.06

these four forms of inner experience. There were large individual differences in the frequency of sensory awareness with one depressed and one nondepressed participant experiencing sensory awareness much more often than all of the other participants. There was more within group consistency for inner speaking and a large between group difference with depressed participants experiencing more frequent inner speaking. The

lowest level of within subject variability occurred for unsymbolized thinking, and although there was a moderate effect size for the difference between the groups, both groups fell fairly close to the one-quarter-of-moments estimate for the relative frequency of unsymbolized thinking found by Heavey and Hurlburt (2008). There was some variability in the frequency of inner seeing across individuals but no difference in the relative frequency between the groups.

Feelings in Controlled Sampling

A summary of participants' feelings in controlled sampling are provided in Table 9. Feelings were experienced more frequently by depressed participants than by nondepressed participants during controlled sampling. In particular, four of the five depressed participants experienced sadness during the negative-emotion-eliciting film clip, whereas none of the four nondepressed participants experienced any feeling during this clip. A similar, though less striking finding occurred during the positive emotion eliciting film clip in which three of the depressed participants experienced a feeling compared to none of the nondepressed participants (with the possible exception of one nondepressed participant who experienced smiling). This pattern was also somewhat evident during the neutral film clips. During the first neutral film clip, two of the depressed participants experienced a feeling compared to none of the nondepressed participants. During the second neutral film clip, three of the depressed participants experienced a feeling compared to one of the nondepressed participants. Feelings during the neutral film clips represented both positive and negative valence emotions.

Table 9

Overview of Feelings in Controlled Sampling

	% of Moments with Feelings	% of Positive- Valence Feelings	% Negative- Valence Feelings
<i>Depressed</i>			
Edward	25%	100%	0%
Paul	50%	0%	100%
Samantha	75%	0%	50%
Violet	75%	0%	50%
Elissa	50%	50%	50%
Depressed Average	55%	30%	50%
Depressed SD	20.9%	44.7%	34.5%
<i>Nondepressed</i>			
Carlos	0%	0%	0%
Vicki	0%	0%	0%
Jason	0%	0%	0%
Triston	25%	0%	100%
Nondepressed Average	6%	0%	25%
Nondepressed SD	12.5%	0%	50%
Effect Size (d)	2.74	0.89	0.59

Relationship Between Questionnaire and Sampling Data

The relationship between within subject variations in the relative frequency of the presence of feelings in momentary experience and questionnaire data (PANAS-X Positive Affect and Negative Affect and SCL-90-R Global Severity Index) was examined using Pearson bivariate correlations. There was a significant relationship between feeling presence frequency and the Global Severity Index in which more psychiatric symptoms were related to more frequent feelings. There were also high, though not significant, correlations in which Positive Affect was related to fewer feelings and Negative Affect was related to more feelings. These correlations are shown in Table 15.

Table 10

Correlations of Questionnaire Data and Feelings in Sampling

	Total Feeling Frequency (<i>df</i> = 7)	
	<i>r</i>	<i>p</i>
SCL-R-90 Global Severity Index	0.73	.03
PANAS-X Positive Affect	-0.51	.16
PANAS-X Negative Affect	0.46	.21

CHAPTER 5

DISCUSSION

This study explored the momentary experience of feelings in depressed and nondepressed participants as well as several other aspects of momentary inner experience. The primary purpose of this study was to describe the experience of feelings in depression and examine the extent to which experience of feelings during depression differs from normal experiences of feelings. Descriptive Experience Sampling was used to investigate inner experience in both naturalistic and controlled setting. The results of this study suggest the following conclusions.

Conclusion #1: Robust Differences in Questionnaire Data were not Mirrored in Sampling Data

Participants completed several self-report measures; 1) repeated CES-Ds, 2) SCL-R-90, and 3) PANAS-X. Analyses revealed very robust differences between depressed and nondepressed participants on these self-report measures. Even when the average CES-D score of the depressed participants was closest to the nondepressed participants on the last sampling day, there was still a large difference in their scores. These self-report measures require participants to recall and summarize their perceived experience to answer the items. The very large between group differences on these self-report measures indicated that depressed participants reported very different perceptions of their experiences over time compared to nondepressed participants. They tended to report on questionnaires more depressive symptoms, more negative affect, more somatic complaints, and more anxiety. In general, they reported on questionnaires much higher levels of distressing experience in a variety of ways. This may turn out to be of central

importance in the study of depression, suggesting that retrospective reports of experience may actually dramatically overstate the presence of depression in actual momentary experience.

*Conclusion #2: Depressed Participants Experience More Feelings than Do
Nondepressed Participants*

The findings of this study provide preliminary support for a possible relationship between depression and the experience of feelings. When feelings were judged within a wide scope (e.g., feelings included tired and exhausted) depressed participants experienced feelings 43% of the time while nondepressed participants experienced feelings 20% of the time. In addition, the participant with the greatest endorsement of depressed symptomatology over the course of the study (as measured by the CES-D) had the most experiences of feelings; feelings were present in 93% of his samples. The participant who experienced considerably fewer feelings than the other participants, only 6%, was in the nondepressed group. The present findings are consistent with previous DES studies (Cavanagh, 2003; Gunter, 2007; Lefforge, 2007, Perlotta, 2001) which have consistently found that depressed participants experienced more feelings than nondepressed participants.

The higher frequency of feelings experienced by depressed participants was also found in the controlled sampling. This indicates that the difference in feeling frequency found in the naturalistic sampling cannot be attributed only to the participants' preference for affective situations.

In addition, the relationship between the Global Severity Index of the SCL-90-R, a general index of psychopathology, and feeling presence had a large magnitude and

approached significance. This study contributes additional evidence that psychopathology may be associated with increased frequency of feeling experiences. The PANAS-X subscales also demonstrated high correlations with feeling frequency. As negative affect increased, feeling frequency increased. As positive affect increased, feeling frequency decreased.

Caution should be used when interpreting this finding. The depressed participants experienced more feelings than did the nondepressed participants, but it is possible that the nondepressed participants' experience of frequency of feelings was unusually low. This possibility's likelihood is increased because the nondepressed group was selected based on their uniquely low reporting of depressive symptoms on the CES-D during the screening phase. These uniquely low CES-D scores persevered over the course of their participation. Also, one participant with a particularly high frequency of feelings accounted for much of the difference between the groups. However, this same participant was also the most depressed. Nonetheless, three of the five depressed participants' feeling frequency was comparable to the average feeling frequency in the normal population reported by Heavey and Hurlburt (2008).

Conclusion #3: Depressed Participants Experience a Higher Ratio of Negative to Positive Feelings

Depressed participants experienced positive feelings during an average of 30% of their samples and negative feelings during an average of 64% of their samples. The pattern for the nondepressed participants was the opposite: positive feelings were experienced during an average of 71% of samples whereas negative feelings were only experienced during an average of 30% of samples. In addition, two depressed

participants experienced only negative feelings and one nondepressed participant experienced only positive feelings. This finding supports previous DES studies (Cavanagh, 2003; Gunter, 2007; Lefforge, 2007, Perlotta, 2001) which have also found that depressed participants experience a higher ration of negative to positive feelings. However, one depressed participant experienced more positive than negative feelings and one nondepressed participant experienced equal percentages of negative and positive feelings; therefore this finding may not be applicable to everyone. It is also possible that this resulted from sampling fluctuations given that each subject provided a limited number of samples. Additionally, there were no relationships between within group fluctuations in CES-D scores and corresponding momentary experience of negative feelings or positive feelings for the depressed participants.

Conclusion #4: Depressed Participants had more Inner Speaking

Depressed participants' inner experience included inner speaking more often than did nondepressed participants. Heavey and Hurlburt (2008) found a frequency of 26% for inner speaking in a normal population. The depressed participants' frequency of 36% in the present study is fairly consistent with this rate. However, the nondepressed participant's frequency of 6% seems unusually low. As previously discussed, the nondepressed participants were selected based on their unusually low CES-D scores and therefore may not be representative of the general population. More research will be necessary to clarify this issue.

Conclusion #5: Secondary Symptoms of Depression were Experienced More Frequently by Depressed Participants than By Nondepressed Participants but Still Less Frequently than They Report on Questionnaires

Depressed participants experienced more secondary symptoms of depression in their sampled moments. There were a total of 13 experiences of secondary depressive experiences in the depressed group but only one in the nondepressed group. Most often the experienced symptom was related to lack of energy, with fatigue, exhaustion, and a lack of energy occurring in a total of six samples. Irritability was found in two samples and psychomotor retardation was found in two samples. There was one experience in which impaired concentration was directly experienced. Lastly, there was one moment of each of worry and guilt.

The between group differences were not surprising when considering how the groups were selected. The nondepressed group was chosen from the lowest scoring 10% of the screened participants who were not considered at high risk for depression. It is likely that the nondepressed participants' having infrequently occurring depressive symptoms compared to the general population contributed to the observed between group difference.

Although depressed participants experienced more secondary depressive symptoms than did nondepressed participants, the individual depressed participants' frequencies ranged from 0% to 33% with an average of 16%. Compared to their rate of endorsement of these symptoms on the self-report measures (i.e., repeated CES-Ds and SCL-90-R), these frequencies were much less than would be expected.

Conclusion #6: Depressed and Nondepressed Participants were Similar in Primary Depressive Symptoms and Time Orientation in Inner Experience

There were a number of facets of inner experience which were similar for the depressed and nondepressed participants. Most strikingly, there were minimal differences in the depressive content of momentary experience between depressed and nondepressed participants. Significant differences were not found in the experience of primary depressive symptoms, and nondepressed participants actually experienced a higher percentage of correlates of depression (e.g., anxiety) than nondepressed participants on average. The only significant difference in terms of depressive content in momentary experience was in secondary depressive symptoms. However, the average amount of experience of secondary depressive symptoms was only 14% for the depressed group. Combining all depressive experiences (primary, secondary, and correlates) revealed that depressed participants experienced depressive content during an average of 34% of their samples. While this appears to be a significant proportion of experience, it is important to keep in mind that nondepressed participants experienced depressive content during an average of 21% of their samples. Although we must take these findings as being highly tentative given the small size of the sample, the magnitude of these differences appears to be smaller than expected

Depressed and nondepressed participants also were similar in terms of time orientation, with present focus being most prevalent for both groups. This contradicts early research that established depressed persons' relative preoccupation with past events (Wyrick & Wyrick, 1977). More recent research has examined past orientation more closely, specifically by differentiating between past-positive and past-negative

orientations. Zimbardo and Boyd (1999) have developed a self report measure, the Zimbardo Time Perspective Inventory (ZTPI) which rates participants degree of five time orientations (past-negative, present-hedonistic, future, past-positive, and present-fatalistic). They have found that depression was highly correlated with past-negative (.59) and present-fatalistic (.37) time perspectives. Depression was also significantly correlated with present-hedonistic (.20) time perspective and negatively with future (-.19). There was also a low, but statistically significant, negative correlation between depression and past-positive (-.17) time perspective. I was able to examine the momentary experience I collected for the time orientations of past-negative, past-positive, and future. While statistical analyses of the time orientation were prevented in this study due to the low frequency of non-present awareness, preliminary evaluation does not support the relationships between time orientation and depression found by Zimbardo and Boyd (1999). For example, future awareness showed relatively equal frequency and distribution in the depressed and nondepressed groups. Participants were also similar in terms of past awareness regardless of group. Even when valence of past awareness was considered, depressed participants' experience did not indicate past-negative tendencies. In fact, past-negative moments were experienced by only two depressed participants one time each, whereas a nondepressed participant, Triston, had two past-negative experiences. Furthermore, the only past-positive moments (two total) were both experienced by depressed participants. It is important to note that I conducted the coding for time orientation in the present study while Zimbardo and Boyd's (1999) results were based on participants' self-reports, which may explain our discrepant findings.

Conclusion #7: Depressed Participants' CES-D Scores Decreased Over the Course of the Study

The depressed participants depression as measured by the CES-D decreased over time. The overall decline was significant and the decreasing pattern was demonstrated by all five of the depressed participants. There are several potential reasons for this observed effect.

First, the DES procedure may have contributed to amelioration of depressive symptoms. There are several characteristics of DES which align with psychotherapeutic interventions that have empirical support for depression. 1) Cognitive therapy (Beck et al., 1979) is the leading psychotherapeutic approach to treating depression with extensive empirical support. The premise of cognitive therapy is that people with depression have distorted ways of perceiving in a way such that they are prone to errors of inference, recollection, and generalization. Cognitive therapy attempts to increase awareness of depressogenic thoughts and assumptions so that patients increase accuracy thereby decreasing depression. It is possible that an analogous process occurs with DES. Similar to cognitive interventions such as mood monitoring, DES requires participants to observe their inner experience over the course of time. As previously mentioned, the samples often revealed an absence of depressive content which provide contradictory evidence for faulty depressogenic recollections and generalizations. Perhaps participants increased self awareness of their mood states over the course of study and corrected some cognitive errors. 2) More recently psychotherapies that incorporate mindfulness have increased and popularity and empirical support (Hayes, Masuda, Bissett, Luoma, & Guerrero, 2004). Mindfulness is paying attention purposefully to the present moment, without

judgment, thereby increasing awareness, clarity, and acceptance of present moment reality (Kabat-Zinn, 1994). This definition parallels the process of DES in which the participant is trained to purposefully observe inner experience and the goal is simply to share understanding of those moments without judgment. It is possible that DES shares enough commonality with mindfulness practices to have therapeutic effects. 3) Lastly, DES shares characteristics with general aspects of psychotherapy also referred to as common factors. Common factors, such as empathy, warmth, and acceptance, have been estimated to account for 30% of the improvement in psychotherapy patients while techniques of specific approaches account for only 15% (Lambert, 1992). This indicates that common factors are substantial. Although not specifically intended to be therapeutic, DES interviewers are trained to take a stance of openness, being attentive to the participant and what they have to say, and acceptance of whatever phenomenon the participant has experienced. Through the iterative process, the investigator typically establishes rapport and gains a unique understanding of the inner experience of each participant. Given the substantial influence of these types of factors, there is some evidence that DES could be utilized as a therapeutic intervention.

Second, the alleviation of depression may simply have been due to the passage of time. Most episodes of depression resolve within weeks or months (APA, 2000). Third, there may have been an increased chance of natural resolution of depression in the particular sample used as opposed to a psychiatric sample. All participants were a relatively high functioning group of college students presumably pursuing research credit through the subject pool. Functioning as a college student could indicate marked difference from other populations where depression is found (e.g., inpatient or outpatient

psychiatric populations) in terms of resiliency to chronic depression. Furthermore, participation in this study required a substantial commitment of time and effort. The study occurred over the course of several days and participants were asked to share their experience during interviews. Although participants were compensated for their time with research credit, the amount of research credit they earned in this study exceeded their semester requirement. Therefore, participation in this study required substantial motivation from the participants. Depression is characterized by symptoms which impede motivation. Therefore, it is possible that the depressed participants who agreed to participate and were able to follow through with the entire study were different from those who were not included in this study. While they all qualified for diagnosis of depression, their depression was not necessarily chronic or as severe as individuals who self-selected out of the study. However, there is evidence to refute this point. A greater percentage high CES-D scorers than low CES-D scorers completed the second phase of the study and there were fewer participants who declined participation or did not respond to requests to participate during this phase. After the qualification phase, only one qualified depressed participant declined further participation compared to two nondepressed participants.

Fourth, depressed participants may have received psychological intervention/s over the course of the study. As mentioned, participants who met diagnostic criteria for depression were referred to the student counseling center. Unfortunately, follow-up questions were not asked regarding whether or not participants pursued treatment. However, none of the depressed participants mentioned beginning treatment.

Fifth, the decrease in CES-D scores of depressed participants may be a response to a perceived expectancy effect. The participants were aware that they were experiencing clinically significant levels of depression because they were given this feedback along with a treatment referral in accordance with ethical principles during the qualification phase. Following identification of their depressed status, participants went through a series of interviews which may have been perceived as an intervention. Participants from the subject pool include students enrolled in psychology classes, most commonly an introduction course. It is possible that the procedure of this study closely resembles a student's concept of a treatment study. Therefore, participants may have perceived an expectancy effect and conformed to the perceived expectancy of improvement. The decreased pattern would not be observed in the nondepressed group because: 1) they were likely aware of their control group status, and 2) a floor effect.

Conclusion #8: Data Supports Previously Described Characteristics of Feelings

Heavey, Hurlburt, and Lefforge (2010) articulated nine characteristics of feelings based on accounts of inner experience gathered using DES. These characteristics were derived from samples of normal populations. However, the present study indicates that they also describe the experience of depressed populations.

This first characteristic of feelings is that feelings occur. In the present study feelings occurred in between 38% and 43% (depending on the breadth of inclusion) of depressed participants' samples.

The second characteristic of feelings is that feelings often are not present. This was evidenced by the remaining 62% to 57% of depressed participants' moments which did

not contain feelings. Similar to normal populations, individual differences in the presence/absence of feelings varied among individuals with a range of 18% to 93%.

The third characteristic of feelings is that feelings range from vague to distinct. This was present among depressed participants in this study. Here are examples to illustrate this point:

Example of a vague feeling: “At the moment of the beep he was thinking that he would let her come to him (that he would let her pursue him instead of pursuing her). This thought was not in words or images. There was a sense of agreeing with himself and that he was making a good decision. This was an emotional tone to the thought. He was also nodding his head, but he was unsure if nodding his head was in his awareness.”

Example of a clear feeling: “At the moment of the beep, he was innerly seeing an accurate rendition of the Trump Tower in Chicago as seen from being on the Chicago River. He was feeling excited which was experienced as a burst of energy throughout his body with particular bubbiness and tingling in his arms.”

The fourth characteristic of feelings notes that sometimes feelings are accompanied by bodily sensations. Depressed participants’ feelings were accompanied by bodily sensations 35% of the time. The sixth characteristic notes that bodily sensations range from vague to hyperclear. Here are examples that demonstrate both of these characteristics:

Example of a sensation that was somewhat vague: “At the moment of the beep, she was hearing the song playing out loud, singing it out loud, and hearing herself singing it. She was also feeling sad. The sadness was partially experienced as a physical sensation of emptiness in her stomach area.”

Example of a sensation that was clear: “At the moment of the beep, most of his awareness was seeing a police car and experiencing a feeling of anxiety. This anxiety was experienced as intense “bubble guts,” an exploding sensation of heat all over his body and an intense turning and warmth in his stomach area.”

The fifth characteristic of feelings is that sometimes feelings are not accompanied by physical sensations. Experiences of feelings without bodily sensations were captured by this study in 65% of depressed participants’ feelings. Here is an example of a feeling without a bodily sensation.

Example of feeling without a bodily sensation: “At the moment of the beep, she was innerly saying in her own voice, “They’re here!” She was experiencing a feeling of excitement which was conveyed in the tone of her inner speech. She was also experiencing a feeling of anxiety. This feeling was experienced as related to knowing that her brother was sick and she would have to avoid being near him so she wouldn’t get sick.”

The seventh characteristic of feelings is that some people experience multiple feelings. Simultaneous experience of more than one emotion was captured only once among the depressed participants. In this moment she was both bothered and surprised in a somewhat separate sense. Along similar lines, this participant also experienced moments that simultaneously consisted of positive and negative affect. Here are the examples:

Example of multiple feelings: “She had heard her mom on the phone gossiping about work. At the moment of the beep she was innerly saying, “she’s a part of its continuation.” This was the end of a train of inner speech in which she had come to the conclusion that her mother was perpetuating workplace gossip, that she liked it and stays involved with it, thereby continuing it and causing herself stress. Her inner speech was characterized by a purposefulness, intentionally clarifying for herself her new understanding of her mother’s involvement in the gossip. She was bothered by this realization which was experienced as part of the thought. To a lesser degree, she was also feeling surprised.”

Example of simultaneous negative and positive affect: “She had just picked up her wallet and was looking at it. She had lost the wallet and just found it after tearing apart her room looking for it. At the moment of the beep, she was deciding how she should feel about finding it. The deciding was present in her innerly seeing two scenes. In front of her to her left was a scene that represented feeling

relieved. She could see herself from above, putting her wallet in her backpack.

The scene to her right represented feeling angry/frustrated. She could see herself from above throwing her wallet on the floor. She was feeling a “buzzing neutral state” in which she was experiencing a buzzing tension on the surface of her forearms and in her chest.”

The eighth characteristic of feelings, feelings are sometimes blended or mixed, was also observed. Participants described their feeling at a particular time with mixed words, in which none of the words alone clarified the exact feeling. For example:

Example of a blended feeling: “At the moment of the beep, he was saying out loud with lower volume than he would use in a conversation, “Oh God, I miss (his boyfriend).” He was thinking about how his relationship eventually has to stop and that it is becoming pointless (because his boyfriend lives in another city). This thought was not in images or words. He was feeling of sad/hopeless which he experienced as related to the thought. There were no other experiential details of the feeling.”

Ninth, feelings are usually but not always discriminated from other phenomena. This final characteristic is evident in the examples that have been provided. Most of these examples contain a feeling distinct from other aspects of awareness. However, some of these examples contain a feeling that is closely related to a thought or tone of inner

speech. Sometimes distinguishing feelings from other forms of inner experience is complex.

Conclusion #9: Idiographic Approaches are Necessary to Capture Wide Ranges of Within Group Inner Experiences

This study included in-depth profiles of each participant. This revealed five unique presentations of inner experience among the participants with depression. Whereas these participants appeared to be a largely homogenous group on self-report measures, closer examination of each one across time revealed many individual differences. In fact, often the within-group variability exceeded between group differences. These findings suggest the importance of conducting idiographic research to understand unique presentations of psychopathology, despite some of the limitations of such methods (e.g., small sample sizes, lower efficiency). This importance may be underscored in the area of depression because treatment of depression is particularly characterized by high rates of nonresponse, partial response, and relapse despite treatment and current predictors of nonresponse lack specificity and sensitivity (Kemp, Gordon, Rush, & Williams, 2008).

Limitations

One of the primary limitations of this study concerned the target of interest. In this study, the target of interest was depression. However, the depressed participants' level of depression decreased substantially as the study progressed. Only the last three sampling days were used in this analysis and by that time depression scores were substantially lower than when the participants were initially recruited. On the last sampling day they were below the typical cut-off for depression. It might be useful to study depression that is more chronic and severe in nature, which would likely be found in a group that is lower

functioning than a university subject pool would likely provide. For example, conducting this study with psychiatric inpatient populations might yield different results.

Additionally, it would have been helpful to have a depressed control group who did not undergo DES sampling. This would have allowed comparison to the depressed group regarding self-report of depressive symptoms over time to determine if the DES procedure contributed to reduction of reported symptoms.

This study was also limited by a small sample size of nine participants. The small sample size prevented the application of statistical analyses to substantiate between group differences. Therefore, the nature of this study is exploratory and the results should be interpreted with some caution until further investigation with larger samples is conducted. Furthermore, the nondepressed group was not selected in such a way to represent the general population. They were chosen because they scored at the lowest level on the CES-D during screening. Therefore, they may have reported fewer depressive symptoms than the average nondepressed population. They may also differ from other people who do not suffer from depression in other ways.

Another limitation is that I conducted the sampling alone. Therefore, there was only one perspective on these experiences. I attempted to address this concern by applying my training in the DES method and by receiving ongoing supervision. However, the possibility still exists my application of the method contains blindness, exaggeration, or other idiosyncrasies that could have influenced the results.

The results may also have been influenced if I had extended the sampling. This study's procedure specified four days of sampling as opposed to sampling to the point of saturation. It is possible that the findings could have been enhanced if sampling with

each participant was repeated until no novel characteristics of inner experience were found. However, conducting in this study would have increased the burden of participation which was undesirable as the procedure as-is was fairly demanding of participant's time.

Implications of Conclusions

Perhaps the most important finding of this study is that whereas depressed participants differ markedly from nondepressed participants on self-report measures, these differences are not necessarily represented in differences in inner experience. This finding is consistent with other research which indicates cognitive errors prevalent in depression. DES reduces the effects of state-dependent memory, which may account for why the depressed participants reported so much depression retrospectively but not during sampling.

Another interesting finding was that depressed participants experienced more feelings than non depressed participants. Despite their increased familiarity with emotion experience, persons with depression are more prone to errors in emotion processing than are nondepressed persons. One possible explanation for this phenomenon comes from depressed individuals' tendency to be self-focused (Larsen & Cowan, 1988) which impairs ability to attend to and respond to others. Therefore, even though individuals are more experienced with emotion, as indicated by their higher frequency of feelings, they are less able to process and/or interpret the emotions of others.

The methodology of this study to unveil distorted perception may have clinical utility. DES can point out the discrepancies in one's perception of his/her experience and his/her actual inner experience in a collaborative way. This collaboration allows for

understanding of the true nature of another's inner experience on the part of both the participant and the investigator. Clinicians currently use tools with similar objectives (e.g., thought records). DES methods have some potential to supplement these tools and may even be preferred because accurate understanding of inner experience is understood before change is attempted.

Future Directions

The current study was an exploratory examination of the experience of emotion among individuals with depression, a topic that warrants further investigation. The findings of this study contribute to divergent findings regarding emotional response in depression. Consistent with experience-based studies, depressed participants tended to react with emotion when presented with emotion-eliciting stimuli. This finding is inconsistent with studies that have detected the emotion insensitivity effect in depression, in which depressed individuals have less of a response to both positive and negative affective stimuli. It is unlikely that response bias is entirely responsible for this discrepancy, as emotion context insensitivity has been observed physiologically through studies measuring electromyographical and neuron response. Further studies would be necessary to understand the discrepancies that have arisen.

The current study included a non-orthodox approach to understanding the experience of feelings. Dimensions of feelings, such as clarity and bodily sensations, are largely overlooked in emotion research. However, to understand emotion, it is important to have some understanding of the basic human experience of emotion. Therefore, the study of emotion would benefit from regarding understanding of the subjective experience of emotion as intrinsic to understanding emotion.

The most important unanswered question that remains from the current findings is an understanding of what happens between lived experience and reporting of experience in people with depression. The process of translating momentary experience into generalizations about one's experience is fraught with errors when a person is depressed. While DES is tailored to capture the momentary experience and other methods have captured depressed individuals generalization of their experience, the bridge connecting these findings is a largely unexplored territory.

APPENDIX 1

IRB APPROVAL FORM



**Social/Behavioral IRB – Expedited Review
Approval Notice**

NOTICE TO ALL RESEARCHERS:

Please be aware that a protocol violation (e.g., failure to submit a modification for any change) of an IRB approved protocol may result in mandatory remedial education, additional audits, re-consenting subjects, researcher probation suspension of any research protocol at issue, suspension of additional existing research protocols, invalidation of all research conducted under the research protocol at issue, and further appropriate consequences as determined by the IRB and the Institutional Officer.

DATE: November 14, 2008
TO: **Dr. Christopher Heavey**, Psychology
FROM: Office for the Protection of Research Subjects
RE: Notification of IRB Action by Dr. J. Michael Stitt, Chair
Protocol Title: **Experience of Depression**
Protocol #: 0808-2822

This memorandum is notification that the project referenced above has been reviewed by the UNLV Social/Behavioral Institutional Review Board (IRB) as indicated in Federal regulatory statutes 45 CFR 46. The protocol has been reviewed and approved.

The protocol is approved for a period of one year from the date of IRB approval. The expiration date of this protocol is November 9, 2009. Work on the project may begin as soon as you receive written notification from the Office for the Protection of Research Subjects (OPRS).

PLEASE NOTE:

Attached to this approval notice is the **official Informed Consent/Assent (IC/IA) Form** for this study. The IC/IA contains an official approval stamp. Only copies of this official

IC/IA form may be used when obtaining consent. Please keep the original for your records.

Should there be *any* change to the protocol, it will be necessary to submit a **Modification Form** through OPRS. No changes may be made to the existing protocol until modifications have been approved by the IRB.

Should the use of human subjects described in this protocol continue beyond November 9, 2009, it would be necessary to submit a **Continuing Review Request Form** *60 days* before the expiration date.

If you have questions or require any assistance, please contact the Office for the Protection of Research Subjects at OPRSHumanSubjects@unlv.edu or call 895-2794.

Office for the Protection of Research Subjects
4505 Maryland Parkway • Box 451047 • Las Vegas, Nevada 89154-1047
(702) 895-2794 • FAX: (702) 895-0805

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VITA

Graduate College
University of Nevada, Las Vegas

Noelle L. Lefforge

Degrees:

Bachelor of Arts, Psychology, 2002
University of Nevada, Las Vegas

Master of Arts, Psychology, 2007
University of Nevada, Las Vegas

Special Honors and Awards:

- Excellence in Teaching Award, University of Nevada, Las Vegas, Graduate College, April 2007.
- Outstanding Student in Psychology, University of Nevada, Las Vegas, March 2003.
- Undergraduate Academic Research Award for \$1000, University of Nevada, Las Vegas, December 2002.
- Vista Award Nominee from the Department of Psychology, University Of Nevada, Las Vegas, March 2002.
- Outstanding Student of the Year, Achievement Center of Psychology, College of Liberal Arts, University of Nevada, Las Vegas, 2000-2001.
- Recognition of Outstanding Research and Performance, Achievement Center of Psychology, College of Liberal Arts, University of Nevada, Las Vegas, August-December, 2002.
- Mary Dougherty Honors Scholarship from the Honors College of the University of Nevada, Las Vegas, 2000 to 2003.
- Dean's Honor List, College of Liberal Arts, University of Nevada, Las Vegas, 1999 to 2002.
- Mitzi & Johnny Hughes Honors Program Scholarship, Honors College, University of Nevada, Las Vegas, 1999-2000.

Publications:

Heavey, C. L., Hurlburt, R. T., **Lefforge, N. L.** (in press). Descriptive Experience Sampling: A method for exploring momentary experience. *Qualitative Research in Psychology*.

Lefforge, N. L., & Heavey, C. L. (2008). *Experience during the early stages of treatment with antidepressant medication: An idiographic approach*. Saarbrücken, Germany: VDM.

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Dissertation Title: The Experience of Feelings in Depression

Dissertation Examination Committee:

Chairperson, Christopher L. Heavey, Ph. D.

Committee Member, David Copeland, Ph. D.

Committee Member, Russell T. Hurlburt, Ph. D.

Graduate Faculty Representative, Jennifer Keene, Ph. D.