UNLV | University Libraries
University of Nevada, Las Vegas

UNLV Theses, Dissertations, Professional Papers, and Capstones

8-2010

Examining the inner experience of left-handers using descriptive experience sampling

Aadee Mizrachi
University of Nevada, Las Vegas

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

 Part of the Biological Psychology Commons

Repository Citation

Mizrachi, Aadee, "Examining the inner experience of left-handers using descriptive experience sampling" (2010). *UNLV Theses, Dissertations, Professional Papers, and Capstones*. 818.
https://digitalscholarship.unlv.edu/thesesdissertations/818

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

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

www.manaraa.com

EXAMINING THE INNER EXPERIENCE OF LEFT-HANDERS USING DESCRIPTIVE EXPERIENCE SAMPLING

by

Aadee Mizrachi

Bachelor of Arts
University of Nevada, Las Vegas
2004

A thesis submitted in partial fulfillment of
the requirements for the

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

Graduate College
University of Nevada, Las Vegas
August 2010

www.manaraa.com

Copyright by Aadee Mizrachi 2010
All Rights Reserved

www.manaraa.com

UNLV
UNIVERSITY OF NEVADA LAS VEGAS

THE GRADUATE COLLEGE

We recommend that the thesis prepared under our supervision by

Aadee Mizrachi

entitled

Examining the Inner Experience of Left-Handers Using Descriptive Experience Sampling

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

Master of Arts in Psychology

Russell Hurlburt, Committee Chair

Jeffrey Kern, Committee Member

Murray Millar, Committee Member

Terance Miethe, Graduate Faculty Representative

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

August 2010

المنارة للاستشارات
www.manaraa.com

ABSTRACT

Examining the Inner Experience of Left-Handers Using Descriptive Experience Sampling

by

Aadee Mizrachi

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

Research suggests that there are anatomical asymmetries of the human brain in relation to hand preference. In addition, left-handedness has been related to a wide range of psychological and physical problems. Despite these relationships, little is known about the inner experience of left-handers. The present study used Descriptive Experience Sampling (DES) to explore the inner experience of 6 left-handed participants. Descriptive Experience Sampling is a nonquantitative sampling method designed to explore and describe inner experience. Undergraduate psychology students were recruited from UNLV to participate in the study. Recruitment consisted of three phases: screening, qualification, and sampling. Students who reported writing with their left-hand in the screening phase moved into the qualification phase. During this phase, students completed the Edinburgh Handedness Inventory (EHI). Students who were left-handed, as indicated by their score on the EHI, were asked to participate in the sampling phase. During the sampling phase, the present study examined the inner experience of each subject. After examining the inner experience of each subject, the present study examined across-subjects data and compared the findings from this study to the findings of Heavey and Hurlburt (2008). To date, there have not been any inner experience explorations of left-handed individuals. The present study found that inner experience

www.manaraa.com

among left-handed individuals is most saliently characterized by sensory awareness, inner seeing, unsymbolized thinking, multiple experience, searching, and inner speech. The present study found that left-handed individuals experience words and feelings substantially less than the general population.

www.manaraa.com

ACKNOWLEDGMENTS

I would first like to thank the six participants who volunteered to participate in the present study for their collaboration and willingness to share these private, momentary experiences of their lives. I would like to express appreciation to my thesis chair, Russell T. Hurlburt, Ph.D. for his support, encouragement, and dedication to this project, and to committee members Jeffrey Kern, Ph.D., Murray Millar, Ph.D., and Terance Miethe, Ph.D. Thank you all for the patience, knowledge, and enthusiasm you have provided me throughout the thesis project.

www.manaraa.com

TABLE OF CONTENTS

www.manaraa.com

www.manaraa.com

www.manaraa.com

www.manaraa.com

CHAPTER 1

INTRODUCTION

Inner Experience of Left-Handers

This project examines the inner experiences of left-handers as they are experienced in everyday activities. Approximately ten percent of the western population is left-hand dominant such that they use their left hand for writing and other one-handed activities (Medland, Duffy, Spurdle, Wright, Geffen, Montgomery, & Martin, 2005). Differences in anatomy and behavior between left- and right-handers have been observed since the 1800s (Herron, 1980). However, little, if anything at all, is known about the inner experience of left-handed individuals or about whether differences exist between the inner experience of left-handed and right-handed individuals. The present study sought to explore these characteristics and differences in inner experience using a methodology designed specifically to reveal inner experience in as detailed a manner as possible, Descriptive Experience Sampling (DES).

The following review of the literature is divided into three parts: handedness, left-handedness and other constructs, left-handedness and self-awareness.

Handedness

Hand movements are extremely important in the physical experience of human beings. The majority of what people do they do with their hands (Hammond, 2002). Hammond (2002) defines handedness as "a fundamental behavioral characteristic that is integrated into our everyday activities," (p. 285). Although many people identify handedness with the hand that is used to write, handedness is actually a construct that involves a variety of activities and modalities. Individuals who consistently use the left

www.manaraa.com

hand to write may perform a variety of other activities with the right hand. Thus individuals may be identified as consistent or mixed handed. Chemtob and Taylor (2003) found that approximately 66% of the population are consistent right-handers and approximately 4% are consistent left-handers, while the remaining 30% are mixed right-handers (Chemtob & Taylor, 2003).

Interest in handedness dates back to the 1800s; however, it is likely that interest in this area existed throughout history. For example, there are references to left-handedness in the Old Testament (Herron, 1980). Early theories regarding handedness include structural asymmetry, dynamic balance, and blood supply. Such theories focused on asymmetrical arrangements of internal organs or the asymmetrical distribution of blood supply throughout the body. More recently, focus shifted to the brain when localization of speech in the left cerebral hemisphere was identified in the 19th century by Paul Broca (Herron, 1980).

The relationship of handedness and brain asymmetry continues to be of considerable interest and brain anatomical asymmetries are thought to underlie hand preference (Phillips & Sherwood, 2005). Humans use their hands asymmetrically which reflects asymmetrical neural control. For example, the dominant hand typically plays a manipulative role while the non-dominant hand plays a stabilizing role. Research shows that the primary motor cortex is larger in the dominant than non-dominant hemisphere (Hammond, 2005). The primary motor cortex is important in controlling movements and guiding the direction and amplitude of muscle forces involved in successive movements (Phillips & Sherwood, 2005). It may be that the difference of the primary motor cortex in

www.manaraa.com

the right and left hemispheres leads to the behavioral asymmetries that result in handedness (Hammond, 2005).

Handedness is also related to variation in the corpus callosum. The corpus callosum (CC) connects the two cerebral hemispheres and plays an integrative role in functional hemispheric specialization. Some postmortem and MRI studies show the total CC is larger in left-handed individuals. The size differences of the CC are believed to be an indicator for strength or quality of interhemispheric connections thus left-handed individuals might have an advantage regarding interhemispheric communication (Westerhausen, Kreuder, Sequeira, Walter, Woerner, Wittling, Schweiger, & Wittling, 2004).

Anatomic brain asymmetry surrounding the planum temporale has been the focal point of much research and has received the most attention in terms of handedness research (Beaton, 1997). The planum temporale is a roughly triangular region located in the posterior temporal lobe. It is an auditory processing structure implicated in developmental dyslexia. The presence of a larger planum temporale in the left hemisphere was first introduced by Pfeifer in 1920 and von Economo and Horn in 1930. In 1968, Geschwind and Levitsky confirmed this presence (Sequeira, Woerner, Walter, Kreuder, Lueken, Westerhausen, Wittling, Schweiger, & Wittling, 2006).

Relationship of Left-Handedness to Other Constructs

It is widely believed that handedness is indicative of hemispheric dominance such that left-handers are right-hemisphere dominant and vice versa (Hicks, Bautista, & Hicks, 1999). Because of the right hemisphere's involvement in attentional, visuospatial, and affective processing, left-handed individuals have been linked to domains that rely on

www.manaraa.com

these abilities such as fine arts, music, architecture and mathematics (McNamara, Clark, & Hartmann, 1998). In addition, left-handedness has been related to a wide range of psychological and physical problems. Observations that there are a higher percentage of left-handed individuals in certain groups than in the general population have led to such associations (Coren, 1993). This section will review how left-handedness relates to an assortment of psychological and physical problems.

Criminality

A documented association between left-handedness and criminality can be traced back to the early twentieth century. In 1903, Cesare Lombroso found a disproportionate number of left-handed criminals. Notable left-handed criminals include Billy the Kid, Jack the Ripper, John Dillinger, and the Boston Strangler (Coren, 1993).

Current literature suggests that behavior of left-handed and right-handed individuals differs and that hemispheric dominance is involved in the development of delinquency. Similarly, research suggests that individuals that commit crimes have less left-hemisphere dominance and rely more on emotional and impulsive right-hemisphere responses (Gabrielli & Mednick, 1980).

Starting in 1972, Gabrielli and Mednick (1980) examined 265 Danish children drawn from a perinatal cohort of 9,125 children born between 1959 and 1961 in Copenhagen. Investigators obtained psychiatric hospitalization records of the parents. Children of schizophrenic parents (n = 72) and psychopathic fathers or character-disordered mothers (n = 72) were included in the study. The remaining subjects had parents with no previous psychiatric background (n = 121). These children were intensively examined using psychological, neurological, medical, psychophysiological,

www.manaraa.com

and social-family measures. Handedness was evaluated through the neurological and psychological assessments. In 1978, the investigators checked the Danish police register to determine which children had had problems with the law. The investigators found that 64.7% of the children identified by the neurologist as strongly left-handed were arrested at least one time since the evaluation whereas only 29.5% of right-handers were arrested. The authors concluded that left-handedness was a predictor of delinquency. (Gabrielli & Mednick, 1980).

Bogaert (2001) evaluated the relationship between non-right-handedness and a history of criminal and/or sexual offending in a large sample of males ($N > 8000$). The sample consisted of investigations conducted at the Kinsey Institute for Sex and Reproduction in Indiana. After Bogaert controlled for parental income, year of birth, and age he found that males with a history of criminality and/or sexual offending had elevated rates of non-right-handedness . However, handedness was no longer significant when Bogaert controlled for education. Bogaert suggested that the relationship between education and criminality may be due to the educational difficulties non-right-handers face. However, education was not related in the pedophilia-handedness association which suggests a different mechanism may be involved in this relationship. Bogaert concluded that the effects were small; thus non-right-handedness should not be used as a predictor of criminality (Bogaert, 2001).

Schizophrenia

Communication between the hemispheres is especially important in mental disorders such as schizophrenia. It has been suggested that individuals with schizophrenia may have an increase in left-hemisphere activity, a decrease in right-

www.manaraa.com

hemisphere activity, diminished interhemispheric communication, or a combination of the three (Ornstein, 1997).

An excess of non-right-handedness has been found in studies of schizophrenia. In 2001, Sommer and colleagues conducted a meta-analysis on studies on lateralization in schizophrenia published between January 1980 and December 1999. The authors grouped mixed-handedness and left-handedness together into a non-right-handedness group. Meta-analysis on handedness studies showed that the incidence of non-right-handedness was significantly higher in schizophrenic patients than in healthy subjects. In addition, a follow-up study on children showed that pre-schizophrenic subjects were significantly more non-right-handed than were the general population. The authors suggest a potential genetic mechanism may play a role in schizophrenia (Sommer, Aleman, Ramsy, Bouma, & Kahn, 2001).

Verdoux and colleagues (2004) explored how Schneiderian first-rank symptoms are related to handedness and speech disorder in psychotic subjects (Verdoux, Liraud, Droulout, Theillay, Parrot, & Franck, 2004). Schneiderian first-rank symptoms are symptoms identified by Kurt Schneider that are more likely to be found in schizophrenia than other disorders and include: third person auditory hallucinations, thought broadcasting, delusional perception, running commentary, and thought echo (Botros, Atalla, & El-Islam, 2006). Verdoux et al. (2004) recruited patients admitted to the university department of the Bordeaux psychiatric hospital who had at least one positive psychotic symptom over the last month. The Edinburgh Handedness Inventory was used to assess handedness. Greater left-handedness was associated with higher Schneiderian scores (Verdoux et al., 2004).

www.manaraa.com

Dream Content

Due to hemispheric variation and dominance, some researchers have assumed that dream content would vary as a function of handedness. McNamara, Clark, and Hartmann (1998) hypothesized that the dream content of left-handers would be more visual, affective, and bizarre than the dream content of right-handers. They recruited 420 undergraduate students to complete questionnaires. Of those, 109 reported a recent dream. Participants were asked to complete the Edinburgh Handedness Inventory (EHI) and were given a blank page to describe their dream. Dream content was evaluated by two research assistants who were blind to the hypothesis of the study, the identity, and the handedness of the participants whose dream content they were scoring. 79 of the 109 subjects who reported a recent dream were right-handers and 30 were left-handed as indicated by the EHI. Researchers found that the dreams of left-handers contained more high imagery nouns, more affective words, and were more fictional. Dreams of right-handers more accurately reflected their everyday lives. The authors concluded that handedness does play a role in dream characteristics. They reported that if their results could be replicated, it would imply a right-hemispheric advantage in processing unusually vivid dreams and a left-hemispheric advantage in processing mundane dreams (McNamara et al.,1998).

In 1999, Hicks, Bautista, and Hicks replicated McNamara et al.'s findings. They recruited 203 college undergraduates to participate in their study. Participants completed the Briggs-Nebes Handedness Scale and the Spadafora and Hunt Dream Scale, which measures seven types of dreams: lucid dreams, archetypal dreams, fantastic nightmares, prelucid dreams, control dreams, post traumatic nightmares, and night terrors. Hicks et

www.manaraa.com

al. (1999) found that dream types stressing the vividness of the dream experience were more significantly related to handedness. More specifically, left-handers had significantly more lucid dreams (vivid dreams during which the individual realizes he/she is dreaming) and fantastic nightmares (highly vivid and upsetting dreams which are remembered in detail) than right-handers. The results of this study were consistent with McNamara et al. (1998) and support the idea that left-handers display right-hemispheric talent (Hicks, Bautista, & Hicks, 1999).

Learning

Although an association exists between visuospatial, attentional, and affective processing abilities and left-handedness, left-handedness is also associated with learning disabilities (McNamara et al., 1998).

In 1982, Geschwind and Behan explored the relationships between left-handedness and the frequency of developmental learning disorders as well as migraine and immune disease. Geschwind and Behan (1982) compared the incidence of these conditions in strongly left-handed subjects to strongly right-handed subjects. In their first study, the investigators developed a questionnaire containing questions about the personal and family history of the participant as well as a modified version of the Oldfield Handedness Inventory. Left-handers reported significantly more developmental learning disorders such as dyslexia and stuttering than did right-handers. Left-handers also reported more family members with learning disorders than did right-handers. These results are consistent with previous findings suggesting a relationship between left-handedness and learning disabilities (Geschwind & Behan, 1982).

www.manaraa.com

Even when no learning disability is present, left-handers and right-handers perform differently. Ward et al. (1989) evaluated the tactuo-spatial ability in subjects as a function of handedness. They recruited 78 self-identified right-handed and 75 left-handed undergraduate students to participate in their study. Handedness was also assessed by the Lateral Dominance Questionnaire. Subjects were blindfolded and learned a finger maze with either their dominant hand or nondominant hand. Investigators assessed transfer to the untrained hand. They reported a left-hand advantage in comparison with the right. Acquisition by the left-hand required fewer trials for both right- and left-handed subjects. This finding suggests a left-handed (right-hemisphere) advantage with tactuo-spatial tasks (Ward, Alvis, Sanford, Dodson, & Pusakulich, 1989).

Physical Well-Being

Immune disease is also associated with left-handers and their relatives. Geschwind and Behan (1982) found that left-handed subjects reported a significantly higher frequency of immune disease than did right-handed subjects. In addition, left-handers had significantly more relatives with immune disease, specifically thyroid and bowel disorders. Geschwind and Behan (1982) also evaluated the frequency of left-handedness in patients with immune disorders or migraines in neurological clinics in Glasgow and compared it to a general population group. They found a significantly higher percentage of left-handers in patients with severe migraines. They also found a higher percentage of left-handers in patients with myasthenia gravis, an autoimmune neuromuscular disease (Geschwind & Behan, 1982).

www.manaraa.com

Posttraumatic Stress Disorder (PTSD)

Although most of the research on Posttraumatic Stress Disorder (PTSD) has been conducted on war veterans, PTSD is also common in the general public. Attempts to identify risk factors for PTSD other than exposure to trauma have indicated the importance of cerebral lateralization (Choudhary & O'Carrol, 2007). Evidence suggests that the right hemisphere of the brain is involved in experiencing negative emotion such as fear as well as in the avoidance of behavior. Behavioral, electrophysical, and neuroimaging studies show comparative left hemisphere hypoactivation and right hemisphere hyperactivation in individuals with PTSD (Choudhary & O'Carrol, 2007).

Researchers proposed a neuropsychological hypothesis regarding a relationship between individual characteristics associated with reduced cerebral lateralization for language in right-handed people and the development of PTSD. Characteristics associated with reduced cerebral lateralization for language included the female gender, familial left-handedness, and mixed lateral preference (Chemtob & Taylor, 2003). The neuropsychological hypothesis also states that the right hemisphere in the brain is more involved in the regulation of emotion and detection of danger thus right-handed people with less cerebral lateralization for language may be more sensitive to danger and experience emotions more intensely. Their cerebral organization may give more weight to right hemisphere input during continuous cognitive processing (Chemtob & Taylor, 2003).

An investigation with Israeli combat veterans indicated an association between mixed lateral preference among right-handed veterans with a vulnerability to combat-related PTSD. The study found a 65% rate of PTSD in mixed-handed veterans and a

www.manaraa.com

43% rate in consistent right-handed veterans. Chemtob and Taylor (2003) replicated these findings in a sample of U.S. Veterans. They explored the relationship between the occurrence and severity of PTSD with the degree of lateral preference (mixed versus consistent) as well as parental left-handedness in right-handed Vietnam veterans. Chemtob and Taylor (2003) found that veterans with mixed lateral preference were more likely to have PTSD than were veterans with consistent lateral preference (Chemtob & Taylor, 2003). Although these findings suggest a relationship with increased left-handedness and increased PTSD symptomatology, they could not distinguish whether the results are due to mixed handedness or left-handedness (Choudhary & O'Carroll, 2007).

In 2007, Choudhary and O'Carroll explored laterality and experience of trauma in a healthy sample as well as laterality and PTSD in a civilian population. The authors hypothesized that there would be more leftward lateral preference in individuals with PTSD. They recruited 596 individuals from the University of Sterling to participate in their study and used the Edinburgh Handedness Inventory and the Coren inventory to measure lateral preference. To assess PTSD, the authors distributed the Posttraumatic Diagnostic Scale (PTDS; Foa, Cashman, Jaycox, & Perry, 1997) and, in some cases, a clinical interview. The severity of reexperiencing, avoidance, and arousal symptoms was measured and summed. 51 participants met all the criteria for a diagnosis of PTSD with relatively more left-handers (15%) than right (8%). Strong left-handers had a higher incidence of PTSD than did strong right-handers or mixed-handers. Left-handers also had significantly higher scores for arousal symptoms of PTSD. The authors found that leftward lateralization in handedness is associated with PTSD symptoms and prevalence. They offered a possible explanation for this finding: left-handers may experience

www.manaraa.com

emotional events differently. In addition, they suggested more research on the potential differences between left- and right-handers is necessary to further explain this phenomenon (Choudhary & O'Carroll, 2007).

Left-Handedness and Self-Awareness

Left-handers have difficulty using items or tools designed for the right-handed such as desks, notebooks, can openers, etc. In addition, research has explored the associations between left-handedness and psychological and physical disorders. Despite these associations, little is known about the inner experience of left-handers. The role of handedness has not been directly observed in studies of consciousness, however, studies have explored the role of hemispheric activity in self-awareness and consciousness.

Evidence suggests that tasks associated with the left- and right-hemisphere differ in electroencephalogram (EEG) recordings. Ehrlichman and Wiener (1980) recorded the EEGs of subjects while they performed covert mental tasks. The authors found that EEG asymmetry occurs and was related to left- and right-hemisphere tasks. Their strongest finding involved covert verbalizations: the directions of all relationships were in accordance with the literature on hemispheric specialization. Verbalizations were more strongly associated with left-hemisphere amplitude. Ehrlichman and Wiener (1980) also suggest that EEG asymmetries reveal cognitive differences between visuospatial and verbal tasks. The authors concluded that more research is necessary to identify accurate variation in hemispheric functioning (Ehrlichman & Wiener, 1980).

Some of the research on self-awareness has focused on covert verbalizations, or inner speech. Morin (2005) defined self awareness as "the capacity to become the object of one's own attention, where the individual actively identifies, processes, and stores

www.manaraa.com

information about the self" (p. 116). According to Morin, the self is involved in awareness through cognitive processes of imagery and inner speech. Inner speech has been indicated in such tasks as verbal self-guidance, problem solving, and memory. Morin argued that the role of inner speech in self awareness has been overlooked. Inner speech allows an individual to become more aware of his/her independent existence and mental states. Morin argues that inner speech plays a fundamental role in self-awareness such that inner speech facilitates self-reflection through verbally communicating with oneself. Furthermore, Morin suggests that without inner speech apprehending one's inner life becomes difficult. Morin compares inner speech to a flashlight illuminating the room of self-awareness—that is, inner speech makes self-awareness much more vivid and clear. Due to the role of the left prefrontal lobe in self-reflection and inner speech, Morin suggested that the left-hemisphere is involved in self-awareness (Morin, 2005).

Lindell (2006) argues that the left-hemisphere is not solely involved in language processing. Lindell reported that "though there is no question that the left hemisphere is the superior language processor, a growing body of research has demonstrated significant linguistic ability in the "nonverbal" right hemisphere" (Lindell, 2006, p. 131). Research shows that right-hemispheric language dominance directly increases with degree of left-handedness. Lindell focused on the 95% of the population in which the right-hemisphere lacks the ability to generate productive language. Lindell reviewed a body of evidence suggesting right-hemispheric involvement in language processing. The left-hemisphere is involved in propositional speech whereas the right-hemisphere is involved in nonpropositional speech involving the "holistic construction of automatic, formulaic, and context-bound utterances (e.g., counting, nursery rhymes, days of the week);

www.manaraa.com

verbalizations that neither involve the generation of new ideas nor the processing of such ideas into original, grammatical utterances" (Lindell, 2006, p. 133). Lindell reported that the right-hemisphere is involved in the prosody of speech, including changes in pitch and rhythm. The right-hemisphere is also efficient in recognizing words that represent a concrete referent, such as *giraffe*, whereas performance declines when the word represents an abstract concept, such as *faith*. Lindell's findings suggest that both hemispheres play a role in language processing and production (Lindell, 2006).

Keenan et al. (2005) examined the role of the right hemisphere in self-awareness and the Theory of Mind. They reported that assessing consciousness in the right-hemisphere tends to be difficult because the traditional speech areas are located in the left hemisphere; thus the right-hemisphere cannot verbalize its consciousness. Theory of Mind and self-awareness are related in that one must have an understanding of one's own mind to be able to understand the mind of another. Theory of Mind "involves the recognition that other minds are possible, and the individual may be privy to thoughts of another" (Keenan et al., 2005, p. 695). The authors hypothesized that the right-hemisphere is active in higher-order consciousness (Keenan, Rubio, Racioppi, Johnson, & Barnacz, 2005).

In 2001, Keenan et al. used an fMRI to explore cortical correlates during face recognition. They found that the right prefrontal cortex was active in participants during self-recognition, supporting the idea that self-recognition results from right-hemisphere activity (Keenan, Nelson, O'Conner, & Pascual-Leone, 2001). Similarly, Vogeley et al. (2001) used fMRI to investigate the neural mechanisms of taking one's own perspective and taking someone else's perspective. Vogeley et al. (2001) found that self-perspective

www.manaraa.com

was associated with an increase in right temporoparietal activity as well as activity in the anterior cingulate cortex. Theory of Mind was associated with an increase in anterior cingulate cortex and left temporopolar cortex activity. In addition, there was an interaction of both self-perspective and Theory of Mind in the right prefrontal cortex (Vogeley, Bussfeld, Newen, Herrman, Falkai, Maier, Shah, Fink, & Zilles, 2001). Research suggests that there are differential mechanisms in terms of consciousness and that the right-hemisphere is more involved in processing of the self (Keenan, Nelson, O'Conner, & Pascual-Leone, 2001).

Research regarding the localization of self-awareness is inconsistent. Investigators have focused on certain tasks and attributed the localization of self awareness to their respective cerebral hemisphere. Studies have employed EEG recordings, fMRIs, etc. to explore this phenomenon.

www.manaraa.com

CHAPTER 2

INTROSPECTIVE MEASURES

Understanding Inner Experience

Thinking is one of the most fundamental phenomena in psychology, but despite its importance, efforts to understand and explain this phenomenon have been unsuccessful (Aanstoos, 1983). Cognitive scientists have inferred cognitive processes through the development of performance measures. Clinical psychologists have relied on the self-reports of their clients during interviews or on questionnaires (Davison et al., 1995). The questionnaire approach is limited by its retrospectiveness when trying to access an individual's stream of thought (Singer, 1975). Recall biases that affect the reliability of self-report and questionnaire data include: 1) participants tend to remember events that are more recent; 2) more salient experiences are likely to be recalled; 3) participants have a tendency to recall events that make them consistent with their view of how the world functions (Smyth & Stone, 2003; Yoschiuchi, Yamamoto, & Akabayashi, 2008); 4) recall can be influenced be experiences that happen after the situation to be recalled; and 5) recall may be effected by the participant's current mood (Smyth & Stone, 2003). In addition, participants may misunderstand the questionnaire instructions (Smyth & Stone, 2003; Yoschiuchi et al., 2008).

The need for alternative methods of examining the study of ongoing behavior and everyday experiences arose from the limitations of laboratory studies. Investigators called for a method that could provide ecological validity for the behavior of interest, aid in the understanding of ongoing behaviors, explore the interaction between situation and personality, and restore interest in the study of the individual (Hormuth, 1986). In an

www.manaraa.com

effort to reduce the recall biases of self-report and questionnaire measures and the lack of ecological validity of laboratory studies, psychologists have developed procedures to access the inner world of individuals (Davison et al., 1995). The next section will review a variety of these measures.

Think-Aloud Methods

Think-aloud methods are designed to access an individual's cognitions. This method involves an individual's reporting aloud the thoughts that occur while he/she is completing a problem-solving task. The goal of this method is to provide information about the content and process of an individual's cognitions. Think-aloud methods have been used since the 1940's to explore problem solving and, more recently, to study other types of spur-of-the-moment thought (Klinger, 1978). Modern think aloud methods consist of recording participants' verbalizations of their cognitions while engaged in a designated activity. Their responses are then evaluated in an attempt to understand an individual's ongoing thought process (Davison et al., 1997; Singer, 1975).

Think aloud measures have been criticized for several reasons. The situation itself is unnatural. Because individuals can verbalize only one thought at a time, only a small portion of what is going on inside the participants' mind is captured (Klinger, 1978). In addition, the task itself may influence the behavior of the participants (Davison et al., 1995). For example, evidence suggests that thinking out loud results in spending more time on a content theme (Klinger, 1978). Lastly, cognitions that are of low frequency but high significance may not be captured (Davison et al., 1995).

www.manaraa.com

Thought Sampling

Thought-sampling is a method for exploring thought content that tries to avoid some of those pitfalls. An experimenter will interrupt individuals during whatever activity they are engaged in and will request a narrative description of their consciousness before the interruption (Klinger, 1978).

In Vivo Thought Sampling

Klinger developed a thought-sampling approach that incorporated randomness (Klinger, 1978-79; Kendall & Korgeski, 1979). Participants in this method are to carry a beeper and, when the beeper sounds, freely record their thoughts or rate their inner experience using a Thought Sampling Questionnaire. The questionnaire consists of variables such as length of thought, vividness, and level of trust of their own memory. Participants may also use tape recorders to dictate their thoughts (Kendall & Korgeski, 1979). This method allows the researcher to compare nonretrospective data about the participant's cognitions and compare with the participant's impression of his/her thought pattern (Kendall & Korgeski, 1979).

During his original study in 1978-79, Klinger used the thought-sampling technique to investigate the differences between fantasy and directed thought. He differentiated between two types of thought: operant thought processes, which are directed or task-oriented, and respondent processes, which are random daydreams or undirected thought. Through the use of thought-sampling, he showed the importance of current concerns as foreshadowing the content in the stream of consciousness (Klinger, 1978-79; Singer & Kolligian, 1987). Klinger recruited 20 college students who completed a series of questionnaires and interviews, underwent training for reporting

www.manaraa.com

their inner experience, maintained a structured diary describing their lives in detail, and participated in a thought-sampling procedure every few weeks (Klinger, 1978-79).

Klinger used two types of thought-sampling methods. One took place in the laboratory; participants listened to two fifteen-minute prose narratives simultaneously through earphones. The passages had been altered on both channels on twelve different points to relate to a concern of the participant on one channel and to be related to something irrelevant to the participant on the other. Klinger provided trained participants with a portable beeper that went off at random intervals. The randomness of the beeper allowed Klinger to conclude that he was actually capturing a random collection of cognitions (Klinger, 1978-79; Kendall & Korgeski, 1979). A tone was sounded ten seconds after the end of each altered passage, at which point the tape was stopped and participants reported the thoughts that were occurring to them the moment before the tone sounded. Participants completed a Thought-Sampling Questionnaire which consisted of a narrative description of the mental content and ratings of variables. The additional variables included: duration of thought, specificity, directedness, simultaneous thoughts, detailedness, visualness, auditoriness, attentive to cues, recall of cues, controllability, confidence in recall of thought, usualness, and strangeness. Lastly, participants rated their ability to accurately rate the variables. In total, 936 thought samples were collected over a series of 78 listening sessions (Klinger, 1978-79).

The second sampling model occurred outside of the laboratory and provided 285 thought-samples over a series of 24 days. Only 12 of the student participants completed this portion. Participants were provided with a device that sounded randomly ("beeper"). The beeper sounded roughly once every forty minutes. Participants were to carry the

www.manaraa.com

beeper with them during their daily routines for a total of 24 waking hours. They were also provided with a pad of Thought-Sampling Questionnaires to be completed. When the beeper sounded, participants filled out a Thought-Sampling Questionnaire that was almost identical to the laboratory questionnaire (Klinger, 1978-79).

Klinger reported that the distribution of thought properties outside of the laboratory (the second sampling model) more likely represent typical human experience than the laboratory model. Outside of the laboratory thoughts tended to be more specific, more focused on the present, more directed, and more tied to immediate stimuli than thought inside the laboratory. There appeared to be little difference with regard to vividness of imagery between the two settings. Klinger found that the majority of the participants had operant thought processes with some respondent elements. Participants rated operant thoughts as more specific, controllable, more relevant to setting, and more recallable. Most thoughts were visual, brief, and related to ongoing activity. Most thoughts involved ongoing activity and consisted of typical kinds of content, however, more than one fifth involved unusual or distorted features which were mostly visual and brief. (Klinger, 1978-79). Furthermore, Klinger reported that his findings provide strong evidence that waking thought varies along three dimensions: respondentness, stimulus independence, and fancifulness. He suggested a need to clearly differentiate between the terms "daydreaming" and "fantasy." Based on his findings, Klinger reported that a "daydream" should be redefined as "thought that is respondent, stimulus-independent, and fanciful." (Klinger, 1978-79, p.112). Deliberate daydreams or daydreams intentionally started for purposes such as self-entertainment or self- arousal should be redefined as "thought that is operant, stimulus-independent, and fanciful" (p. 112) and

www.manaraa.com

mind wandering about one's own life should be redefined as "thought that is respondent, stimulus-independent, and unfanciful" (Klinger, 1978-79, p.112).

More recently, Zotter and Crowther (1993) investigated cognitive characteristics of bulimic, nonbulimic, repetitive dieting, and nondieting women on two randomly selected days using in vivo thought-sampling. After screening and training were completed, participants received a 3in X 5 inch spiral notebook and an alarm that signaled every 30 minutes. Participants were told to record the thought they were having and the activity they were engaged in at the moment just before the alarm sounded. The researchers found that bulimic women report a significantly greater amount of eating or weight-related thoughts than do nonbulimic and nondieting women. In addition, the thoughts of bulimic women are more likely to be of negative affect than the other women. Zotter and Crowther reported that their findings were consistent with theoretical models of bulimia nervosa such that bulimics are more preoccupied with thoughts of food, eating, weight, and shape (Zotter & Crowther, 1993).

Thought-Sampling Method

Hurlburt (1976) developed a thought-sampling (or thought-and-mood sampling) method to access and quantify an individuals' mental life (Hurlburt, 1980). Participants were given a random interval sound generator and told to carry the generator with them from the moment they woke up in the morning until the time they went to bed for three consecutive days (Hurlburt, 1979). Participants were then interrupted at random intervals and self-reported the thought that was occurring at the moment of interruption, what they were doing, and the time of day (Hurlburt, 1979; Hurlburt, 1980).

www.manaraa.com

Unlike retrospective methods, thought-sampling involves an immediate description of an actually occurring thought. This technique aims to gain ecologically valid data of thinking and behavior by eliciting responses from individuals in their natural environments. Individuals respond to random beeps and record their thoughts along with any additional inner or outer experiences that were occurring at the time of the beep. Participants respond by either completing a quantitative questionnaire, providing a short written narration of their experience, or a combination of the two (Hurlburt, 1997). This process is repeated until a series of single-thought descriptions are acquired. An investigator rates the series of single-thought descriptions on rating scales (Hurlburt, 1980). The primary goal is for the investigator to quantify the aspects of the individuals thinking or thinking and mood (Hurlburt, 1997).

Articulated Thoughts during Simulated Situations

In 1983, Davison, Robbins, and Johnson developed an alternative approach to the think-aloud paradigm. They evaluated the approaches developed by both Hurlburt and Klinger and acknowledged that in-vivo thought sampling had potential in terms of eliciting the participants' immediate concerns; however, the technique lacked in ability to control or be knowledgeable about the actual stimuli the participants were reacting to. In addition, the questionnaire format restricted the breadth of cognition obtained. In response to these limitations, they proposed a need for a better method of exploring cognition (Davison, Robins, & Johnson, 1983).

Davison et al. (1983) identified four main features necessary in a cognition exploring method including: 1) it would allow for open-ended verbal responses that would capture the participant's ongoing thought process as opposed to retrospective

www.manaraa.com

reporting; 2) the experimenter should present realistic and complex stimuli to the participants as well as have the capability of manipulating the stimuli; 3) both anxiety-provoking and neutral stimuli should be presented to the participants; and 4) the procedure should not be time-consuming or expensive. They introduced a model they believed met those requirements: Articulated Thoughts during Simulated Situations (ATSS; Davison et al., 1983).

ATSS offers an alternative to structured questionnaire methods (Davison, Haaga, Rosenbaum, Dolezal, & Weinstein, 1991). Davison et al. (1997) refer to ATSS as a "paradigm" because of its generality and lack of specificity in terms of procedures and technology (Davison et al., 1997). The procedure involves participants' listening and responding to audio-taped conversations intended to mimic a complex event. Participants listen to a 15-25 second audio-recording and are asked to imagine that the event is real and that they are a part of it. The researchers tell the participants that they are interested in the thoughts and feelings they have during the situation. Following the recording are 30 seconds of silence. During the silent 30 seconds, the participants verbally report what they are thinking and/or feeling (Davison et al., 1983). Participants are told to say as much as they can until the 30 seconds are over (Davison et al., 1997). After the report, another 15-25 second segment is played, followed by the participant's 30-second report, and so on. Participant's verbal reports are tape-recorded to be analyzed later (Davison et al., 1983).

Davison et al. (1997) report that ATSS compliments the in vivo random sampling of cognitions demonstrated by Hurlburt (1979). The flexibility of ATSS also allows researchers to evaluate cognitions in situations that would be impractical, unethical, or to

www.manaraa.com

complex to study in vivo (Davison et al., 1997). Because of the unstructured response format of ATSS, respondents are provided an opportunity to engage in open-ended responding. This format increases the likelihood that the researcher is actually capturing the scope of the participant's cognitions without limiting them to experimenter-selected options. They state that "thinking aloud that immediately follows each brief segment taps cognitions as close to on-line as possible" (Davison et al., 1997, p. 952). By dividing the ATSS stimulus tapes into short segments, participants' retrospective responding with generalized thinking patterns is reduced (Davison et al., 1997). Due to the specificity of the audiotaped hypothetical situations presented to the participants, Davison et al. (1997) report that ATSS provides situational specificity and experimental control in assessing cognitions. The researcher can confidently relate certain thoughts with certain situations as well as compare categories of thought across individuals. Researchers can also evaluate thoughts that are of importance but which only occur in infrequent situations.

For example, Eckhardt, Barbour, and Davison (1998) evaluated the associates of anger arousal in a community sample of 88 married men. The men were grouped into one of three groups; maritally violent (MV), maritally distressed-nonviolent (DNV), and maritally satisfied-nonviolent (SNV). The participants completed an assessment packet consisting of a State Anger Scale, Survey of Personal Beliefs, and Dysfunctional Attitudes Scale. Upon completion of the assessment packet, the participants listened to tape-recorded instructions informing them of the ATSS procedure. Three stimulus situations were included, two anger-inducing scenarios (overheard conversation and jealousy) and one control. Each scenario was divided into eight 30-second segments. The researchers found that MV males articulated more aggregate irrational beliefs and

www.manaraa.com

cognitive biases during anger arousal than did nonviolent males. In addition, ATSS was more successful in discriminating between the groups as compared to the questionnaires. The researchers concluded that the fact that ATSS measures cognition while participants are enduring affective arousal is a significant strength in support of the method (Eckhardt et al., 1998).

Thought-Listing

Brock and Greenwald developed a self-report tool called the thought-listing procedure in the late 1960s. This procedure allows for eliciting either spoken or written listings. Subjects are asked to list all the thoughts they were having when presented with a stimulus or a communication or problem of topic. It is assumed that subjects are able to distinguish thoughts elicited by the stimulus from other thoughts (Cacioppo & Petty, 1981). Thought listing differs from thought sampling in that the listing occurs immediately after the event rather than at an interruption during the event.

Cacioppo, Glass, and Merluzzi (1977) used thought-listing to study the social anxiety of male participants prior to interacting with a female confederate. They found that male participants who scored high on The Social Avoidance and Distress Scale provided more negative self-statements (Cacioppo, Glass, & Merluzzi, 1977; Davison et al., 1997).

Forerunners to Modern Sampling

In 1925, Flugel proposed a method that would study the affect of individuals in their normal, every day life. Flugel observed affect at intervals varying from two minutes to two hours. The nature and duration of the day's activities largely determined the length between the intervals. Flugel's method had two main goals: 1) to quantify the

www.manaraa.com

length and amount of pleasurable activities and unpleasurable activities experienced by individuals and 2) to describe the mental states such as sensations, moods, emotions and thoughts that are related to the incidences of pleasures or unpleasures (Flugel, 1925).

Participants in Flugel's were instructed to keep a detailed record of their pleasurable and unpleasurable experiences and the accompanying emotions. Furthermore, they were told to make frequent entries as to provide a more accurate description of the state. Participants rated the amount of their pleasure or unpleasure from -100 to +100. A rating of +100 indicated the most pleasure whereas a rating of -100 indicated the most intense unpleasure. A rating of 0 indicated indifference. Participants also reported the content of the activity/experience as well as a description of the activity/experience. They were instructed to record their affective states for at least 30 days. In addition, they were given a list of questions to answer regarding their opinion of the captured affective states (Flugel, 1925).

Experience Sampling Method

ESM was developed by Csikszentmihalyi, Larson, and Reed to explore the activities and experiences of individuals in a natural setting (Csikszentmihalyi & Larson, 1987). It provides an opportunity to explore the activities, thoughts, and feelings of individuals in the moment rather than retrospectively (Csikszentmihalyi & Figurski, 1982). ESM participants respond to random or quasirandom beeps which signal the participants to report various aspects of their experience on the Experience-Sampling Form (ESF). An ESF is a questionnaire designed to access the internal and external situation of the participant at the time of the signal. The form consists of a variety of items including open-ended questions regarding the location of the participant, activities

www.manaraa.com

the participant is engaged in, content of cognitions, and time; and Likert-type items measure the participant's motivation, activation, cognitive competency, and affect (Csikszentmihaly & Larson, 1987).

Here is an example to illustrate the use of this method. The earliest investigation using ESM began at the University of Chicago in 1975. Csikszentmihalyi et al. (1977) sampled 25 adolescent (age 13-18) volunteers in the Chicago area. The participants completed self-report forms at random times throughout a week, cued by an electronic paging device that sounded a beep at a predetermined, quasi-random, schedule. The schedule consisted of 5 to 7 signals per day during normal waking hours. Each participant was given a book of 50 self-report forms which consisted of four groups of items. The first group consisted of open-ended questions involving the participant's location at the time of the beep, the activity they were engaged in, any other activities going on, and who they were with. The second group inquired why the participant was doing the aforementioned activity. They were to check one of three choices including an obligation to do it, a desire to do it, or lack of something else to do. The next group of items was designed to evaluate the quality of the participants' interaction with his/her environment. Participants were to respond to these questions on a 10-point scale ranging from "low" to "high." Questions included their challenges during the activity, their skills in the activity, and their level of control over the activity. The last group consisted of 13 items designed to access semantic differences between mood and physical experiences. Participants rated their state at the signaled moment on 7-point scales of adjectives. The ends of each scale consisted of extreme opposites. The authors found that their sample

www.manaraa.com

spent most of their time in conversation with their peers or watching television (Csikszentmihalyi, Larson, & Prescott, 1977).

Johnson and Larson (1982) used ESM to investigate characteristics of the daily lives of normal-weight bulimic women. They compared the overall moods, mood fluctuation, social isolation, and amount of food related behavior of 15 bulimic patients with 24 normal controls. Each participant provided self-reports of 40 to 50 random moments in her life. Johnson and Larson (1982) found that bulimic women report negative mood states significantly more often than do normal women. Bulimic women experienced more dysphoria and mood fluctuation than did normal women. Overall, bulimic women as a group were significantly sadder and more lonely, irritable, passive, weak, and constrained than the normal group. The two groups did not differ on items related to excitement and alertness (Johnson & Larson, 1982).

Ecological Momentary Assessment

Ecological Momentary Assessment (EMA) was developed as a mean of assessing variations in behavior across time and situations (Shiffman & Stone, 1998). Shiffman, Stone, and Hufford (2008) argue that the typical scientific emphasis on global assessments and retrospective reports limit both scientists and practitioners from obtaining a complete and accurate depiction of an individual's behavior (Shiffman et al., 2008). EMA allows subjects to report their experiences in their real world (Shiffman et al., 2008). EMA attempts to capture momentary reports of psychological, behavioral, and physiological aspects in an individual's natural environment (Smyth & Stone, 2003). Collection of many momentary reports allows the researcher to arrive at a general picture of the participant's characteristics. The inductive approach of EMA uses sampling of

www.manaraa.com

many immediate, momentary instances to create a summary of the particular phenomenon of interest (Shiffman & Stone, 1998).

In EMA individuals are signaled in their natural environment to immediately report on a specific construct over repeated intervals (Smyth & Stone, 2003). For example, individuals may be asked to report on current or recent psychological states, environmental conditions or behaviors. Individuals are usually signaled multiple times a day for a period of days or weeks (Smyth & Stone, 2003). Although EMA is similar to ESM, EMA collects more diverse information and uses more flexible measures compared to the self-report measures, checklists, or brief open-ended questions collected in ESM.

Smyth and Stone (2003) maintained that EMA and other data capturing techniques were developed in response to the concern that retrospective recall of self-reported experiences in orthodox science are faulty. One of the concerns deals with retroactive reconstruction or the influence the outcome of an event has on the recall of the actual event. By signaling an individual to immediately report on a specific construct, EMA helps control for retroactive reconstruction. Another concern with orthodox data collection measures deals with ecological validity or generalizability of research conducted in the laboratory. There is concern that data collected solely in the laboratory may lack generalizability. Participants' behaviors or psychophysiological processes may differ in contrived situations such as the laboratory than in their own natural environments. Some situations may also be too difficult or unethical to recreate in the laboratory. EMA signals participants in their natural environment thus reducing ecological validity and generalizability concerns (Smyth & Stone, 2003).

www.manaraa.com

EMA studies vary depending on the behavior of interest to be studied. Longitudinal designs using the EMA method have been used to study stress and coping, depression, asthma, chronic pain, personality traits and negative affect, as well as eating disorders (Smyth, Wonderlich, Crosby, Miletnberger, Mitchell, & Rorty, 2001). Shiffman and Stone (1998) report that EMA has great potential to enhance the understanding of how behavioral factors effects disease (Shiffman & Stone, 1998).

Stein, Kenardy, Wiseman, Dounchis, Arnow, and Wilfley (2007) tried to identify the motivation behind binge eating in binge eating disorder through an exploration of the antecedents and consequences of binge eating using EMA. They gave 33 females with binge eating disorder a handheld computer for 7 days and asked them to specify their present hunger, emotions, and binge status when the computer signaled them to do so. Investigators found more negative mood and hunger in prebinge than nonbinge times. Negative mood was highest after the binge. Because of the heightened negative mood following a binge, Stein et al. (2007) proposed that further research is necessary to explore the reinforcing aspects of a binge. The authors suggested an escape from self-awareness as a potential benefit of bingeing (Stein, Kenardy, Wiseman, Dounchis, Arnow, & Wilfley, 2007).

Descriptive Experience Sampling (DES)

Descriptive Experience Sampling (Hurlburt, 1990, 1993) is a descriptive sampling method designed to explore and describe inner experience. Hurlburt and Akhter (2006) define 'inner experience' as "anything that is going on in awareness at the particular moment defined by the beep" (Hurlburt & Akhter, 2006, p. 274). DES was developed by Hurlburt and grew out of his thought-sampling and cognition-sampling methods. DES

www.manaraa.com

was a response to the many problems and inadequacies of other methods of introspection (Wheeler & Reis, 1991). Hurlburt sought to describe real inner experience data by capturing participant's cognitions at random moments (Hurlburt, 1997; Hurlburt & Heavey, 2006; Heavey & Hurlburt, 2008).

DES is designed to capture inner experience as it occurs in the natural environment (Hurlburt & Akhter, 2006). Hurlburt and Akhter referred to the real events that are really being experienced by real people as "pristine experiences." They reported that "pristine experiences" are important aspects of consciousness research and psychology and general (Hurlburt & Akhter, 2006).

DES is not only designed to provide high fidelity descriptions of individuals' inner experiences, but to discover patterns of experience within individuals and across individuals within groups. At any point in time, an individual has a countless array of possible experiences. These experiences may be external such as temperature, tastes, and smells. They may be interoceptive, proprioceptive, or kinesthetic such as pressures, itches, and tickles. These potential experiences may also be inner events such as images, feelings, and thoughts. At any moment, a person generally chooses one (sometimes more) of these possibilities to create his or her pristine experience. One individual may have an emotional experience while someone else, in the same situation, might have a visual image. The goal of DES is to catch these pristine experiences in flight (Hurlburt & Akhter, 2006). Inner speech, unsymbolized thinking, images, feelings and sensory awareness are examples of frequently found characteristics that have emerged across subjects using DES (Hurlburt, 1997; Hurlburt & Heavey, 2006; Heavey & Hurlburt, 2008).

www.manaraa.com

The method of DES has been refined throughout the years; however, the main aspects of the method remain. A participant wears a beeper in his or her everyday environments. The beeper sounds at random intervals averaging six beeps per three hours. The beeps are delivered through an earphone and prompt the participant to pay attention to the experience that was ongoing at the last undisturbed moment before the beep. The participants are asked to immediately record the details of their experience in a notebook or other form of recording device. Within 24 hours of capturing a certain number of experiences, usually six, the participant will meet with a DES investigator for an "expositional interview." This interview is designed to aid subjects in providing high fidelity descriptions of their sampled experiences. Upon completion of the interview, the investigator writes the description of the participant's inner experience at each sampled beep. This process is repeated over several sampling days, usually four to eight, until approximately 20 to 50 samples of experience have been collected (Hurlburt, 1997; Hurlburt & Heavey, 2006; Heavey & Hurlburt, 2008; Hurlburt & Akhter, 2006).

DES is an idiographic procedure that produces a characterization of a specific person's experiences (Hurlburt & Akhter, 2006). Some DES studies collect samples from a group of subjects that have some commonality. In this case, the investigator reviewed each idiographic characterization to see if the subjects have any significant characteristics in common. Thus, DES may be used in one of two ways: 1) as a purely idiographic procedure used to capture the inner experience of one individual or 2) as a sequence of idiographic procedures with an ultimate, nomothetic purpose (Hurlburt & Akhter, 2006).

www.manaraa.com

For example, Jones-Forrester (2009) used DES to explore the inner experience of thirteen individuals with bulimia nervosa (BN). Participants were given a small beeper that sounded a 400 Hz tone at random intervals ranging from one minute to one hour. Participants were provided with a small spiral notebook to record notes on their inner experience when the beep signaled. Participants were instructed to wear their beeper for approximately 3 hours (to allow for 6 beeps) during their daily activity. Participants were interviewed using the DES expositional interview method within 24 hours of collecting their 6 beeps. The DES expositional interview consisted of detailed questions to allow for an accurate depiction of the participant's experience at the moment of each beep. Participants repeated the sampling/interview process approximately 6 times each. Jones-Forrester summarized the salient characteristics of each individual as well as the salient characteristics of the group. She found that all the participants had attention that was divided, she referred to as "fragmentation." Additionally, Jones-Forrester reported that inner experience of individuals with BN was characterized by unsymbolized thinking, inner speech, inner seeing, poorly differentiated affect that is confused with cognition, and the presence of interfering phenomena (Jones-Forrester, 2009).

DES Compared to Other Methods

We have reviewed various methods of exploring the subjective experiences of individuals. This section will review the differences between those approaches and how DES may add to our understanding of the inner experience of left-handers.

The think aloud paradigm attempts to understand the emotions and cognitions of individuals as they occur. Think aloud studies are not retrospective in that investigation occurs while the participants are in the moment. In addition, participants' reports are

www.manaraa.com

recorded verbatim so that details are not missed. This approach provides a detailed report of the internal processes of the participants. DES is similar to the think aloud paradigm in that they are both interested in a detailed depiction of the inner world of individuals. The think aloud paradigm uses the participants' verbal narrative of their experiences as the primary mode of data. Unlike think aloud studies that explore preselected events, DES explores single, momentary experiences. DES randomly samples participants in their natural environment whereas think aloud studies occur in experimental conditions. The fidelity of the think aloud results are limited by the amount that can be narrated while an activity is ongoing; that generally results in a gloss on cognitions, or perhaps cognitions and emotions. By contrast, DES has no time constraints. It aims at a particular moment, and will take as long as is required to elaborate all the salient details of that momentary experience, thus allowing complex characteristics of an individual's awareness, including thoughts, feelings, and sensations, and multiple simultaneous instances thereof, to emerge. Furthermore, the DES focus on iterative immersion in the method facilitates the bracketing of presuppositions necessary to high fidelity descriptions.

Thought-sampling methods spontaneously explore thought content. Experimenters interrupt participants as they are engaging in a task and solicit for a narrative description of their thought content before the interruption. In Vivo Thought Sampling uses a beeper to randomly sample the inner experience of participants. When the beeper sounds, participants complete a Thought Sampling Questionnaire, rating characteristic of their thoughts on Likert-type scales. Similarly, Thought-and-Mood Sampling also randomly explores the cognitions of individuals as they occur in their

www.manaraa.com

natural environment, however, it also accesses their moods. DES is similar to Thought (and Mood) Sampling in that both randomly sample participants in their natural environments. Unlike DES, Thought Sampling has participants rate their cognitive experiences on a questionnaire. In addition, DES explores all aspects of an individual's inner experience, not only their thoughts and/or moods.

ATSS is a broader approach to accessing the cognitions of individuals than thought-sampling and the think-aloud paradigm. ATSS studies are conducted in a controlled laboratory setting. Individuals listen and react to a series of tape-recorded simulated situations. ATSS is useful in that it allows investigators to explore cognitions during infrequent or complex situations. Individuals provide open-ended responses to the simulations. In this sense, ATSS is similar to DES because both allow participants to present the full range of their inner experience. Unlike DES, ATSS is conducted in a laboratory setting and explores only the cognitions of the participants. And perhaps most importantly, ATSS aims at simulations, whereas DES aims at pristine, naturally occurring experiences. There are some situations where simulations are doubtless faithful copies of pristine experiences, some situations where they are not. Unfortunately, at this stage we don't know which is which.

Thought listing is a self-report procedure which elicits participant's thoughts directly after an event. This is different from DES in that thought-listing is conducted in a controlled, laboratory setting. Additionally, the investigators in thought-listing studies explore the thoughts surrounding certain situations from individuals. These lists are all retrospective, and are aimed only at thoughts, with no careful attention paid to the

www.manaraa.com

bracketing of the subjects' or the investigators' presuppositions about the existence of or nature of thoughts.

The Experience Sampling Method (ESM) and Ecological Momentary Assessment (EMA) use beepers to interrupt individuals, randomly or at a set time, during their naturally occurring lives. At the moment of beep, participants complete a questionnaire which solicits feedback about their location, mood, environment, and other general characteristics at the time of the beep. These methods provide an overview of who, what, when, and where people spend their time as well as what they think and how they feel. DES is similar to ESM and EMA in that both use beepers to sample experiences in the naturally occurring lives of individuals. DES differs from ESM and EMA by working to bracket presuppositions individuals have about the nature inner experience. Beliefs about what one will find in a particular person's inner experience are set aside as to not contaminate what is there to be discovered. DES does not have a set of predetermined questions that may limit the scope of inner experience elicited. In this way, DES is both open ended and "open beginninged" (Heavey & Hurlburt, 2008).

DES is unlike Thought-Sampling methods, ESM, and EMA in that it is a qualitative method that provides qualitative descriptions and not quantitative analysis. DES has an open-ended approach in that it allows the participants to develop their own descriptive language for their inner experience. DES does not constrict participants' descriptions of their inner experiences by having them answer questions based on a predetermined concept or construct. The participant and the DES investigator together develop apprehensions of experience over the course of several iteratively improving interviews. In addition, the participant and investigator together identify salient

www.manaraa.com

characteristics of the participant's inner experience. After these salient characteristics specific to a certain participant's inner experience have been identified, the investigator may identify nomothetic regularities that occur among those who share a certain similarity (Hurlburt, 1997).

For example, the differences between thought-sampling, ESM, EMA, and DES can be seen in the motivation for and findings of their respective studies. For example, let us consider four studies of bulimia nervosa, one a thought sampling study, one an ESM study, one an EMA study, and one a DES study.

Zotter and Crowther (1994), in the study described above in the In Vivo Thought Sampling section, used in vivo thought-sampling to explore the cognitive characteristics of bulimic, nonbulimic, repetitive dieting, and nondieting women on two randomly selected days. Participants were provided with an alarm that sounded every 30 minutes. They were instructed to record the time, the thoughts they were having, and the activity they were engaged in the moment before the alarm sounded. Investigators found that bulimic women reported significantly more eating and weight-related thoughts than nonbulimic or nondieting women (Zotter & Crowther, 1994).

Johnson and Larson (1982) used ESM to explore the characteristics of the daily lives of normal-weight bulimic women. They investigated the overall moods, mood fluctuation, social isolation, and amount of food related behavior of bulimic patients as compared to normal control. Bulimic and normative women were provided with an electronic pager that sounded randomly. The sounding of the pager prompted the participants to fill out a self-report questionnaire which asked about their situation and subjective experiences at that moment. Johnson and Larson (1982) found that bulimic

www.manaraa.com

women report negative mood states significantly more than normal women. In addition, bulimic women experienced more dysphoria and mood fluctuations, were sadder, lonely, irritable, passive, weak, and constrained than normal women (Johnson & Larson, 1982).

Stein, Kenardy, Wiseman, Dounchis, Arnow, and Wilfley (2007) used EMA to investigate the motivational factors behind binge eating in individuals with binge eating disorder through exploring the antecedents and consequences of binge eating. The participants reported more negative mood and hunger during prebinge than nonbinge times. Additionally, negative mood was at its peak after the binge (Stein et al., 2007).

Jones-Forrester (2009) used DES to explore the inner experience of individuals with bulimia nervosa. Participants were instructed to wear a beeper that randomly sounded in their natural environment. They were instructed to record all that was in their awareness at the moment of each beep. Jones-Forrester found that fragmentation of awareness, sensory awareness, unsymbolized thinking, inner speech, inner seeing, poorly differentiated affect, and interfering phenomenon characterized the inner experience of the participants (Jones-Forrester, 2009).

All four studies presented involved the use of a sounding device to prompt participants into giving accounts of their subjective experience. DES is different in that its lack of specificity allows for a more broad and accurate depiction of participants' inner experience. For example, the thought sampling study specifically instructed participants to record their cognitions the moment before the beep. This approach is similar to DES in that it allows participants to freely respond as opposed to answering a series of preset questions or questionnaires. Thought sampling is different from DES in that it is designed to explore the thoughts of the participants whereas DES is designed to

www.manaraa.com

capture all that a participant experiences. In this way, thought sampling studies limit their potential findings. Although emotions and cognitions are important aspects of experience, they are not all of experience. Though DES studies may educe the cognitions of an individual, they are not limited to them.

The EMA and ESM studies both instruct participants to answer a series of predetermined questions. This approach assumes that all individuals share common experiences which, in turn, limits the scope of experiences to be captured. Unlike the thought sampling study which focused on the cognitions of the participants, the ESM and EMA studies focused on behavioral factors. Although the focus is different, emotions and cognitions versus behavioral factors, thought sampling, ESM, and EMA studies are similar in that they all narrow the potential findings of the study by specifying a particular aspect of experience. Though DES may find similar results to the three mentioned studies, it is not limited to them.

DES has an advantage over the other measures of introspection in that it allows for a more in-depth investigation to the inner world of participants. Unlike the findings on the emotions and cognitions of individuals with eating disorders in thought-sampling, ESM, and EMA studies, Jones-Forrester found that bulimic individuals as a group had more fragmentation of awareness, sensory awareness, images, and perceptual awareness than feelings, thought/feelings, feeling fact of body, and preoccupation with weight, shape, or food, and cognition (Jones-Forrester, 2009). This is a finding that studies exploring cognitions and emotions would not have been able to discover.

To date, there have not been any inner experience explorations of left-handed individuals.

www.manaraa.com

CHAPTER 3

METHOD

The present study consisted of three phases: the screening phase, the qualification phase, and the sampling phase. The participants, instruments and procedures to be used in each phase will be described below.

Phase 1: Screening Phase

Overview

Undergraduate volunteers taking introductory psychology courses at the University of Nevada, Las Vegas completed a brief screening questionnaire consisting of five noninvasive multiple-choice questions designed for this study, a brief demographic questionnaire, and informed consent form. Based on this initial screening, those likely to exhibit characteristics of left-handedness were contacted and invited to participate in the second phase of the study.

Participants

One-hundred and seventy-four undergraduate students at the University of Nevada, Las Vegas from several introductory psychology courses participated in the screening phase of the present study. Volunteers received 0.5 research participation credits.

Instruments

The Screening and Demographic Questionnaire, devised for this study, asked students how many hours they do homework per week, how many times they eat at fast-food restaurants per week, which hand they use to write with, their relationship status, and their favorite animal. The only question of interest to this study is the handedness

www.manaraa.com

question (the others are distracters): “Which hand do you use to write with? 1) Right; 2) Left; 3) Both.”

The demographic portion of this questionnaire asked participants to provide their name, preferred phone number, age, race/ethnicity, sex, marital status, education level, and employment.

Procedures

With the instructors’ permission, the researcher entered the classroom, briefly described the study and asked for volunteers to complete the screening battery. After informed consent was explained and obtained, volunteers completed the screening phase package. Volunteers received participation credit (0.5) to meet a course requirement. The questionnaires were collected and scored. Students who consented to be contacted and answered the questionnaire item “Which hand do you use to write with?” with choices “2) Left” or “3) Both” were invited to participate in Phase 2: Qualification.

Phase 2: Qualification Phase

Overview

The individuals that self-reported as left-handers in Phase 1 were invited to participate in Phase 2. These undergraduate volunteers were involved in a more detailed and thorough assessment involving the use of a measure of handedness and of overall psychological functioning. Those found to be mostly left-handed according to the Edinburgh Handedness Inventory were invited to participate in Phase 3 of the study.

Participants

Ten participants who self-reported left-handedness or both in Phase 1 were contacted via telephone to participate in Phase 2. Participants received 1 research credit

www.manaraa.com

for participating in this phase of the experiment. Recruitment continued, randomly selected from those eligible, until 6 left-handed participants had been advanced to Phase 3.

Instruments

The Symptom Checklist-90-R (SCL-90-R; Derogatis, 1994) is a 90 item inventory designed to provide an outline of both an individual's symptoms and their intensity. The items are scored on a five-point Likert scale indicating the rate of occurrence of the symptom. It is designed to measure symptoms on nine different subscales including: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. The SCL-90-R may be administered to individuals 13 years of age and older and takes approximately 12 to 15 minutes to complete (Derogatis, 1994; Derogatis, Lipman, & Covi, 1973).

The Edinburgh Handedness Inventory (EHI; Oldfield, 1971) was used to identify left-handed individuals who were invited to enter the Phase 3. The EHI,a brief 10-item handedness questionnaire, is the most widely used handedness questionnaire and was developed to provide a simple and brief method for assessing handedness in neuropsychological and other clinical and experimental work. It was tested for reliability by Oldfield on over 1100 young adults (Oldfield, 1971; Lehnkering, Strauss, Wegner, & Siegmund, 2005). Participants are asked to indicate their hand preference on the following activities: writing, drawing, throwing, scissors, toothbrush, knife (without fork), spoon, broom (upper hand), striking match (match), and opening box (lid). In addition, participants are asked to indicate which foot they prefer to kick with and which

www.manaraa.com

eye they use when only using one. Participants are asked to put a plus sign in the column corresponding to their preferred side (left, right) and to place two plus signs in the appropriate column if they never try to use the other hand unless absolutely forced to. If they are indifferent, they are asked to put one plus sign in each column. To score the laterality quotient of the EHI, the number of plus signs in the left column is subtracted from the number of plus signs in the right column; that difference is divided by the total number of plus signs and multiplied by 100. Scores range from -100 (strongly left-handed) to +100 (strongly right-handed). Oldfield (1971) reported that laterality quotients between +31 and +40 in his subjects were indicative of marked deviations from truly right-handed behavior (Oldfield, 1971). Assuming that the reverse is also true, scores less than -40 would indicate truly left-handed behavior; we therefore chose -40 as a cutoff score for left-handedness.

Procedures

The purpose of Phase 2 was to identify a group of individuals that are left-handed as measured by the EHI and advance them to Phase 3. Participants were invited to complete informed consent, the EHI and SCL-90-R. They were asked to schedule a convenient time to meet with the investigators in the Experience Sampling Lab located in the Central Desert Complex at UNLV. Participants received 1 research credit for this phase of the study. This phase of the study took approximately one hour to complete.

The EHI was then scored. Participants scoring below -40 on the EHI were selected and contacted for participation in the sampling phase until six subjects had completed Phase 3. All participants indicated on the EHI that they use their left hand to write.

www.manaraa.com

Phase 3: Sampling Phase

Overview

Participants identified in the qualification phase as being left-handed were contacted to participate in Phase 3 until six had completed Phase 3.

Participants

Six undergraduate volunteers taking introductory psychology courses at the University of Nevada, Las Vegas between the ages of 18 and 20 years old participated in the sampling phase of the present study. Two participants were female, both aged 18, and four participants were male, aged 19, 18, 20, and 18. Two male subjects were Caucasian, one female and one male subject were African American, one female subject was Pacific Islander/Filipino, and one male subject was Hispanic. All six subjects were recruited via the administration of a brief screening questionnaire in their introductory psychology course. Four subjects participated during the Fall 2009 semester and two subjects participated during the Spring 2010 semester.

Apparatus

The subjects received a random-interval sounding device (beeper) developed by Hurlburt (Hurlburt & Heavey, 2002). The beeper is rectangular in shape and designed to emit a 700-Hz tone at random intervals that can be heard from an earphone. The random intervals range from a few seconds to one hour with an average of 30 minutes. The volume of the beeper is adjustable and the beep can be stopped by pressing a button. The subjects also received a pocket-sized spiral notebook for recording notes describing their inner experience at the last undisturbed moment before the beep sounded (Hurlburt & Heavey, 2002).

www.manaraa.com

Procedure

Participants who scored below -40 on the EHI in Phase 2 were invited to participate in Phase 3. Subjects who agreed individually met with two DES investigators approximately six times in the DES lab at the University of Nevada, Las Vegas (UNLV) campus. The first meeting was intended to train the subject on the procedure, complete informed consent paperwork, and to answer questions pertaining to the study. At their consent, participants were videotaped during the remaining interviews. The next four meetings (2-5) were 1-hour long expositional interviews, with the exception of meeting 5. During the expositional interviews the DES investigators interviewed the subject about the samples collected the previous 24 hours. The last meeting (meeting 5) also included a thorough debriefing after the expositional interview. Subjects received 4 research credits for participation in this phase.

Meeting 1: Orientation

Respondents met in the DES lab at the UNLV campus. They were informed of confidentiality and Informed Consent for the Sampling Phase was obtained. Participants were advised that they may discontinue sampling at any time and without penalty. Should a participant had chosen to withdraw from the study, they would have received one research credit per each attended meeting. None of the subjects withdrew from the present study.

The investigators explained the nature of the DES method in detail to the participants. They received the beeper and were instructed on the mechanisms of the device. They were taught how to turn it on and off, adjust the volume, and how to reset it.

www.manaraa.com

Participants were given a 3in X 5in spiral notebook to record their experiences and pocket-sized beeper programmed to beep at random intervals. They were told to wear this beeper the 24-hours before the next meeting as to have "fresh beeps" for the expositional interview. Participants were told to capture their naturally occurring experience at the last undisturbed moment before the beep occurs and record their experience in a notebook. They were informed of confidentiality and told to skip any samples they did not feel comfortable reporting (Hurlburt & Heavey, 2006).

Meetings 2-5: Expositional Interviews and Debriefing

Meetings 2 through 5 were 1-hour long expositional interviews. Each participant met with two investigators to discuss the participant's recently collected samples of inner experience. During the expositional interviews, the investigators essentially engage in conversations with the participants in an effort to discover the phenomenology of the participant's inner experience. The expositional interviews do not have a standard format although, typically, the participants consult their notes about their beeps and attempt to describe to the investigators their recently sampled experiences. The expositional interview is an unstructured interaction with the participant and investigators that involves the participant initially providing a variety of reports about such things as: a) the background or context of the experience, b) the situation (who they were with, who was there, etc.), c) the activity they were engaged in (watching tv, driving, etc.), d) the experience that occurred before the moment of the beep, e) the experience that occurred after the moment of the beep, and f) the ongoing experience at the moment of the beep. The aim of the expositional interview is to focus as exclusively on f) as possible, and allow other aspects only to the extent that they assist in the apprehension of f). This is a

www.manaraa.com

collaborative process in which the investigators work together with the participant to come to a high fidelity apprehension of the participant's pristine inner experience. This is an iterative process which takes place over several interviews. With each successive interview the participant may become more skillful at identifying their own inner experience and filtering out extraneous material.

Due to the iterative nature of the expositional interviews, the first expositional interview is considered to be a training exercise rather than an opportunity for data collection. During that first interview, participants are frequently surprised by the amount of detail sought by the DES investigators, and therefore have difficulty answering the questions posed by the investigators. After struggling through this first interview, and hearing the kinds of details the investigators probe for, participants may become better able to observe their own inner experience. The remaining expositional interviews consist of the same kinds of questions aimed at the participant's experience as were asked in the first interview; however, participants are now likely to be better observers of their inner experiences and more proficient in describing them.

Meeting 5: Debriefing

Participants met the investigators at the UNLV DES lab for their last expositional interview and were provided with an opportunity to ask questions. Participants received research credit for their completion of the study as part of their undergraduate psychology course requirement.

Data

The aim of this study was to collect randomly sampled experiences from left-handed individuals and then see what characteristics emerged from those samples.

www.manaraa.com

The unit of data collected in this study was therefore the sample of inner experience. Our subjects received a randomly sounding beeper and were instructed to jot down notes in a spiral notebook about whatever was in their inner experience the moment immediately preceding the beep. Subjects were instructed to collect six beeps within 24 hours of their scheduled expositional interview.

Upon completion of the sampling process, the investigators considered a subject's samples of inner experience and explored the characteristics of their samples for patterns. This resulted in an idiographic analysis of each subject.

After completion of the sampling process with all the subjects as well as completion of the idiographic analyses, the momentary samples from all subjects were considered to explore patterns, forms, and/or characteristics that emerged across subjects.

www.manaraa.com

CHAPTER 4

RESULTS

This study is aimed at exploring the inner experience of left handed subjects; toward that end, six left-handed individuals participated in Descriptive Experience Sampling (DES). Their characteristics are shown in Table 1.

Table 1
Demographics

	Subject						
	"KC"	"MC"	"DD"	"NH"	"LC"	"FM"	All Subjects
Age	18	18	20	18	18	19	18.5
Gender	F	M	M	M	F	M	
Ethnicity	PI/F	AA	C	C	AA	H	
EHI Laterality Quotient	-100	-100	-90	-58	-52	-47	-74.5
SCL-90-R							
GSI Raw Score	0.67	0.19	0.48	2.83	0.42	0.96	0.93
GSI T-score	61	50	60	73	56	72	62
Norm Group[a]	B	B	B	A	B	B	
Number of samples[b]	18 (18%)	16 (16%)	14 (14%)	16 (16%)	18 (18%)	19 (19%)	101 (100%)

Note:
a. Norm A is Adult Psychiatric Outpatients, Norm B is Adult Nonpatients.
b. First day samples excluded (considered training)
c. PI/F is Pacific Islander/Filipino, AA is African-American, C is Caucasian, H is Hispanic.

Subjects were administered the Edinburgh Handedness Inventory (EHI), a quantitative assessment of handedness, to evaluate their handedness laterality. The EHI consists of 10 items evaluating the hand preference of a variety of activities. Completion of the EHI yields a laterality quotient ranging from +100 to -100 (Oldfield, 1971). Negative laterality quotients are associated with left-handedness whereas positive laterality quotients are associated with right-handedness. The absolute values indicate degree of handedness with larger values signifying stronger handedness in either

www.manaraa.com

direction. Variations exist in the literature regarding the cutoff points of handedness, however, the present study used laterality quotients of -40 to -100 as indicators of left-handedness.

Table 1 shows that our subject's EHI scores ranged from -100 to -47, with three near -100, strongly left handed, and three clustering around -50, moderately left handed.

Subjects also completed the Symptom Checklist-90-R (SCL-90-R; Derogatis, 1994), a self-report inventory aimed at reflecting the psychological symptom patterns of various respondents (community, medical, and psychiatric). The SCL-90-R is a self-report inventory consisting of 90 items with a 5 point rating scale of distress from 0 "Not at All" to 4 "Extremely." Scoring is based on 9 symptom dimensions: Somatization, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism. The Global Severity Index (GSI) is one of three global indices of distress intended to summarize the level of symptomatology and distress. The GSI is the best indicator of the current level or depth of distress combining both the number of symptoms reported along with the intensity of experienced stress. Overall, an individual's severity of symptoms can be assessed through elevations in the GSI thus the GSI should be used when only one summary measure is reported (Derogatis, 1994).

The subjects' GSI raw scores and T-scores on the SCL-90-R are also presented in Table 1, which shows that our subject's GSI T-scores ranged from 50 to 73. In general, when compared to adult nonpatient norms, T-scores above 63 are indicative of clinically significant psychological difficulties (Derogatis, 1994). Two of our subjects, FM and NH, had T-scores in this range. One of these, NH, obtained a GSI raw score that was too

www.manaraa.com

high to be compared to nonpatients and was therefore compared to psychiatric outpatient norms. NH received an elevated T-score when compared to psychiatric outpatients indicating his level of distress is clinically significant. When compared to psychiatric outpatient norms, FM's GSI raw score converted to a T-score of 47 suggesting his symptoms are not clinically significant. The correlation coefficient between GSI raw scores on the SCL-90-R and laterality quotient on the EHI is 0.443, indicating the strong positive relationship between psychological distress and handedness often reported in the literature. However, the present study, with only six subjects, has a correlation coefficient critical value at the .10 level of significance of r=±.729. Because the observed value of 0.443 does not exceed its critical value of .729, we conclude that the sample size in this study is too small to produce a statistically significant relationship even in situations where the relationship is quite strong.

Organization

The main results of this study, the descriptions of left-handers' experience, are organized on two levels: 1) idiographically, within each individual subject; and 2) collectively, across all subjects. The next six chapters (Chapters 5 through 10) are idiographic descriptions of the inner experience of each individual subject as discovered by DES. Then Chapter 11 describes the patterns and emergent characteristics of inner experience across all six subjects and compares the results from the present study to the literature.

The intent of idiographic analysis is to explore the characteristics of an individual's inner experience as thoroughly as possible. In DES, idiographic analyses are performed through a consideration of all the samples of inner experience collected by a

www.manaraa.com

subject and then describing those characteristics. Six left-handed subjects participated in the present study; thus the investigators created six idiographic descriptions. Each idiographic analysis is presented in its own chapter (Chapters 5-10); the chapters are presented in descending order of degree of left-handedness as measured by the EHI (that is, we present the most left-hand subjects first).

Following the idiographic analyses, an across-subject description considering all the samples of inner experience from all subjects was prepared; it is provided in Chapter 11. The aim of this across-subject participation is to discover the salient characteristics and patterns of inner experience in left-handers.

www.manaraa.com

CHAPTER 5

"KC"

KC was an 18 year-old Pacific Islander/Filipino female who sampled with us in November of 2009. KC received a laterality quotient of -100 on the EHI (EHI; Oldfield, 1971); that is the maximally negative EHI score, indicating she is strongly left-handed. She received a GSI raw score of 0.67 (a T-score, compared to nonpatients, of 61) on the SCL-90-R (SCL-90-R; Derogatis, Lipman, & Covi, 1973; Derogatis, 1994), suggesting the absence of clinically significant psychological difficulties.

KC sampled on four separate occasions, collecting a total of 24 samples. Because Sampling Day 1 is considered training for the participants, 18 of KC's samples counts her inner experience characteristics. We will discuss these characteristics: sensory awareness, occurring in 12 of her 18 samples (67%); multiple experiences, occurring in 4 samples (22%); unsymbolized thinking, occurring in 3 samples (17%); inner seeing, occurring in 2 samples (9%); and other noteworthy characteristics.

Sensory Awareness

Sensory awareness was the most frequently occurring characteristic discovered in KC's samples, occurring in 12 of her 18 samples (67%). Here are examples:

> Sample 2.3. She was drinking a smoothie. At the moment, she was experiencing the peachiness and iciness (coldness and crunchiness) of the smoothie.
>
> Sample 3.5. She was experiencing the urge to urinate which presented itself as a physical sensation. There was nothing else in her experience. She was putting materials in her backpack, but that was not in her experience.

www.manaraa.com

Sample 3.4. She was looking at the fabric and redness of her friend's shirt, her focus aimed at the shoulder of the shirt. KC was not interested in the appearance of her friend's shirt for its functional use, but she was interested in the sensory quality of the fabric and its redness. She was also thinking of a man named "Jimmy." This was a cognitive process that did not involve words or images. Somehow the idea of Jimmy was present (an example of unsymbolized thinking) that seemed to exist in the physical middle of her head.

Sample 3.3. She was spinning her cell phone with her right index finger. At the moment, she was focused on the act of spinning the phone with her finger. Also in her awareness was the smooth feeling created by the spinning. She was seeing the cell phone spin, but that was not in her experience—her focus was on the act of spinning and the feeling of smoothness.

Two of KC's sensory awareness experiences featured more than one sensory awareness per sample. Thus KC had 14 separate instances of sensory awareness within these 12 samples:

Sample 2.4. Her headlights were illuminating a tree in front of her. At the moment, she was seeing the leaves on the tree. At the same time, her hand was on the headlight switch and she was feeling the headlight switch with the fingers of her left hand. That is, this was a sensory awareness, a feeling of the switch, not merely a part of the act of turning off the lights.

KC was engrossed in the sensory quality of the leaves being illuminated by the headlights as well as the sensory aspect of the feeling of the switch.

www.manaraa.com

One of KC's sensory awareness samples involved the sensory awareness of words:

> Sample 3.2. She was looking for Thursday on a calendar. At the moment, she was seeing the written words "guitar hero" on the paper calendar. She was interested in the visual presentation of the words and was taking in some quality about the shape of the words. KC was interested in the words for their visual and sensory aspect, and was not seeing the words as meaningful units, not interested in the words for their function. She was also innerly seeing a guitar leaning on the front, right part of a TV screen. The game Guitar Hero was on the screen of the TV. This was a still seeing, in color, and "not exactly clear." The seeing was in the back of her brain and looking rearwards at it. The written words "guitar hero" were more salient in her awareness.

Multiple Experience

KC's inner experience featured 4 samples of multiple experiences. We have already seen two: in sample 3.4, KC was experiencing the sensory quality of her friend's shirt and experiencing an unrelated, unsymbolized thought process of a man named "Jimmy." In sample 2.4, KC was seeing the leaves on the tree illuminated by the headlights, and at the same time feeling the headlight switch with the fingers of her left hand. Here is another example:

> Sample 2.6. KC was at a flag football game, having a conversation with her friend Bonnie about Jorge, a man Bonnie had recently met and was currently mad at. At the moment, KC was innerly seeing Jorge (with whom she had a prior acquaintance) from the waist up. She saw him from the front, but his face was

www.manaraa.com

directed to the left of her. He was seen in color and in motion (his head moved). At the same time, she was also seeing the grass of the flag football field. The inner seeing of Jorge and the outer seeing of the flag football field were both equally in her awareness.

Sometimes it is difficult to be confident about the multiplicity of sensory experience. For example, in sample 2.3 above, is the peachiness a separate sensory experience from the iciness? That distinction depends on matters of definition too precise to be useful. We counted sample 2.3 as one sensory awareness sample.

Unsymbolized Thinking

KC's second most frequently occurring characteristic, although substantially less frequent than sensory awareness, was unsymbolized thinking, appearing in 3 of KC's 18 samples (17%). Here is an example:

Sample 2.1. She was considering how to shape a paddle for her sorority big sister. At the moment, she was considering outlining the handle end of the paddle in a Mickey Mouse shape. This was a thought process present to her without words or pictures.

Two of her unsymbolized thinking experiences occurred along with other phenomenon. One of these we have seen before: in sample 3.4, described in the Sensory Awareness section, KC was experiencing the sensory quality of the fabric shoulder of her friend's T-shirt. She was also thinking without words, images, or any other symbolic representation of a man named Jimmy.

Here is another example:

www.manaraa.com

Sample 3.1. She was looking at a picture of a large group of women. She was looking for a particular person in the picture. She only knew the name of the person and not what she looked like. At the moment, she was looking at a face of one of the women. The woman had a big smile and KC was focused more on her smile than the rest of her face, though her whole face was in KC's awareness. KC was also wondering if the face she was looking at was that of the woman she was searching the picture for. This wondering was present to her without words or images. The looking at the face and the wondering were equally in her awareness.

In sample 3.4, KC experienced the unsymbolized thinking as localized in a physical region in her head--the middle of her head. Other examples of unsymbolized thinking had no physical location. KC has one other sample in which a characteristic is localized to a region in her head, Sample 3.2 discussed below in Inner Seeing section.

Inner Seeing

KC had 2 samples of inner seeing in her 18 samples (11%). KC's inner seeing samples were in color and involved the presence of another characteristic. We have encountered both of these samples already. In sample 3.2, discussed in the Sensory Awareness section above, KC was innerly seeing a guitar leaning against a TV screen. This was a still seeing, in color, and "not exactly clear." The seeing was in the back of her brain and looking rearwards at it. Sample 3.2 is similar to sample 3.4, discussed in Unsymbolized Thinking section, in that both involve localization of the experience. Sample 3.2 also features unsymbolized thinking, however, it is the innerly seen image and not the unsymbolized thought that is localized.

www.manaraa.com

One of KC's inner seeing samples involved seen motion. In sample 2.6, described in the Multiple Experience section above, KC was innerly seeing a man named Jorge her friend was talking about. His head moved.

Just Doing

Just doing was present in 1 sample of KC's inner experience (6%). Her just doing samples involved words:

> Sample 4.5. She was writing the word "idiots." In her experience was just writing the word and seeing the written word. We could not tell whether the seeing was merely a part of the doing of the writing or whether there was some interest in the shape of the letters.

Other Noteworthy Characteristics

Listening with Intent

KC had 1 sample (6%) of listening with intent in which she was listening with the intention of doing something:

> Sample 4.3. She was walking towards her room and heard music coming from her room. She was hearing the music, which sounded familiar, with the intention of figuring out who the singer was. KC was certain the trying to figure out who the singer was not a separate thought process.

In this sample, the listening was KC's way of trying to figure out who was singing. She was hearing the song with the intention to discover who was singing. There was not an explicitly present thought process separate from the hearing.

www.manaraa.com

Concentrated Doing

One of KC's samples featured the concentrated doing of understanding (6%). KC was actively trying to understand verbal input, the understanding was not automatically happening:

> Sample 2.2. KC was having a conversation with her friend Sonia, who was talking about what she is going to do with her paddle. At the moment, KC was actively engaged in the purposeful, effortful, directed understanding of what Sonia was saying. That is, KC was not merely hearing and immediately understanding Sonia's words; she was, in her direct experience "reaching out" for the meaning.

KC was concentrating and purposefully trying to understand the meaning of her friend's words, it was as if she was mentally reaching out for the meaning of the words. The comprehension involved some active engagement in the task of understanding the content of her friend's dialogue. The comprehension was not automatic.

Searching

One of KC's samples involved searching (6%):

> Sample 3.1. Described in detail in Unsymbolized Thinking section above. KC was looking at a girl's face that she was unfamiliar with in a picture of a group of women that she mostly knew. KC was attending to the girl's entire face but paid a little bit more attention to her smile. The looking at the girl's face was part of a scanning of the picture, she was looking for a particular person that she did not know. She only knew the name of the girl and not what she looked like. KC was

www.manaraa.com

wondering if the face she was looking at was the face of the person she was looking for.

This experience involved concentrated effort to find something in particular. In this case, KC was unaware of what she was searching for but she was still searching.

Valence

Although KC's inner experience did not feature Feelings, she did have 1 sample with positive valence to it:

Sample 3.6. She was watching a group of men dance on a stage. At the moment, she was noticing a particular man dancing and noticing his awkwardness, an example of Sensory Awareness. This was a positive experience in that something about his awkwardness appealed to her. She was seeing the man from head to toe.

No Experience

One of KC's samples did not feature any characteristics:

Sample 2.5. KC had just finished having a conversation with her friend Athena. At the moment, she was turning away from Athena and turning towards Julia, a friend who had just approached. Both Athena and Julia were in her visual field—Athena to the left and Julia to the right, but as far as KC could tell, there was nothing in her experience. Her eyes were in the process of swinging from Athena to Julia; she had; experientially, left Athena behind, but had not yet begun to experience Julia.

In this sample, there was nothing in KC's inner experience.

www.manaraa.com

Discussion

KC seemed to be a motivated and eager participant who enjoyed the DES process and seemed dedicated to depicting an accurate portrayal of her inner experience. Sensory Awareness was the dominant characteristic of KC's inner experience, occurring in 67% of her samples. Her inner experience did not include any inner speech or inner hearing. Words were present in KC's inner experience on 2 occasions, but only for their sensory quality or while writing, and even while writing it was unclear if the actual word was in KC's inner experience. Although KC's inner experience did not include feelings, she did have 1 sample with a positive valence to it.

www.manaraa.com

CHAPTER 6

"MC"

MC was an 18 year-old African-American male who sampled with us in January and February 2010. MC received a laterality quotient of -100 on the Edinburgh Handedness Inventory (EHI; Oldfield, 1971); that is the maximally negative EHI score, indicating he is strongly left-handed. He received a GSI raw score of 0.19 (a T-score, compared to nonpatients, of 50) on the SCL-90-R (SCL-90; Derogatis, Lipman, & Covi, 1973; Derogatis, 1994), suggesting the absence of clinically significant psychological difficulties.

MC sampled on four separate occasions, collecting a total of 20 samples. Because Day 1 is considered training for participants, 16 of MC's samples counts his inner experience characteristics. We will discuss these aspects of his inner experience: sensory awareness, occurring in 7 samples (44%); unsymbolized thinking, occurring in 5 samples (31%); searching, occurring in 5 samples (31%); multiple experiences, occurring in 4 samples (25%); concentrated doing, occurring in 3 samples (19%); feeling, occurring in 2 samples (13%); inner seeing, occurring in 2 samples (13%); and words and meaning in experience.

Sensory Awareness

Sensory awareness was the most frequently occurring characteristic in MC's inner experience occurring in 7 of MC's samples (44%). Here is an example:

> Sample 4.4. He was playing a video game and he was attempting to block the computer's combination. At the moment, he was aware of physically pressing the buttons on the control with his left hand. He was aware of the sensation in his

www.manaraa.com

hand from pushing the button. He was focusing on pressing the button at the right time—synchronizing the button push with the action on the screen—and hoping it would work.

One of MC's sensory awareness samples had five separate sensory awarenesses; thus he had a total of 11 sensory awareness experiences within the sensory-awareness 7 samples. Here is the multiple sensory awareness sample:

> Sample 2.3. He was eating Ramen and chicken and watching TV. At the moment, he was experiencing the spiciness of the Ramen, the flavorful taste of the chicken, and the kind-of-dry-but-moist texture of the chicken. He was experiencing these three aspects separately. He was also experiencing the combination of these three aspects. He was also watching the movie 'Pitch Black', focused on the purplish hue of the film itself. He was paying more attention to this visual aspect of the movie than the dialogue or action.

Whether the combination of the three aspects deserves to be called a separate sensory awareness is difficult to ascertain; our best understanding was that it was a separate experience.

Unsymbolized Thinking

Unsymbolized thinking occurred in 5 of MC's samples (31%). In these samples, MC was experiencing a specific though without words, images, or any other form of symbolic representation. We have already seen examples in samples 2.2 and 3.1 described in Searching section. In sample 2.2, MC was thinking that it was his responsibility to answer the phone. In sample 3.1, he was aware of being off task. This

www.manaraa.com

was a thought that was present without words, images, or other symbolic representation. Additional examples are:

Sample 2.4. He was watching the movie 'Pitch Black'. The scene consisted of the people realizing that the two suns will be eclipsed on the planet; therefore they are doomed. He had already seen the movie before and knew how it ended. His experience had two primary aspects: a sensory awareness of the film itself, and empathizing with characters in the film The film was becoming blackish and losing its purplish hue, and was half dark, half light. At the moment, he was noticing that the darkness was making the lightness stand out, an example of sensory awareness. The empathy with the characters had two aspects: a mental inner commentary that the people will not survive. This was a thought process that did not involve words or images, and was factual, not emotional, an example of unsymbolized thinking. He was also feeling a combination of bad and hopeful for the people. This was a mental feeling with no bodily aspect.

In reality, because he had seen the movie and knew how it ended, he knew that there was no hope, yet he felt hopeful for them, as they would have felt it. This sample is considered multiple experience: the sensory awareness of the film dark/lightness along with the thinking and feeling of empathy.

Sample 4.2. He was eating soup. His mom was talking to him and he was watching the movie 'Twilight'. At the moment, he was hearing his mom talk about a necklace in the movie 'Twilight' and how it was for sale somewhere. He was processing the meaning of what she was saying but not the exact words [he said, for example, that even if he had known we would ask, he could not have

www.manaraa.com

written down her exact words immediately after the beep]. As part of the same experience, he was seeing on the TV the necklace she was talking about, seeing the whole necklace. The rest of the screen was not in his experience. He was also thinking that the necklace being for sale at some particular store [not the specific store his mom was talking about]; this thought took place without words or other symbols, and is therefore an example of unsymbolized thinking.

Searching

Five (31%) of MC's inner experience samples involved some kind of searching. In these samples, MC was actively involved in looking for some specific thing. This looking was more than a sensory awareness or perceptual experience of seeing the stimuli. Here is an example:

Sample 2.2. He was looking for the phone because it had just rung and his sister had not answered it. He had expected her to answer the phone because he knew it was next to her. Before the beep, he had been thinking that it was his sister's responsibility to answer the phone because it was next to her and he was innerly seeing her answer the phone. At the moment of the beep, the inner seeing was gone but the thinking continued (an example of Unsymbolized Thinking). He was also saying aloud, "Where's the phone?" to his sister. The words were formed as a question but the statement was critically imperative, a suggestion that she should have answered the phone. He was also physically looking for the phone. He was more focused on the physical aspect of the looking, the moving of the sofa pillows and papers, than on the seeing.

Two of MC's searching samples consisted of looking for words or phrases:

www.manaraa.com

Sample 3.1. He was supposed to be working on an essay but he was looking up a comic book character named Blade on the internet instead. He was looking at a Wikipedia page for information about Blade. At the moment, he was searching the Wikipedia page for particular words or phrases about Blade—he was of the impression that he knew what these words or phrases were, and would recognize them when he saw them, but he could not recall them explicitly at the moment of the sample. He was also explicitly aware of being off task from the essay he was writing, and that he would get back on task when finished reading about Blade. This seemed to be a thought that was present in his awareness without words or images (an example of unsymbolized thinking and multiple experience).

Sample 4.5. He was moving his left thumb on the touch screen of his phone looking for a particular text message. He was getting closer to the specific text message he was interested in reading. At the moment, he was making sure he did not pass the text message he was looking for, was somehow instructing his thumb to slow down. That is, it was not merely that his thumb was slowing down, it was that he recognized himself as intentionally slowing his thumb. He was also seeing the first part of the currently displayed text message. He knew what the screen would look like when the correct text message was pulled up; he was simultaneously searching for particular words and for the visual characteristics of the message. He was also feeling the vibration of the phone on his thumb (an example of sensory awareness and multiple experience).

In both samples, MC was more than just reading or seeing the words, he was looking at the stimuli with the intent of finding particular phrases, words, or characteristics.

www.manaraa.com

Multiple Experience

Four of MC's samples involved multiple experiences (25%). For example in sample 4.5 described in Searching section, MC was experiencing multiple phenomenon simultaneously. He was purposely slowing his thumb down (concentrated doing), searching for a particular text message (searching), and experiencing the sensation of the vibration of his phone on his thumb (sensory awareness). In this sample, MC is attending to separate experiences (purposely slowing down his thumb, the searching for a text message and the feeling of the vibration on his thumb) simultaneously.

Concentrated Doing

Concentrated doing was present in 3 samples of MC's inner experience (19%). In these samples, MC was experientially involved in the deliberating and directing of the mental processes or physical actions. MC's concentrated doing samples involved bodily manifestations of self instruction. Here is an example:

> Sample 4.1. He was sitting at a table eating soup while his mom was watching the movie 'Twilight' and talking to him. At the moment, he was putting a soup filled spoon to his mouth with his left hand. He was carefully, concentrated moving the spoon to his mouth without spilling. He was also aware of the closeness of the spoon to his mouth. Something about the closeness of the spoon alerted him that it was time to open his mouth. This was a bodily experience; he was not seeing the spoon. He was also hearing his mom speak to him. He was tracking and understanding what she was saying but he was not placing any additional mental energy into what she was saying. That is, he was understanding

www.manaraa.com

her in an uninvolved way, the uninvolvement reflecting the fact that he could not do anything about what she was saying.

Feeling

Two of MC's samples (13%) involved his experience of feeling. Both samples of feeling involved mentally experiencing the feeling:

> Sample 3.4. He had finished writing a claim in his essay and he was trying to think of an example supporting his argument. At the moment, he was aware of having written an example in his pre-notes; he was of the impression that example would support the claim he was making, but he couldn't remember what the example was—he was waiting for it to appear. In his experience was also a mental annoyance to a song that had just come on that he had already heard several times before. He was just at the beginning of the action to click the button on his keyboard that would start a new song.

One of MC's feeling samples involved empathizing with others. In sample 2.4, described in Unsymbolized Thinking section, MC was empathizing with the characters in the film 'Pitch Black'. He was feeling a combination of bad and hopeful for the people. This was a mental emotion. In this sample, MC is experiencing an empathic emotion. He was not experiencing badness and hopefulness for himself but for the characters in the movie.

Inner Seeing

MC's inner experience featured inner seeing in 2 of his samples (13%). One of MC's inner seeing samples involved innerly seeing something he is craving:

www.manaraa.com

Sample 2.6. He was craving ice cream and had just asked his sister if they have any. At the moment, he was innerly seeing vanilla ice cream in a bowl. The vanilla ice cream was slightly melting and covered with chocolate syrup. The bowl was a clear Tupperware bowl that he has at home. He was seeing this as if he was looking down at it on a table or his lap. The ice cream and chocolate syrup appeared glossier than they actually are, as if glamorized for an advertisement. He was seeing this in color. He was also hearing his sister say "No." He was paying attention to her answer. He was not looking at her.

MC's other inner seeing sample involved a visual reseeing of something he had already seen:

Sample 3.3. He was typing his essay on 'Buffy the Vampire Slayer' and recalling the episode he was writing about. He was recalling the episode where Buffy the Vampire Slayer fights Kendra and he was trying to figure out who struck who first. At the moment, he was innerly seeing the scene where Buffy and Kendra were fighting. As far as he could tell, the scene was an accurate recreation of the actual scene. He could not say what he was innerly seeing at the moment of the beep other than that Kendra was on the left and Buffy was on the right. He was innerly seeing the scene vividly, in motion, and in color. There was no sound. He was not aware of the typing, it was is if his fingers were doing their own thing.

In this sample, a meaningful verbal process is going on outside of his awareness. MC continues typing throughout the sample; however, the typing is not in his awareness. This is consistent with the lack of mental energy MC contributes to verbal input or uninvolved understanding in samples 4.1 and 4.2.

www.manaraa.com

Words and Meaning in Experience

On only one occasion did MC have explicit words appear in his inner experience. That was sample 4.3:

> Sample 4.3. He was playing a video game and had just been distracted by his mom calling to him from the next room, telling him he hadn't taken out the trash. At the moment, he was continuing to hear her voice say "You didn't take out the trash" even though she was no longer talking. He was innerly hearing her voice say these words in the same way as she had actually said them moments earlier, although it was not as vivid as the original hearing (an example of inner hearing). He was understanding what she said and he was innerly saying the words "Oh yeah" (an example of inner speech). Also in his awareness was the pressing of the pause button to restart the game. He was aware of the physical action of pressing the button. The pressing of the button was automatic.

In sample 4.3, MC is not merely extracting the meaning from what his mother has said; instead, he is replaying her speaking. Furthermore, there was no direct connection to the meaning: he was restarting the play of the game, rather than, for example, getting up to take the trash.

Two of MC's inner experience samples involved having a distant or partial understanding of verbal input. It is as if some form of understanding of the gist is happening, even though the specific understanding of the words that are being spoken is not taking place. It is as if the meaning comes in beneath the surface. In both samples, MC's mom was speak to him. In sample 4.1, described in detail in Concentrated Doing section, MC was carefully eating soup while his mother said something to him. He was

www.manaraa.com

tracking and more or less understanding what she was saying but he was not directly focused on it—in fact, he couldn't remember what she had said or even its gist. That is, it seemed as if he was understanding her but in an entirely uninvolved way, the uninvolvement reflecting the fact that he could not do anything about what she was saying. In sample 4.2, described in detail in the Unsymbolized Thinking section, MC was hearing his mom talk about a necklace in the movie 'Twilight' and how it was for sale somewhere. He was processing, somehow grasping, the gist or basic meaning of what she was saying but not the exact words [he said, for example, that even if he had known we would ask, he could not have written down her exact words immediately after the beep].

Thus, meaning sometimes seemed to pass through him without his being paying much if any attention to it. On one occasion, he was actively involved with the meaning:

> Sample 3.2. He was reading tweets on Twitter. He had just read a tweet that did not make sense. He understood the parts of the tweet but not the whole. At the moment, he was actively trying to understand the tweet as a whole. It was as if he were actively putting together pieces of puzzle (an example of the doing of understanding; Hurlburt, 1993).

On one other occasion, MC experienced had an inner experience of the existence of words without the words themselves being explicitly experienced:

> Sample 3.5. He was trying to remember the name of Kendra's Watcher on the show Buffy the Vampire Slayer. At the moment, he was searching for the name of Kendra's Watcher on the internet. He was aware of an inner stream of names of other characters in the story coming and going gone at a time. He was

www.manaraa.com

somehow recognizing the sound of the names but he was not innerly hearing them or innerly saying them. The names were experienced as being in his own voice, but they were not fully articulated. It was as if her were somehow incompletely or inchoately or hintily voicing the names. As each name semi-appeared, he would reject that name and move on to the next. He was also waiting for the screen on the computer to appear. He had also just clicked the button next to the computer touch pad. He was feeling the button resistance against his finger. This was a clear sensory awareness but not as prominent in his experience as the stream of names or the waiting for the icon to appear.

As a general rule, for most adults, the meaning of words is tightly tied to the words themselves. Thus, in typical hearing, the meaning comes of a piece with the words. But that is not the case with MC. Sometimes the words pass through with only a hint of meaning. Sometimes the words require effort to adduce the meaning. Sometimes the meaning comes with only a hint of the words.

Discussion

Overall, MC's samples of inner experience suggest that he is experiencing sensory awareness much of the time (44%) and also unsymbolized thinking much of the time (31%). Words occurred only rarely in MC's inner experience (two occasions), and his overall experience with words was unusual. Meaning did not seem directly connected to words; meaning could be present without words being comprehended, and meaning could be absent when words were ongoing.

www.manaraa.com

CHAPTER 7

"DD"

DD was a 20 year-old Caucasian male who sampled with us in February 2010. DD received a laterality quotient of -90 on the Edinburgh Handedness Inventory (EHI; Oldfield, 1971) indicating he is strongly left-handed. He received a GSI raw score of 0.48 (a T-score, compared to nonpatients, of 60) on the SCL-90-R (SCL-90-R; Derogatis, Lipman, & Covi, 1973; Derogatis, 1994), suggesting the absence of clinically significant psychological difficulties.

DD sampled on four separate occasions, collecting a total of 18 samples. Because Sampling Day 1 is considered training for the participants, 14 of DD's samples counts his inner experience characteristics. We will discuss these characteristics: sensory awareness, occurring in 7 samples (54%); inner seeing, occurring in 4 samples (29%); unsymbolized thinking, occurring in 3.5 samples (25%); searching, occurring in 2 samples (14%); concentrated doing, occurring in 2 samples (14%); multiple experience, occurring in 5 samples (36%); and other noteworthy characteristics.

Sensory Awareness

Sensory awareness occurred in 7 of DD's samples (54%), which suggests that sensory awareness is highly characteristic of DD's inner experience. Here are examples:

> Sample 2.2. He was experiencing the physical sensation of hunger. He felt an empty feeling in his lower abdomen area. He was also innerly saying the words "I'm going to chow down in a minute." This was related to the empty feeling in his stomach. He was also aware of the driving task; he was seeing what was in front of him.

www.manaraa.com

Sample 2.3. He was rubbing the back of his neck with both hands in his Sociology class. At the moment, he was focused on the feeling in his neck created by his thumbs, but not focused on his thumbs. He was experiencing pressure on the top layer of his back neck muscles. He was also loosely paying attention to his teacher's talking about Kinsey, mostly seeing the word "Kinsey" on the screen. This occupied only about 10% of his experience, the other 90% focused on his neck pressure massage. It was unclear whether he was just very loosely understanding his teacher's words, or whether he was not paying any attention at all to what she was saying, knowing only that she must have been talking about Kinsey because that was on the PowerPoint screen.

Those two examples are very typical sensory awarenesses. Here is a less typical example:

Sample 3.5. He was in class trying to think of an example of how power has influenced his life. In his experience, he was actively searching for an example. The searching seemed to be visual in some way such that he was searching for an image but he was not seeing an image at the moment. He was also hearing the teacher talk and was tracking what she was saying. He was also noticing that the teacher was walking back to the podium with her left hand in the air, and he was somehow particularly noting that it was her *left* hand that was in the air. That is, it was *not* that he was noticing that one of her hands was in the air and that hand *happened* to be her left hand; he was noticing in particular that it was her *left* hand that was in the air.

www.manaraa.com

This sample is an unusual sensory awareness for two reasons: 1) this is a left-handed study and DD is noticing the left-hand of his teacher and 2) he is noticing a particular characteristic of his teacher irrelevant from what she was doing. In this sample, DD was experiencing the sensory quality of his teacher's hand in the air.

Two of DD's sensory awareness samples featured two simultaneous sensory awarenesses. Thus DD had 9 separate instances of sensory awareness within the 7 samples. Here is an example:

> Sample 4.5. He was driving when the brake lights of the car ahead came on. At the moment, he was attending to only the right brake light, he was not noticing the left one. He was noticing the bright reddish-pink of the brake light. He was also gently pressing underneath the inner corner of his left eye with his finger. In his awareness was the sensation of the hard boniness of his nose. This was a sensation in his finger, not a sensation in his nose caused by his finger.

Inner Seeing

Inner seeing was the second most common characteristic in DD's inner experience, occurring 4 times (29%). Two of DD's inner seeing samples consisted of innerly seeing himself:

> Sample 3.1. He was driving. He had been thinking that he would like to play the guitar. This was a thought that was not represented in words or images. At the moment, the thought had continued and triggered a related but separate innerly seen image of himself playing the guitar and singing. He was seeing his whole body straight ahead, sitting and strumming on a guitar. He was strumming the guitar with his left hand and his right hand was on the neck of the guitar. The

www.manaraa.com

image was in motion and he was also seeing his mouth move. He was not hearing himself sing and was unsure of what song he was singing. He was wearing a light green shirt. He was attending to the greenness of the shirt (an example of sensory awareness). There was no background. He was also thinking that in order for him to play the guitar and simultaneously sing in front of people, he would have to expand his comfort zone, that it would be a stretch for him to do that. This did not involve words or images (an example of unsymbolized thinking). This thought was separate from but related to the thought of wanting to play the guitar and the inner seeing (an example of multiple experience).

Sample 4.1. He was sitting in his car passing time until his next class starts. At the moment, he was thinking that he has to sit and wait in his car, with the focus being on the *having to* sit and wait. This was an ongoing thought process that was caught in flight. This thought also had a negative valence, like *Ugh!* I have to sit and wait. However, he was *not* directly experiencing impatience--he was expressing impatience indirectly through the thought. He was innerly seeing himself sitting in the car. He was seeing himself from the back seat. This was not clearly visible and only a small part of his awareness. He was also seeing the DES beeper in his hand.

Two of DD's inner seeing samples involved innerly seeing words or sentences:

Sample 2.4. He was taking an online quiz and was researching the concept of preadolescent resistant training related to the question he was answering. At the moment, he was reading an article on the computer. He was looking for an idea in the article that he needed but he was not sure what it was. This seemed like an

www.manaraa.com

active comparison of what he was reading with what he was looking for, rather than a reading for comprehension. He was also innerly seeing the trajectories of sentences going forward from the back of his head. The sentences were colorful on a black background. The letters of each word were presenting themselves sequentially; that is, the letters were displayed along the trajectory, rather than across it. Each sentence was moving at a different angle but seemed to be coming all from about the same place at the back of his head. All the sentences were related to the same idea of whether preadolescent resistance training would have helped him. One of the sentences was "Would this have helped me?" This was in futuristic type font, yellow lettering on a black background. This sentence was in the middle of the others. He could not remember the other sentences. The reading was central in his awareness.

Sample 4.2. He was having a conversation on Facebook regarding a quote that was the opening line of a song; he had once used the quote in his youth group. He was responding to a friend, telling her that he had only used the quote for his speech and not the whole song. He was typing the word "just" on his phone. This word was part of the phrase "Just the Quote." He was innerly seeing the words "Just the Quote" set off in straight quotation marks. The J in 'Just' and Q in 'Quote' were upper case; the remaining letters were lower case. The letters were large as if they were close to him. He was seeing them without a background. The font was basic and there was no period. He was also aware of what he was doing, typing the words, and was involved in the doing of it. The

www.manaraa.com

doing was more in his awareness than the inner seeing. The words may have been yellow, but he was not sure about that.

Unsymbolized Thinking

Unsymbolized thinking occurred in 3.5 of DD's samples (25%). Here is an example:

Sample 2.1. He was completing an in-class exam. He had just finished reading a multiple-choice question that asked which theorist was association with the slip-of-the-tongue phenomenon. At the moment, he was thinking that he would have remembered it if he had read about Freud, so it must have been someone else. This was a thought process that did not involve words or images.

DD's other sample of unsymbolized thinking (sample 3.1 described in detail in the Inner Seeing section) involved the multiple and separate simultaneous unsymbolized thoughts. DD was thinking that he would like to play the guitar. He was also thinking that, in order for him to play the guitar and simultaneously sing in front of people, he would have to expand his comfort zone. These thoughts were present without words, images, or other symbolic representation. They were related, but separate thus also an example of multiple experience.

Three of DD's samples involved the presentation of ideas; however, these ideas were not as specific as is usually the case in unsymbolized thinking. We were not sure if these samples were unsymbolized thinking phenomena so we counted each sample as 0.5. Here are the samples:

Sample 3.3. DD was communicating with his friend Sandra via text messaging. Sandra had texted him that she was with Tacy. DD does not like Tacy which

www.manaraa.com

implies that he would not go to dinner with Sandra. He had just completed texting the words "It's all good" and he was trying to figure out what to say next. At the moment, he was trying to figure out how he was feeling about this situation and he had different potential feelings present themselves to him. Being slightly annoyed was the primary possibility that presented itself to him. This was a mental process. In the back of his head he was experiencing the notion that he does not want to be rude to Sandra. This notion was physically located in the back of his head.

There were thus two separate cognitive experiences ongoing simultaneously that were similar to unsymbolized thinking: the trying to figure out his emotions, and the notion of not wanting to be rude to Sandra. However, while cognitive, there is less directly apprehended content than is usually the case in unsymbolized thinking.

Here is another example:

Sample 4.3. He was sitting inside his car with his head leaned back and his eyes closed. A truck engine had just started next to him and startled him. At the moment, he was hearing the deep guttural sound of the truck engine that the exhaust was making. He was also recognizing that this was an aftermarket exhaust. This recognition was automatic, present somehow cognitively but without a thought process. He was attending more to the sound of the engine than the recognition.

In this sample, DD's hearing of the guttural sound is a sensory awareness. The recognition of the sound as being an aftermarket exhaust is a cognitive event, but there is less directly apprehended content than is usually the case in unsymbolized thinking.

www.manaraa.com

The third example occurred in sample 4.4:

Sample 4.4. He was reclined in his parked car on the second floor of the parking structure. His eyes were open. A truck was driving by following a parade of cars. He felt his car shaking while the truck was driving by. He was focused on the shakiness of his body and the shakiness of his car separately. Thus he was experiencing the shakiness of his body and the shakiness of the car as separate sensory awareness. He was also thinking that the outer thigh of his left leg was a bit uncomfortable. There was an awareness present that it was his left leg and not his right leg. This discomfort was only present in his left leg.

In this sample, DD was not experiencing a specific thought process regarding the discomfort present in his left leg, however, he was mentally aware of the fact that the discomfort was in his left, and not right, leg.

Searching

Searching occurred in 2 of DD's inner experience samples (14%). One of DD's searching samples involved reading. This sample (sample 2.4) was described in detail in Inner Seeing section. DD was looking for an idea in an article on the computer, but he was not sure what the idea was. The looking was an active comparison of what he was reading with what he was looking for. He was not reading for comprehension.

DD's other searching sample (sample 3.5 described in Sensory Awareness section) involved an internal, mental searching. DD was searching his mind for an example of how power has influenced his life. The searching seemed to be visual—that is, he was searching for an image but he was not seeing an image at the moment.

www.manaraa.com

Concentrated Doing

Two samples in DD's inner experience involved intentional doing (14%). In these samples, DD was actively involved in the doing of some action. The action was not automatically happening. DD was experientially invested and directing the activity:

> Sample 3.2. He was looking down and noticed his iPhone earphones were tangled. At the moment, he was noticing that the earphones were tangled and instructed himself to do something about it. The noticing of the tangle and the self instruction happen one after the other very quickly and both at the moment of the sample. The self-instruction was not experienced as a thought, not a cognitive process.

DD's other example of intentional doing occurred at sample 4.2 (described in Inner Seeing section). He was typing words on his phone in response to a conversation he was having with a friend on Facebook. He was involved in the action of typing the word "just"—that is, the typing was not automatically happening. He was aware of the process of keying in the letters "j-u-s-t" with his right hand into his phone. He was focused on the action of the typing—that is, he was involved in the doing of the typing. He was not aware of what it felt like or what it looked like (he was not involved in the external seeing of the words).

Multiple Experience

Five of DD's inner experience samples feature multiple experiences (36%). Sample 4.5, described in the Sensory Awareness section, is one example: he was seeing the bright reddish-pink of the brake light and simultaneously feeling with his finger the hard boniness of his nose. Sample 4.4, described in Unsymbolized Thinking section, is

www.manaraa.com

another example. DD was experiencing shakiness of his body and shakiness of his car separately. He was experiencing the shakiness of his body as a separate sensory awareness from the shakiness of his car. He was reclined in his parked car on the second floor of the parking structure. His eyes were open. A truck was driving by following a parade of cars.

Other Noteworthy Characteristics

Valence

DD's inner experience did not feature the direct experience of Feelings; however, he did experience hints of feelings in 2 samples. Sample 4.1 (described in Inner Seeing section) had a negative valence to it. DD was experiencing an ongoing thought process that he has to sit and wait in his car until his next class starts. The thought process had a negative valence to it like *Ugh!* I have to sit and wait. He was experiencing impatience indirectly through the thought. DD was not directly experiencing impatience; however, impatience is present in the thought process. DD is aware of the impatience, but he is not feeling impatient at the moment. Another sample within the realm of feelings involved the trying to understand or comprehend feeling. DD only had one sample of this phenomenon in sample 3.3 (described in Unsymbolized Thinking section). DD was communicating with his friend Sandra via text messaging. Sandra had just informed DD that she was with Tacy. Because DD does not like Tacy, he would not go to dinner with Sandra. At the moment, DD was trying to understand how he felt about the situation. He had different feelings present themselves to him. Being slightly annoyed was the primary possibility present at the moment. This was a mental process. This sample is not a standard feeling sample in the sense that DD was not actually experiencing an emotion.

www.manaraa.com

DD was trying to understand what he was feeling; he was not actually experiencing an emotion. Multiple emotions were presenting themselves to DD as a mental process, but he was not actually experiencing any of them. At the moment, the emotion mostly present was being slightly annoyed but he was not slightly annoyed.

Words and Meaning in Experience

DD experienced inner speech in 1 of his samples (sample 2.2 described in Sensory Awareness section). DD was innerly saying the words "I'm gonna go chow down in a minute" related to a hunger sensation he was experiencing.

No Experience

In 1 of DD's inner experience samples, nothing was in his awareness:

> Sample 3.4. He was idly scrolling through his phone. There was nothing in his experience. He was not paying attention to the phone or the feeling of the phone or anything.

This sample is much different than the Concentrated Doing samples. Although DD is scrolling through his phone, there is not intentionality or directive aspect in his experience.

Discussion

Overall, DD's samples of inner experience suggest that he is experiencing sensory awareness much of the time (54%); also frequent were unsymbolized thinking (29%) and inner seeing (29%). Words occurred only rarely in DD's inner experience (two occasions), and his overall experience with words was unusual. DD's inner experience included only one sample of inner speech (typically the most frequent form of words in

www.manaraa.com

experience). Innerly seen words were present in DD's inner experience on two occasions (seen words is typically a rare phenomenon).

DD did not experience any direct feelings, although he did have 2 samples within the realm of emotions. As an example of the lack of direct experience, at sample 3.3 he was presenting several potential feelings to himself, one at a time, trying to figure out which one he should feel. It is more typical for people simply to experience feelings.

DD's inner experience also featured the awareness of the leftness of stimuli such as his teacher's left arm and the discomfort in his left leg. During the expositional interview, DD reported that the awareness of the left aspect of stimuli is common in his awareness.

www.manaraa.com

CHAPTER 8

"NH"

NH was an 18 year-old Caucasian male who sampled with us throughout October and November of 2009. He received a laterality quotient of -58 on the EHI (EHI; Oldfield, 1971) indicating that he is left-handed. NH received an SCL-90-R GSI (SCL-90-R; Derogatis, Lipman, & Covi, 1973; Derogatis, 1994) raw score of 2.83, which converts to a T-score compared to psychiatric outpatients of 73, suggesting the presence of clinically significant psychological distress. NH's GSI score was substantially higher than any of our other subjects, necessitating the use of the psychiatric outpatient norms; all our other subjects could be compared to the adult nonpatient norms.

NH sampled on four separate occasions, collecting a total of 20 samples. Because Sampling Day 1 is considered training for the participants, 16 of NH's samples counts his inner experience characteristics. We will discuss these characteristics: inner seeing, 6 samples (38%); sensory awareness, 4.5 samples (28%); and other noteworthy characteristics.

Inner Seeing

Inner seeing occurred in 6 of NH's 28 samples (38%). All of his inner seeing samples were vivid and clear. Here are examples:

> Sample 2.1. He was talking to his friend on the phone about getting her nose pierced. He was innerly seeing a girl's nose with a piercing. He was only seeing the right side of the nose. The jewelry in the piercing was a small, silver stud with a diamond-like tip. He was seeing the nose and the piercing in color. He was also hearing his friend talk on the phone about her getting her nose pierced.

www.manaraa.com

He was both hearing and understanding what she was saying. The inner seeing of the nose was more salient in his awareness.

Sample 3.1. He was walking to class with his friend. Just prior to the beep he had taken a drink of his Peppermint Mocha Frappuccino. He was innerly seeing a red and white candy cane with a vertical straight portion and a curved portion at the top. He was only innerly seeing the candy cane, he did not see a background. The seeing of the candy cane seemed to be triggered by the taste of the peppermint in his Peppermint Mocha Frappuccino that he had tasted moments earlier. However, the triggering was not in his awareness at the moment. He was also seeing the sidewalk and buildings in front of him as he was walking. That is, the sidewalk and buildings in front of him were in his experience. The inner seeing of the candy cane was more salient than the actual seeing of the sidewalk and buildings.

Two of NH's inner seeing samples consisted of innerly seen words or symbols with significance for words. Examples:

Sample 2.2. He was studying Spanish vocabulary and he was trying to make sense of the material he just reviewed in his textbook. He was innerly seeing the word "beber." He was innerly seeing the word in neatly typed letters without a background or base. He was seeing the word by itself. The font of the innerly seen word was different than the font of the word printed in his Spanish book.

Sample 2.3. .He was innerly seeing a tilde; he was seeing only a tilde. He had just finish writing the word "manana" and he was trying to figure out which "n" the

www.manaraa.com

tilde goes over but he was not innerly seeing the word manana or the letter n. The tilde was typed in the same font as the word "beber" in sample 2.2.

Sensory Awareness

NH's inner experience involved sensory awareness in 4 or perhaps 5 of his samples (28%). One of NH's sensory awareness samples involved paying particular attention to the sensory aspect of letters:

Sample 3.3. He was reading his friend's essay and was focused on the letter "F" in the word "Forever." He could still see the other letters in the word, but he was paying particular attention to the letter "F." The "F" appeared to be larger than the other letters. He was reading with comprehension, however the topic of the reading was not in his experience at the moment of the beep. Even though he was reading, the meaning was not in his experience.

All of NH's sensory awareness samples involved awareness of the external world:

Sample 3.5. His Spanish professor walked in the classroom. He was looking at the leather jacket being worn by his Spanish professor. He was attending to the jacket (not the person wearing it), and was either not paying particular attention to any one aspect of the leather jacket or to its buttons (we weren't sure).

Sample 3.6. He was seeing the shininess and curliness of the hair of the girl sitting in front of him. He was drawn to or absorbed in the shininess and curliness, which occupied his entire experience.

Sample 4.3. He was putting his wallet in his back pocket. He was feeling the wallet as it slid against his butt as it was being pushed into the back pocket of his jeans. At times in the interview it seemed that he was experiencing both the

www.manaraa.com

action of placing the wallet into his back pocket and the feeling in his butt of the wallet being pushed against it, but at other times it seemed that he was just experiencing the butt-sensation of the wallet entering his pocket. He was simultaneously looking at his roommate to see if he was getting ready to go.

The sample where it was difficult to tell whether he was experiencing sensory awareness was sample 4.2:

Sample 4.2. He was watching the show Dexter on television and was being carried along by the show. He was seeing a crime scene with a lot of red blood. During the expositional interview it was hard to tell if there was something about the redness of the blood that was drawing him in or if he was just describing the scene that happened to be red. Because we could not determine whether this was or was not a sensory awareness, when we count sensory awareness we will count this as 0.5.

Other Noteworthy Characteristics

One Unclear Day

NH was very clear about many of his samples except on one day. NH had difficulty apprehending his inner experience in 3 of his samples which occurred on the last day of sampling (Day 4):

Sample 4.1. He was on Skype chatting with his friend. At the moment, neither was talking, and NH was looking at his friend. We could not become clear, although we tried, what was directly in his experience at the moment of the beep. At times in the interview it seemed that he was seeing her, her room in the background, and also the remainder of his computer screen, but at other times it seemed he was just seeing her. At times it seemed that he was seeing her, but at

www.manaraa.com

other times it seemed he was seeing an image of her as projected by Skype. That is, despite this being the fourth sampling day, we had difficulty nailing down what was in his experience at the moment.

Sample 4.6. He was sitting in his dorm with his eyes closed. The last thing he could remember thinking about was his playing baseball, but we could not nail down what was occurring in his experience at the moment. Perhaps he was asleep, and the beep awakened him. Perhaps at the moment he was thinking about nothing, and in response to the beep "went looking for" what he had been thinking, and discovered that it had been baseball. Perhaps he was indeed thinking about baseball "on the fly" at the moment of the beep. However, he could not provide any details about what about his "playing baseball" other than that it was about his playing. But he could not specify whether he was thinking about batting, or fielding, or any other specific characteristic of baseball.

The rest of NH's samples on Day 4 were not as elaborate as the other samples. For example,

Sample 4.2. He was watching Dexter on the television and was being carried along by the show. At the moment, there was a crime scene with a lot of red blood. Sometimes in the interview it seemed that the redness of the blood drew his attention, but at other times it seemed he was just describing the scene that just happened to be red.

Sample 4.4. He had just given his RebelCard to a cashier in the dining commons. He was seeing her swipe his card in the register. This was a just seeing, just observing her perform the action.

www.manaraa.com

Sample 4.5. He was walking in a hallway back to the dorm with his roommate. His eyes were aimed at the floor but as best we could ascertain there was nothing in his awareness. The tiles of the floor were doubtless being projected on his retina, but apparently he was not experiencing them.

During the expositional interview, NH had difficulty describing his samples. This may have been due to difficulty apprehending his experience. Sampling day 4 was very different from his previous sampling days in two ways: 1) NH's previous sampling days were very clear and 2) inner seeing was present in his previous sampling days. NH had a difficult time apprehending and describing his inner experience when inner seeing was not present.

The Doing of Walking

One of NH's samples consisted of concentrating on the doing of walking upstairs. NH's experience with walking upstairs was broken into steps and he was paying particular attention to the action of walking upstairs correctly:

Sample 3.2. He was walking upstairs. He was focused on doing the stair climbing correctly. The experience of walking up the stairs correctly was central in his awareness. As part of this doing-it-right effort, he was concentrating on the looking at the stairs in front of him and the placing of his foot on the correct stair. The looking at the stairs was part of the doing-it-right effort. He had broken down walking upstairs into a series of steps. He was experiencing the planning and placing of his feet on the correct step. Thus it seemed that he felt he had to actively guide or shape his stair climbing. That is, the stair climbing was not

www.manaraa.com

merely happening, but he was actively focused on it so as to do it right, so as not to trip.

Walking upstairs, for most people, is an automatic process without any additional experiential investment. Most people think about something else or where they are going and the walking up the stairs is just happening. This is different from NH's experience in this sample. NH was somehow focused on going upstairs correctly and the experience of walking up the stairs was central to his awareness. He was experiencing the planning and placing of his feet on each subsequent step. He had broken down the act of walking upstairs into a series of steps.

Words and Meaning in Experience

Another noteworthy characteristic in NH's inner experience involved comprehension not experienced:

> Sample 3.3. NH and a friend had each written essays for a class assignment. Now they had swapped essays and were reading each other's. At the moment, as he read, NH was focused on the capital letter "F" in the word "Forever." The "F" appeared to be larger than the other letters. He could also still see the remaining letters in the word but he was focused on the "F." He understood himself to be reading with comprehension, but the topic of the reading was not in his experience at the moment. His experience was focused on the single letter F; a minor part of his experience was occupied by the entire sentence of which "Forever" was the first word.

We asked carefully; this experience seems quite different from most mind-reading-while-reading samples. Most people whose mind wander report going through the motions of

www.manaraa.com

reading but not at all gleaning the sense or comprehension of what is read. Here, NH's attention is elsewhere but he continues to read *with comprehension* (at least, so he says), as if the comprehension center is not in the same structure as the experience structure.

An interesting characteristic that emerged in NH's samples was the unusual experience NH has with words. NH's inner experience lacked inner speech. According to Heavey and Hurlburt (2008), inner speech occurs frequently in the inner experience of adults with an overall frequency of about 26%. NH had no samples with inner speech which makes the features of his inner experience atypical from what is commonly seen.

Another unusual characteristic that emerged in NH's inner experience with regard to words involves the fact that the only spontaneous worded experiences NH did have involved inner seeings. For example, at sample 2.2 (described in detail in Inner Seeing section above), NH was innerly seeing the word "beber." Similarly, at sample 2.3 (described in detail in Inner Seeing section above), NH was inner seeing a tilde (only a tilde). The word "beber" in sample 2.2 and the tilde in sample 2.3 were both innerly seen in the same neatly typed font. Inner seeings of words or parts of words is an unusual phenomenon.

Lastly, NH's experience of reading included the sensory awareness of characteristics of the letters in 1 of his samples. At sample 3.3 (described in detail in Sensory Awareness section), NH was reading his friend's essay and was focused on the letter "F" in the word "Forever." NH was paying particular attention to the letter F, the reading was not in his awareness.

www.manaraa.com

Feelings

NH had no samples that included the experience of feeling. Moreover, NH did not have any samples that involved emotions in general. For example, some individuals have an emotion present in their samples but that emotion was not directly felt at the sample. NH's samples did not involve such a phenomenon. His inner experience, according to the samples, seem to lack any emotional involvement. In addition, they did not have an emotional valence to them, positive or negative.

Discussion

NH was very clear about the majority of his samples, especially when they consisted of inner seeing. The most frequent characteristic of his samples was inner seeing (38%). Sensory awareness occurred in 38% of his samples.. There were 3 samples that were unclear or difficult to apprehend. Despite being the last day of sampling, all 3 difficult samples occurred on Day 4. In addition, NH did not have any Inner Seeing samples on Day 4. Samples that consisted of characteristics other than inner seeing seemed difficult for NH to capture as well as describe. NH did not have any experiences that included inner speech or inner hearing, typically the most frequent way that words appear in experience. He did experience words on three occasions, two inner seeings (of the word "beber" in beep 2.2; of a tilde in beep 2.3) and a sensory awareness (focusing on the capital letter "F" in the word "Forever" in beep 3.3). Furthermore, he did not have any feelings or multiple awareness experiences.

www.manaraa.com

CHAPTER 9

"LC"

LC was an 18 year-old African-American female who sampled with us in November 2009. LC received a laterality quotient of -52 on the EHI (EHI; Oldfield, 1971) indicating she is left-handed. She received a GSI raw score of 0.42 (a T-score, compared to nonpatients, of 56) on the SCL-90-R (SCL-90-R; Derogatis, Lipman, & Covi, 1973; Derogatis, 1994), suggesting the absence of clinically significant psychological difficulties.

LC sampled on four separate occasions, collecting a total of 22 samples. Because Sampling Day 1 is considered training for the participants, 18 of LC's samples counts her inner experience characteristics. We will discuss these characteristics: unsymbolized thinking, occurring in 6 samples (33%); inner seeing, 6 samples (33%); inner speech, 3 samples (17%); feeling, 2 samples (11%); knowledge of an emotion, 2 samples (11%); and other noteworthy characteristics.

Unsymbolized Thinking

Unsymbolized thinking, thinking without the presence of any words, images, or any other symbolic representation, was (along with inner seeing) the most frequently occurring phenomenon in LC's inner experience, occurring in 6 of LC's 18 samples (33%). Here are examples:

> Sample 2.4. LC was wondering if the day of her little sister's death would make a good topic for a paper she had to write for a school assignment. She was thinking more about the paper than her sister. She was considering writing about how the death occurred, what happened on the day of the death. All that was present to

www.manaraa.com

her was the thought of whether or not she should use the day of her sister's death as her paper topic; for example, neither the event of her sister's death nor feelings thereabout were present to her at the moment of the beep. The wondering did not involve words, images, or any other symbolic representation.

Sample 2.5. LC was thinking whether she should eat cereal or make bacon and eggs for breakfast. This thought did not involve words, images, or any other symbolic representation, but clearly involved a choosing between eating cereal and making bacon and eggs. That is, the choice was not merely between what to eat, but was between *eating* cereal and *making* bacon and eggs to eat. She was also seeing a cereal carton on the counter.

Sample 3.6. She was seeing her phone bill and thinking that she needs to change her plan because her phone bill is too high. This was a thought process that was somehow present to her, without words and without images.

Sample 4.3. She did not want to work on Thanksgiving. At the moment, she was innerly saying the words, "I don't want to work." This was in her own voice just as if she had said it out loud. She was also thinking that if she went to work, it would be boring. This thought was not represented in words or images.

Inner Seeing

Inner seeing was (along with unsymbolized thinking) the most frequently occurring phenomenon in LC's inner experience, occurring in 6 of LC's 18 samples (33%).. All of her inner seeing experiences were vivid and detailed. Four of her 6 inner seeing samples involved some kind of visual seeing of something that had happened previously:

www.manaraa.com

Sample 2.1. LC was thinking of a time she almost drowned. She was innerly seeing herself as a child holding onto her brother's back in a swimming pool. She saw herself lying on top of him with her arms around his neck while he was swimming. She also saw the pool water and the back edge of the pool behind them. She saw the right side profile of herself and her brother. The image was still and in color. There was also present in her experience at the moment of the beep a knowledge that she had been scared when the event occurred, but she was not feeling scared at the moment.

Sample 3.1. She was innerly seeing herself and her friend Liz sitting on a couch talking about food. She was seeing her, Liz, the couch, and the table in front of the couch. She noted that the room was bright, as if illuminated from the side by a lamp, but she did not see a lamp. She saw herself on the left and Liz on the right. The image was still and in some color. The color was the clearest on her, Liz, and the area of the couch surrounding them. The color became less clear in the periphery. That they were talking about food was a fact of the universe—that is, LC was not hearing them talking or explicitly thinking about food. She understood that they were talking about food because the inner seeing was a visual reseeing of a conversation she had with her friend the day before.

In this sample, LC was reseeing a conversation she had had with her friend Liz about food. LC was not explicitly thinking about them talking about food or hearing them talk about food.

Three of LC's inner seeing experiences involved trying to make a decision. Here are examples:

www.manaraa.com

Sample 4.2. LC was deciding what to get her mom for Christmas. At the moment, she was innerly seeing a gold necklace with a heart pendant in a box (she was only seeing the bottom part of the necklace box). The necklace and the box was positioned straight up and she was seeing it straight ahead. She was mostly attending to the heart pendant but she was also seeing a little bit of the necklace directly above the pendant and the box underneath the heart and necklace. The heart was seen in color but she was not focused on the color.

Sample 4.5. She was trying to decide if she should go to her boyfriend's house for Thanksgiving or stay at home. At the moment, she was innerly saying "Whose house should I go to" in her own voice. She was also innerly seeing her boyfriend and his parents sitting on their living room couch. She was seeing their full bodies, her boyfriend to the left, his mother in the middle, and his father to the right. She was seeing a little bit of the couch – the sections in between the individuals. She was seeing this as if she were sitting on the couch across from them. Although there were colorful items in the picture, the seeing was only in grey and white. The seeing was still.

Sample 2.2. She was innerly seeing a living room with a Christmas tree with presents underneath, a window and a couch. Her main focus was on the Christmas tree and the presents; they were the only features clearly seen. The tree and the presents were slightly to the left of the center. She was seeing the living room from her own perspective as if she was actually looking at it. This innerly seen scene represented a time of excitement and seemed to be a reseeing of what

www.manaraa.com

she had seen when she was five years old, but she was not feeling excited at the moment of the beep.

In this sample, the inner seeing was of a time of excitement. LC was not directly experiencing excitement at the moment, however, what she was innerly seeing happened to be a time of an exciting time in her life.

Inner Speech

LC's inner experience involved inner speech in 3 of her 18 samples (17%). All of LC's inner speech samples were in her own voice. We have described one sample in the Unsymbolized Thinking section. In sample 4.3, she did not want to work on Thanksgiving. At the moment, she was innerly saying the words, "I don't want to work." This was in her own voice just as if she had said it out loud.

Two of LC's inner speech samples involved a form of wondering. Sample 4.5 was described in the Inner Seeing section above. She was trying to decide if she should go to her boyfriend's house or stay at home for Thanksgiving. She was innerly saying "Whose house should I go to" in her own voice. Here is the other example:

Sample 3.2. She was trying to feed her niece, and was innerly saying to herself, in her own voice, "Why don't she want to eat her breakfast?" She was also seeing her niece shake her head.

Feeling

LC directly experienced feeling only rarely, if at all. By DES standards, the least controversial example of feelings was sample 4.1:

Sample 4.1. She was thinking about her nephew, who was about to be born. At the moment, the idea of being unable to wait for her nephew to

www.manaraa.com

be born was somehow present to her. This did not involve words, images, or any other form of symbolic representation (an example of unsymbolized thinking). She was also experiencing a feeling of excitement related to her unborn nephew's arrival. The excitement was experienced in her body was not localized anywhere and did not have any physical sensations.

However, this sample is unusual in that the excitement is said to be in the body but without physical sensations or localization. Therefore we found it difficult to know whether LC indeed experienced a feeling or inferred the feeling from the unsymbolized thinking.

The second example that might be feeling was sample 3.4:

Sample 3.4. She had been thinking about going to the doctor and getting a shot which was making her scared. At the moment, she was "being scared" of shots. LC was experiencing a physical scaredness, she was not thinking about getting a shot or feeling a mental scaredness. The scaredness was present as an imaginary stinging sensation in her upper left arm. The imaginary stinging sensation she was experiencing was the "the aftereffect of a shot." The imaginary stinging sensation in her upper left arm felt as if she had really gotten a shot. In LC's experience, only her upper left arm was experiencing scaredness.

It was difficult for us to know in this sample whether LC was experiencing scaredness which was manifested as a stinging sensation in her upper left arm (in which case we would call it a feeling) or whether she was experiencing an imaginary stinging which

www.manaraa.com

somehow related to an emotion (scaredness) which was not actually present in her awareness as an imaginary stinging sensation in her upper left arm.

Thus, feelings were present for LC somewhere between zero and 2 times, depending on the details of interpretation.

Knowledge of an Emotion

LC's inner experience involved knowledge of an emotion without directly experiencing feeling in 2 of her 18 samples (11%). In these samples, LC experienced the knowledge of the presence of emotion but she was not actually feeling emotion. This is a rare phenomenon in DES (Hurlburt, personal communication). Additionally, all 2 samples were a visual reseeing of something that had already happened. All 2 of LC's knowledge of an emotion samples involved an inner seeing. Sample 2.1 was described in the Inner Seeing section above. LC was innerly seeing a time she almost drowned. Directly present to her at the moment of this beep, there was a knowledge of being scared, but she was not feeling scared.

Here is another example:

> Sample 2.6. She was innerly seeing herself from the back sitting at a desk in front of a computer in high school. She was seeing herself from the middle of the chair and up. She was also seeing the computer screen. She was seeing this from a slightly elevated perspective. She was also experiencing a knowledge of being rushed related to her inner seeing of herself. She was not feeling rushed at the moment of the sample and she was not thinking about being rushed, but there was something about being rushed present to her.

www.manaraa.com

These samples are different from LC's inner seeing of an emotional time. In sample 2.2, described in Inner Seeing section above, LC was innerly seeing a time of excitement. The excitement was not directly present to her at the moment of the beep. In samples 2.1 and 2.6, the emotion was directly present to her at the moment of the beep. LC was experiencing the knowledge of the existence of an emotion but she was not directly feeling the emotion. She was not explicitly feeling or thinking about the emotion, however, the emotion was present in her awareness.

Thus it seems that LC does not easily or frequently experience emotion. Feelings were either rare or nonexistent; there were occasions where it would seem reasonable to experience feelings but feelings were not experienced.

Other Noteworthy Characteristics

Sensory Awareness

LC experienced sensory awareness in perhaps one of her samples. LC's only sample of sensory awareness was sample 3.4, described in Feelings section above, where LC was scared. The scaredness was present as an imaginary stinging sensation in her upper left arm, as if she had received a shot. The imaginary stinging sensation was a manifestation of the scaredness—that is, the scaredness was present as an imaginary stinging sensation in her upper left arm. She was not experiencing the imaginary stinging sensation as an isolated and random sensory awareness. DES does not consider the bodily manifestation of an emotion to be a sensory awareness; for example, if you are angry manifested by a hotness on the back of your neck, that hotness is not counted as sensory awareness. In LC's sample 3.4, it was difficult to tell whether the stinging *was*

www.manaraa.com

the scaredness (in which case we would not count it as a sensory awareness) or whether it existed *alongside* the scaredness (in which case we would count it).

Words and Meaning in Experience

In one of LC's samples, she experienced words present without being spoken, heard, or seen:

> Sample 3.2. LC remembered that she has a doctor's appointment and that she has neglected to write it down. In her experience, she was reminding herself to write down the appointment, she was telling herself to write down the date. The words "Don't forget to write down the date" were present one after the other in the same way that words said are present one after another but they were not said or heard. She was unable to identify whether the words were innerly spoken, innerly heard, or present without representation.

Words present without being (innerly or outerly) spoken or heard is a rare phenomenon (Hurlburt, personal communication).

LC's inner experience included 1 sample of inner hearing. Her sample of inner hearing was in her own voice.:

> Sample 3.3. She was innerly hearing her own voice say, "I need to make a doctor's appointment."

Thus LC experienced inner speech in 3 of her samples, inner hearing in 1, and words without being spoken or heard in 1. None of these experience of words appeared in LC's inner experience until the third day of sampling so it is possible she has difficulty apprehending her inner experiences involving words; it is also possibly the result of sampling fluctuations.

www.manaraa.com

Difficulty Apprehending

LC's inner experience included one sample in which she had difficulty apprehending what was in her experience:

> Sample 3.5. She was engaged in physical activities (cleaning room, organizing) but could not apprehend what was in her experience. We could not tell if this was because she was engaged in many activities and have a variety of experience or because she was engaged in many activities and had nothing in her experience.

Searching

One of LC's samples involved searching for something:

> Sample 4.4. She was standing in front of her closet, seeing the clothes in her closet and trying to decide what to wear. She was seeing all the clothes in front of her with the intention of finding something to wear.

In this sample, LC was seeing all the clothes in her closet with the intention of finding something to wear.

Discussion

LC seemed to be a motivated subject. She expressed interest in DES and appeared to have gained clarity and self-awareness from the process. LC had difficulty apprehending her experience the first two days of sampling. It was difficult to determine whether or not she had very little in her experience or if she was experiencing difficulty capturing her inner experience. While Unsymbolized Thinking was a frequently occurring form of LC's inner experience, she initially (typical of many subjects who experience unsymbolized thinking) had a difficult time apprehending her experience when it did not include words, images, or other experienced symbols.

www.manaraa.com

CHAPTER 10

"FM"

FM was a 19 year-old Hispanic male participant who sampled with us throughout October of 2009. He received a laterality quotient of -47 on the Edinburgh Handedness Inventory (EHI; Oldfield, 1971) indicating that he is moderately left-handed, and the least left-handed of our subjects. He received a GSI raw score of 0.96 (a T-score, compared to nonpatients, of 72) on the SCL-90-R (SCL-90-R; Derogatis, Lipman, & Covi, 1973; Derogatis, 1994), suggesting the possibility of clinically significant psychological difficulties. However, although FM's GSI is elevated, his symptom profile is not considered in the clinical range. When comparing FM's GSI raw score of 0.96 to psychiatric outpatients he receives a T-score of 47.

FM sampled on five separate occasions, collecting a total of 25 samples. Because Sampling Day 1 is considered training for the participants, 19 of FM's samples counts his inner experience characteristics. We will discuss the following characteristics: inner speech, occurring in 4 or 5 samples (24%); happening of speaking, occurring in 4 of 19 samples (21%); inner seeing, occurring in 4 samples (21%); sensory awareness, occurring in 4 samples (21%); inner hearing, occurring in 3 samples (16%); multiple experience, occurring in 3 samples (16%); and other noteworthy characteristics.

Inner Speech

Inner speech occurred in 4 or perhaps 5 of FM's 19 samples (24%). All of FM's inner speech samples consisted of his own voice. Only 1 of FM's inner speech samples consisted of FM innerly expressing himself:

www.manaraa.com

Sample 4.4. He was watching a clip of Eddie Royal of the Denver Broncos on TV wearing the throwback colors on his uniform. At the moment, he was seeing Eddie Royal on TV and innerly saying "those are weird colors" in his own voice. He was also innerly seeing Eddie Royal walking down the field as he was on the TV screen wearing the original colors that the team plays in. This image was in the same perspective as the clip of Eddie Royal on TV and consisted of Eddie Royal from head to torso and with no background.

Two of FM's inner speech samples occurred while he was reading.

Sample 5.4. He was skimming through an article displayed on his computer screen. At the moment, he was innerly saying the words "continuing to investigate: in his own voice. "Continuing to investigate" was part of a whole sentence, however, the rest of the sentence was not in his experience.

Sample 5.5. He was working on the computer and about to click on the tab labeled "injury report." At the moment, he was innerly saying "injury report" in his own voice. This was the only thing in his awareness. The screen and the moving of the mouse were not in his awareness.

In these samples, FM was innerly saying the words as he read them, in his own voice.

One of FM's inner speech samples involved self-direction, as if FM was guiding his searching process:

Sample 5.6. He was studying for physics. He was looking at a diagram and trying to make a connection between what he previously read about tangential force and the diagram. In his experience, he was actively looking at and taking in the whole of the diagram with the intention of finding the vector that represented

www.manaraa.com

the tangential force; he had not yet found it. [His sense was that if the beep hadn't arrived, he would have found the vector with a fraction of a second.] He was also innerly saying "tangential force" in his own monotone voice. The looking at the diagram was more salient than the inner speech.

The sample where it was difficult to tell whether he was experiencing inner speech was sample 4.3:

Sample 4.3. There was a piece of apple stuck in between his teeth. He was experiencing the pressure in between his teeth from the apple and also feeling a mild throbbing from it. He was also mentally thinking to himself ("making words to myself" "giving myself the action to do") to pick out the piece of the apple. He said this thought consisted of innerly saying to himself a phrase consisting of using his fingers to pick out the apple, but he could not specify what the words he was innerly saying were.

During the expositional interview it was hard to tell if FM was actually experiencing inner speech. This sample is not a coordinated, one word after the other innerly spoken sample. It seems as though FM is estranged from the words. Most people who have inner speech are able to specify what the words they were innerly saying are. Additionally, FM was clear on the innerly spoken words in his other samples. Because we could not determine whether this was or was not inner speech, when we count inner speech we will count this as 0.5.

Happening of Speaking

In 4 or 5 of FM's samples (21%) he was saying words out loud without those words being directly in his experience, words are coming out without the experience of

www.manaraa.com

creating them. In these samples FM had no creation investment in the words, they are just coming out:

> Sample 2.4. He was watching The Fresh Prince of Bel-Air, a scene in which the character gave water from a flower pot to another character to drink. At the moment, he was saying "That's nasty." He was taking in the screen and the visual context. The words were not directed to anyone; they seemed to be an accompaniment to his watching. He was not experiencing himself creating the words, he was not aware of the words coming. The words were rolling out of his mouth without being driven by him; they appeared to him unthought of. The words had a disgusted tone but he did not feel disgusted at the moment.
>
> Sample 5.2. He was looking for his physics homework assignment in his three ring binder. In his experience, he was saying "Chapter 4" out loud. He was not directing the words—they were "rolling out" of his mouth. He felt his fingers picking at the plastic portion of his binder, searching for the Chapter 4 homework.

In these samples, FM is not paying attention to the words or directing the words, it is as if they are just coming out. He has no sense of agency, the words were coming out of his mouth as if a stranger was saying them.

> Sample 2.3. He was looking at a computer advertisement for a house that was for sale with his mother's husband, saying, "Hurry up, grandma! Hurry up!" out loud. These words were not directed at anyone—that is, he was not talking to his mother or to her husband—it was as if the words were an accompaniment to his looking at the screen. "Grandma" in this expression referred to his mother—she is usually called "grandma." "Hurry up" referred to his mother getting her

www.manaraa.com

finances in order so that they might qualify for the house. The words "Hurry up, grandma! Hurry up!" were said in a gleeful tone but he was not experiencing gleefulness at the moment.

During the expositional interview, FM differentiated the talking out loud in this sample from his talking out loud in Sample 2.4. In sample 2.3, FM seemed more actively involved in the production and the delivery of the words whereas in Sample 2.4 the words were rolling out of his mouth. And yet in sample 2.3, these words were not directed at anyone or anything. When we count the "happening" samples, we will count this sample as .5.

In what may be a related phenomenon, the searching for his Chapter 4 homework that was taking place in Sample 5.2 also seemed to be a "happening" phenomenon. In that sample FM's fingers were searching for his Chapter 4 homework, but FM himself did not experience himself as doing the looking. FM is removed from the experience of searching, as if his fingers, not FM himself, are the agent doing the looking.

Inner Seeing

FM's inner experience involved 4 samples of inner seeing (21%). One of those samples we have already seen: in Sample 4.4 (discussed above in the inner speech section), FM was innerly seeing Eddie Royal as he exteriorly watched Eddie Royal on TV and said to himself, "those are weird colors."

Two of FM's inner seeing samples had an informative specified nature to them:

Sample 3.2. He was innerly seeing the time "3:00" that he was writing into (or about to write into, we were not sure) his lesson plan. The numbers were in digital clock (that is, pointy ended), black font with a lighter black background.

www.manaraa.com

Earlier in the writing of his lesson plan, he had by mistake entered a time using a slash (so the time looked more like a date). Now he was engaged in the explicit effort to use a colon rather than a slash, and that was somehow conveyed by the inner seeing of the 3:00. The colon was not emphasized; he did not say "colon"; he was not looking particularly at the colon; but somehow the inner seeing conveyed that he was to write a colon.

Sample 3.3. He was working on a physics equation. At the moment, he was looking at an equation in his notes: "$va \cdot ma \sin \theta a = mb \sin \theta b$". As he looked at that real equation, most of his attention was the inner seeing of that equation rearranging itself to become "$va = \frac{mb \sin \theta b}{ma \sin \theta a}$" That is, at the moment, he saw $ma \sin \theta a$ in motion from the left hand side of the equation to the denominator of the right hand side of the equation. He saw $ma \sin \theta a$ move, as if of its own accord, in a downward curve from the left hand side to the denominator of the right hand side, as if it were going around the equal sign. He was of course actively trying to solve this equation, but the experience was of the equation term moving of its own accord. Both the real equation and the imaginarily seen equation were in blue ink and in his handwriting with a white background; the innerly seen equation was more visually prominent, perhaps 80-20. This visualization overlayed the actual written equation on his notes. There was no confusion as to what was the real equation and what was his mental image of the equation, but this was not in his awareness at the moment of the beep.

In both samples, FM's inner seeing seemed to be working for him somehow. In Sample 3.2 he was intentionally seeing the 3:00 to remind himself to use a colon and in sample

www.manaraa.com

3.3 he was literally solving a problem. He did not experience himself directing these innerly seen images, it was as though he was the passive receiver of them.

Sensory Awareness

FM's inner experience consisted of 4 sensory awareness samples (21%). For example:

> Sample 2.2. He was reading the question "Is it easy to learn complicated things like a foreign language while asleep?" on a PowerPoint for his Psychology class. At the moment, he is taking in the last four words of the question ("foreign language while asleep?"), innerly seeing his classroom, and saying aloud "False" in answer to the question. He innerly heard his own voice reading the last four words of the question. He seemed confident that it was the last four words, as if they somehow appeared as a four-word chunk, but we were not confident about that. He was also innerly seeing his Psychology classroom, seeing the table where the computer is, the teacher, and the overhead screen as if viewed from the perspective where he usually sat in class. There were no specific images or words on the overhead screen. The inner seeing was still and clear. He was also hearing the sound of the water flowing out of the faucet and hitting the sink, which is the sensory awareness in this sample.

In 1 of FM's sensory awareness samples he had a multiple separate sensory awareness within the sample, thus he had 7 separate instances of sensory awareness:

> Sample 4.2. He was text messaging his friend the message "Have a safe trip" and biting into an apple. At the moment of the beep, the words "have a safe trip" were in his experience, innerly hearing this phrase as if said in his own voice.

www.manaraa.com

The four sensory awarenesses were: feeling the weight or heft of the phone in his left hand; at the same time, tasting the sourness of the apple, at the same time feeling the tingliness of the sour in his mouth, and at the same time feeling the corresponding twitching of his right cheek. He just noted these sensations—they did not involve any thought process.

Inner Hearing

Three of FM's samples involved inner hearing (16%). All of FM's inner hearing samples consisted of his own voice. We have seen two examples in the Sensory Awareness section above. In Sample 2.2 he innerly heard his own voice reading the last four words of "Is it easy to learn complicated things like a foreign language while asleep?" In Sample 4.2, he was hearing his own voice say "have a safe trip" while text messaging his friend the same words. Here is a similar example:

Sample 3.1. He was writing a lesson plan for work. At the moment, he was innerly hearing the words "on lesson plan" in his own voice. (He referred to this phenomenon as, "I'm the receiver of those words"; we were very careful to distinguish between inner speaking and inner hearing.) The entire phrase that was innerly heard was "working on lesson plan," yet he was confident that the "working" was before the beep. We did not know whether this was "working on lesson [beep] plan" or whether it was "working" followed by "on lesson plan." Somehow it seemed that "on lesson plan" was a unit. There was nothing else in his awareness at the moment.

www.manaraa.com

Multiple Experience

Three of FM's inner experience samples involved multiple experience (16%). We have seen one example (Sample 4.2) in the Sensory Awareness section above. FM was innerly hearing the words "have a safe trip" while simultaneously feeling the weight or heft of the phone, tasting the sourness of the apple he had just bitten into, feeling the tingliness of the sour in his mouth, and feeling the corresponding twitching of his right cheek. In this sample, FM is attending to various, unrelated phenomena. He is experiencing the innerly heard words "have a safe trip" while tasting the sourness of the apple, feeling the tingliness of the sourness in his mouth, and the twitching of his right cheek at the same time.

Other Noteworthy Characteristics

Words and Meaning in Experience

He had 4 or 5 inner speakings, which are quite similar to the inner speakings of right-handed people. However, he had three inner hearings of his own voice, a relatively rare phenomenon in right-handed people, and frequent exterior speakings that were experienced as simply "happening" rather than being driven or guided by himself, a very rare phenomenon.

Unsymbolized Thinking

Unsymbolized thinking occurred in 2 of FM's samples. One of FM's unsymbolized thinking samples involved a recollection:

> Sample 4.1. He was watching Monday night football and a sports announcer was saying "They've made it to the post season every other year." At the moment of the beep, he was hearing the announcer say "every other year." Also he was

www.manaraa.com

seeing a picture of Elizabeth Hasselback coming into view on his computer screen (as the screen refreshed), taking in the overall picture. At the same time he was thinking that she looked familiar and was trying to figure out where he had seen her before. This was a thought process, was less prominent than the seeing of the shifting screen, and did not involve any words or images.

Valence

FM's inner experience did not consist of any samples that included the experienced of Feelings. However, 2 of his samples involved a positive or negative valence that was ongoing but not directly experienced. Both samples consisted of FM talking aloud, and both were described in the Happening of Speaking section above. In Sample 2.3, FM was saying the words "Hurry up, grandma! Hurry up!" out loud to himself. These words were said in a gleeful tone; however FM was not feeling gleeful at the moment. In Sample 2.4, FM was watching a character on *The Fresh Prince of Bel-Air* give another character water from a flower pot to drink. FM was saying the words "that's nasty" out loud. The words were said in a disgusted tone, reflecting the fact that FM was disgusted; however, FM was not *experiencing* disgust at the moment. FM was not directly experiencing an emotion in both of these samples, however, an emotional valence was hinted at through the tone of his voice.

Discussion

Overall FM seemed to be a motivated DES participant. FM was interested in the process of exploring inner experience as well as his inner experience. FM frequently experienced inner words, but often those words were innerly heard words as him being "the receiver of those words." Furthermore, his exterior speech was experienced as

www.manaraa.com

simply happening, rather than being under volitional control. FM did not have any samples of Feelings, although 2 of his samples have valence to them.

www.manaraa.com

CHAPTER 11

ACROSS-SUBJECTS RESULTS & DISCUSSION

The previous six chapters were dedicated to describing the inner experiences of our 6 subjects (KC, MC, DD, NH, LC, FM). Each chapter provided an idiographic description of each subjects' inner experience. In this chapter, we will consider the collection of samples across all subjects and discuss the characteristics, patterns, and tendencies that emerged.

The present study was designed with two objectives in mind: 1) to explore the inner experience of left-handers; and 2) to compare the inner experience of left-handers to the inner experience of the general population. Our results are divided into four sections. The first section presents our subjects' frequently occurring characteristics. The second section discusses other observations found across our subjects. The third section reviews the overall findings of the present study. The last section of this chapter discusses the limitations of this study and directions for future research.

Frequently Occurring Characteristics

Our across-subjects results are based on a total of 101 samples of inner experience from 6 subjects. As shown in Table 2, FM contributed 19 of these samples (19%), NH 16 (16%), KC 18 (18%), LC 18 (18%), DD 14 (14%), and MC 16 (16%). Sampling began in October 2009 and was completed in February 2010. Four subjects completed sampling within one month of beginning participation (FM, KC, LC, and DD) and two subjects completed sampling within two months (NH and MC). Each subject collected an average of four (range: three to six) samples on four (five for FM) separate days. Within 24 hours of collecting samples, each subject participated in an expositional interview; thus there

www.manaraa.com

were four expositional interviews per subject (with the exception of FM who participated in five expositional interviews). Data from the first sampling days and expositional interviews were excluded from the idiographic analyses as well as the collective pool of samples across all subjects; therefore only three sampling days and expositional interviews (four for FM) were included in the results and discussion.

The frequently occurring characteristics of the inner experience of our subjects are presented in Table 2 in descending order. Table 2 shows in bold face the frequent characteristics identified by Heavey and Hurlburt (2008). Overall, our findings suggest that the characteristics of inner experience in left-handers are quantitatively and qualitatively both similar and different from the characteristics of inner experience in the general population.

Table 2
Frequently occurring or otherwise noteworthy characteristics of inner experience

	Subject							**Comparison[1]**
Characteristic	"KC"	"MC"	"DD"	"NH"	"LC"	"FM"	All Subjects	
Number of samples	18 (18%)	16 (16%)	14 (14%)	16 (16%)	18 (18%)	19 (19%)	101 (100%)	
Sensory Awareness[2]	**12 (67%)**	**7 (44%)**	**7 (54%)**	**4.5 (28%)**	**1 (6%)**	**4 (21%)**	**35.5 (35%)**	**22% (0–100%)**
Inner Seeing	**2 (9%)**	**2 (13%)**	**4 (29%)**	**6 (38%)**	**6 (33%)**	**4 (21%)**	**24 (24%)**	**34% (0–90 %)**
Unsymbolized Thinking	**3 (17%)**	**5 (31%)**	**3.5 (25%)**	**0**	**6 (33%)**	**2 (11%)**	**19.5 (20%)**	**22% (0–80%)**
Multiple Experience	4 (22%)	4 (25%)	5 (36%)	0	0	3 (16%)	16 (16%)	
Searching	1 (6%)	5 (31%)	2 (14%)	0	1 (6%)	1 (5%)	10 (10%)	
Inner Speech	**0**	**1 (6%)**	**1 (7%)**	**0**	**3 (17%)**	**4.5 (24%)**	**9.5 (9%)**	**26% (0–75%)**
Concentrated Doing	1 (6%)	4 (25%)	2 (14%)	1 (6%)	0	0	8 (8%)	
Feeling	**0**	**2 (13%)**	**0**	**0**	**2 (11%)**	**0**	**4 (4%)**	**26% (0-90%)**

Notes:
1. Frequencies from Heavey & Hurlburt, 2008.
2. Main characteristics from Heavey & Hurlburt (2008) are in **bold face**.

www.manaraa.com

In 2008, Heavey and Hurlburt explored the inner experience of a stratified random sample of college students. They were interested in surveying the naturally occurring phenomena in the inner experience within and across people. They administered the Symptom Checklist 90-Revised (SCL-90-R; Derogatis, 1994), a measure of psychological distress, to 407 students taking introductory psychology courses at an urban university. They stratified the 407 SCL-90-R scores into 10 strata and selected a random sample of 3 participants from each stratum. Then they used DES to explore the inner experience of these 30 participants (16 female and 14 male). Participants were asked to participate in three days of sampling and interviewing with 6 samples per day. Samples from the first day were discarded as this day is considered as sampling. The first five samples were used on the second and third days of sampling unless one of those samples were unusable and the sixth sample was used in it's place. After the researchers gained an understanding of the experience occurring at each beep, they coded the experience according to the codebook developed by Hurlburt and Heavey (1999). The codebook describes 16 forms of inner experience. The researchers were aware that, because DES is an exploratory procedure, it was possible that either none of the codebook identified phenomena would occur or that new phenomena would emerge. After completion of sampling, Heavey and Hurlburt (2008) did not discover new frequently occurring characteristics of inner experience. They did find that five characteristics that occurred with substantial frequency (22% or higher) in the inner experience of their participants: inner seeing (34%),the seeing something in one's imagination that is not actually there; feeling (26%), the direct experience of emotion; inner speech (26%), the innerly speaking words usually in one's own voice; sensory

www.manaraa.com

awareness (22%), the attending to a particular sensory aspect of one's internal or external environment where the sensation itself is the focus of one's perception; and unsymbolized thinking (22%), the thinking of a thought without conveyance of that thought in words, images, or any other symbolic representation. The next most frequently occurring phenomena included inner hearing (3%) or paying attention to auditory characteristics of an internal phenomenon and just doing (2%) or being engaged in an activity with no awareness of thinking about it as well as no other aspects of inner experience present at the moment. In fact, the remaining 11 characteristics (partially worded speech, unworded speech, worded thinking, imageless seeing, inner hearing, just doing, just talking, just listening, just reading, just watching tv, and multiple awareness) occurred with much less frequency than the main five (3% or less) (Heavey & Hurlburt, 2008; Hurlburt & Heavey, 2006). Four of those five main characteristics were also frequent in our left-handed subjects and are shown in bold face in Table 2: sensory awareness, inner seeing, unsymbolized thinking, and inner speech.

Sensory Awareness

Sensory awareness is the experience of paying particular attention to the sensory aspect of the internal or external environment. In such experiences, subjects do not merely attend to an object for its functional use, they directly attend to some particular sensory quality of the object. As shown in the second row of Table 2, sensory awareness was the most frequently occurring characteristic of inner experience across subjects in the present study, occurring in 35.5 (recall that in Chapter 8 we were unable to determine if NH was experiencing a sensory awareness in one of his samples) of 101 samples (35%) and all six subjects experienced it at some point in their sampling. For comparison,

www.manaraa.com

sensory awareness occurred with 22% frequency in Heavey & Hurlburt (2008), the least frequent of the five main characteristics (along with unsymbolized thinking) in Heavey and Hurlburt's sample. Only one of our subjects, LC, had substantially fewer sensory awareness samples than the average subject in Heavey & Hurlburt (2008).

Heavey and Hurlburt (2008) found within-participant frequency of sensory awareness ranging from 0% to 100%. The sensory awareness frequency within our left-handed subjects ranged from 6% to 67%, and was the most frequently occurring characteristic in three of our subjects' inner experience: KC (67%), DD (50%), and MC (44%).

Overall, the instances of sensory awareness described by our subjects were similar in nature and content to those reported by Heavey and Hurlburt's general population. However, one noteworthy pattern did emerge in two subjects (NH and KC). Both had samples of sensory awareness involving words or letters. On one occasion (sample 3.3), NH was attending to the sensory aspect of the letter "F" in the word "Forever." Similarly, KC (sample 3.2) was attending to the visual quality or shape of the written words "guitar hero." In both instances, the subjects were not attending to the functional quality or meaning of the letters and words, they were instead experiencing their sensory quality. It is Hurlburt's impression (personal communication, 2010) that sensory awarenesses of words are rare in the general population.

Thus the frequency of sensory awareness across our subjects suggests that sensory awareness may be a more frequent characteristic in left-handers than in the general population. Additionally, the instances of sensory awareness of words or significance for

www.manaraa.com

words suggest that left-handers may have an unusual way of dealing with letters or words in their experience.

One of our subjects, LC, reported only one sensory awareness sample in her inner experience (6%). This is substantially lower than the rest of the subjects whose samples of sensory awareness ranged from 21% to 67%. Furthermore, LC's only sample of sensory awareness was qualitatively different from our other subjects, involving an imaginary sensation (sample 3.4). LC did not report any sensory awareness samples of the real external or internal environment. LC was also 1 of the 2 subjects who did not report multiple experiences. Without speculating on whether there is a link, we note for the record that LC was among the least left-handed of our subjects (EHI score of 52), and among the least psychologically distressed as measured by the SCL-90-R (.42).

Inner Seeing

Inner seeing is the experience of seeing things that are not immediately present in the external environment. As shown in Table 2, inner seeing was the second most frequently occurring characteristic of inner experience across subjects, occurred in 24 of 101 samples, or 24%. This frequency is somewhat less than the overall frequency of 34% inner seeing in Heavey and Hurlburt's (2008) sample, where it was the most frequently occurring main characteristic with a within-participant frequency that ranged from 0% to 90% (Heavey & Hurlburt, 2008).

In the present study, all six subjects experienced inner seeing at some point in their sampling. The inner seeing frequency in our left-handed subjects ranged from 9% to 38%, and was the most frequently occurring characteristic in two subjects, NH (38%) and LC (33%).

www.manaraa.com

Overall, the samples of inner seeing were similar to Heavey and Hurlburt's sample (Hurlburt & Heavey, 2008). All examples in the present study of inner seeing were vivid and detailed. However, it is noteworthy that inner seeing in our left-handed subjects occasionally involved seeing words or parts of words. This pattern emerged in three subjects, FM (twice), NH (twice) and DD (twice). For example, FM (Sample 3.3) was working on a physics equation and, simultaneously, he was innerly seeing the physics equation rearrange itself, as if the inner seeing was doing the work for him. Similarly, NH was studying Spanish vocabulary and he was innerly seeing the word "beber." At sample 4.2, DD was talking on the telephone and innerly seeing the phrase "Just the Quote," which reflected what he was saying. It is Hurlburt's impression (personal communication, 2010) that the inner seeing of words is rare in the general population.

Thus the frequency and quality of inner seeing in our sample suggest that inner seeing may be a somewhat less frequent characteristic in left-handers than in the general population. The presence of words or symbols in the inner seeing of our subjects suggests left-handers may have an unusual experience of words or verbal symbols.

Unsymbolized Thinking

Unsymbolized thinking, the experience of thinking without the presence of words, images, or any other symbolic representation, was the third most frequently occurring main characteristic across subjects, occurring in 19.5 of 101 samples or 20%. Five of six subjects (FM, KC, LC, DD, and MC) experienced it. Unsymbolized thinking was the dominant characteristic in LC's samples (33%).

www.manaraa.com

One subject, NH, did not experience unsymbolized thinking. The majority of NH's samples consisted of inner seeing (38%). Additionally, he experienced inner seeing substantially more than our other subjects. When NH did not experience inner seeing, he had a difficult time apprehending what was in his experience. NH was by far the highest scorer on the SCL-90-R GSI scale among our subjects, indicating the highest level of psychological distress in our sample. NH, along with LC, did not report multiple experience.

One of our subjects, DD (three times), reported samples where an idea was present even though there did not seem to be a clear thought present. It was as if a notion or idea was present without an explicit thought. For example, in sample 4.4 DD was aware that his left leg was uncomfortable. He was not explicitly thinking that his left leg was uncomfortable, however the fact of this uncomfortableness was a mental awareness. It was unclear if these should be considered unsymbolized thinking so we counted them as 0.5 each.

Heavey and Hurlburt (2008) reported an overall unsymbolized thinking frequency of 22% and a within-participant frequency ranging from 0% to 80%. Unsymbolized thinking (along with sensory awareness) was the least frequently occurring of the main characteristics in Heavey and Hurlburt's (2008) sample. Overall our findings are both quantitatively and qualitatively consistent with Heavey and Hurlburt's (2008) study.

Searching

Searching is the direct experience of searching for something. That is, searching as we define it is not a searching *behavior*, it is a searching *experience.* Searching was the fourth most frequently occurring characteristic across our subjects. It occurred in 10

www.manaraa.com

of 101 samples, or 10%. Searching was not the dominant characteristic of any subject's inner experience; our subjects experienced searching with a frequency ranging from 0% (NH) to 31% (MC).

Searching is not an established category of inner experience. For example, Heavey and Hurlburt (2008) did not mention instances of searching, and the Codebook Heavey and Hurlburt (2010) provide does not mention searching.

Here are examples. In his sample 2.2, MC was physically searching for the telephone. He was engrossed in the physical aspect of the searching—that is, he was more involved in the moving things around than in the seeing where he was looking. In his sample 3.5, DD was mentally searching, actively trying to find an example of how power has influenced his life. The searching seemed to be visual such that he was searching for an image but he was not actually seeing an image. In her sample 4.4., LC was standing in front of her closet searching for something to wear. She was seeing all the clothes in front of her with the intention of finding something to wear. LC was not physically searching through her closet—that is, she was not using her arms to sift through her clothes. This was a mental searching. In her sample 3.1, KC was looking at a picture of a group of girls and searching for a particular person she did not know.

In 4 of the 10 (40%) searching samples, the searching involved words or symbols with significance for words. For example, in his sample 3.1, MC was searching the *Wikipedia* page for particular words or phrases about a comic book character named Blade. Similarly, in his sample 2.4, DD was searching an online article with the intention of finding an answer. The searching seemed to be an active comparison of what he was reading with what he was searching for, however what he was searching for was not in

www.manaraa.com

his awareness at the moment. At his sample 5.6, FM was searching a physics diagram for the vector that represents tangential force. He was actively looking at the diagram with the intention of finding the vector.

One of our subjects, NH, did not experience any searching samples. Considering NH did not experience any unsymbolized thinking or multiple experience samples, it may be that NH's inner experience is different from the rest of our subjects; NH is the subject whose SCL-90-R GSI score is much higher (more distress) than our other subjects.

In a preliminary study such as this, we have no way of knowing whether such searching, like the other characteristics we have identified, is merely an accidental or random occurrence or a robust characteristic of the inner experience of left-handed individuals.

Inner Speech

Inner speech was the fifth most frequently occurring characteristic of inner experience across our subjects, occurring in 9 or 10 (depending on how one counts sample 4.3 in FM's inner experience) of 101 samples (9.5%). Heavey and Hurlburt (2008) found inner speech to occur with a frequency of 26%. Thus it appears that inner speech may occur in left-handers at a lower frequency than in the general population.

The frequency of inner speech in our subjects ranged from 0% (NH and KC) to 24% (FM). Thus the *highest* rate of inner speech in our left-handed subjects was lower than the *average* rate found by Heavey and Hurlburt. Heavey and Hurlburt reported a large variability in within-participant frequency of inner speech, ranging from 0% to 75% (Hurlburt & Heavey, 2008). We should recognize that some of the subjects in Heavey

www.manaraa.com

and Hurlburt's sample may have been left handed— Heavey and Hurlburt did not collect that information.

Inner speech was the most frequently occurring characteristic in FM's inner experience, occurring in 4 or 5 of his 19 samples (24%). We note that 2 of FM's inner speech samples occurred while reading, which may be a different phenomenon from "pure" inner speech. It is Hurlburt's impression (personal communication, 2010) that many people who do not generally exhibit inner speech do so while reading. If we exclude FM's 2 samples of inner speech while reading, thus counting only what might be called "free-range" inner speaking, then the rate of inner speech across his samples would be 13%.

Overall, the phenomenological characteristics of inner speech described by our left-handed subjects were similar to those reported by Heavey and Hurlburt (2008). The inner speech of our subjects was experienced to be like outer speech except it was happening internally and was experienced as being in of the subjects' own voice. However, the content of the inner speech of our left-handed subjects was quite narrow or restricted by comparison to everyday non-left-handed inner speech (Hurlburt, personal communication, 2010): mostly it was simple and directly related to their ongoing experiences. For example, FM was innerly saying "those are weird colors" in sample 4.4 regarding the throwback uniform Eddie Royal of the Denver Broncos was wearing; LC was innerly saying "I don't want to work" while thinking about not wanting to work on Thanksgiving in sample 4.3; DD was innerly saying "I'm gonna go chow down in a minute" at sample 2.2 in response to his physical sensation of hunger; and MC was

www.manaraa.com

innerly saying “Oh yeah” in response to his mom telling him he had not taken out the trash in sample 4.3.

Thus the prevalence of inner speech across our left-handed subjects suggests that left-handers experience inner speech less frequently than does the general population, and the complexity or floridness of the inner speech may be less in left-handers.

Concentrated Doing

Concentrated doing involves the concentrated, intentional doing of some action. In these samples, subjects were actively, specifically, focusedly involved in the doing of some action or activity. That is, the action or activity that we call concentrated doing were not experienced as automatically happening. Concentrated doing was the sixth most frequently occurring characteristic across our subjects, occurring in 8 of 101 samples, or 8%. Concentrated doing is not a well-established DES category of inner experience.

Four of our six left-handed subjects (KC, MC, DD, NH) experienced concentrated doing. Concentrated doing was not the dominant experience in any subjects’ inner experience but it occurred quite frequently in MC’s inner experience (4/16 or 25%) and DD’s inner experience (2/14 or 14%). It occurred rather infrequently in NH (1/16 or 6%) and KC (1/16 or 6%).

For example, MC was in the process of eating soup in sample 4.1. He was putting a soup filled spoon to his mouth with his left hand. He was concentratedly and carefully moving the spoon to his mouth without spilling. In sample 3.2., NH was concentrated on the doing of walking upstairs. He was engrossed in the walking upstairs correctly, he was experiencing the planning and placing of each foot on the correct step. KC

www.manaraa.com

experienced concentrated doing of understanding in sample 2.2. She was having a conversation with her friend. KC was involved in the purposeful, effortful, directed understanding of what her friend was saying. The understanding was not automatically happening, in KC's awareness she was reaching out for the meaning of what her friend was saying.

This kind of experience of doing seems related to what Hurlburt (1993) called the doing of understanding, which we discuss below in the section called Words and Meaning in Experience.

Other Observations

In addition to the most frequently occurring characteristics, we make the following additional observations about the inner experience of our left-handed subjects. As we have said about the observations above, all these observations should be considered tentative, exploratory. All require corroboration by additional phenomenological observation and/or validation by so-called objective procedures.

Feelings

Feelings, the experience of emotion, occurred infrequently across our left-handed subjects; only 4 feelings occurred in 101 samples (4%), a substantially lower frequency than the 26% reported by Heavey and Hurlburt (Hurlburt & Heavey, 2008). Heavey and Hurlburt (2008) reported a within-participant range of 0% to 90%. Among our left-handers, only two subjects out of six experienced feelings: LC experienced feelings in 2 of her 18 samples (11%) and MC experienced feelings in 2 of his 16 samples (13%).

Furthermore, of the four samples that we counted as feeling, only one was what Hurlburt (personal communication, 2010) would consider an everyday, unremarkable

www.manaraa.com

feeling experience, LC's sample 4.1: she was thinking about her soon to be nephew, an unsymbolized thought about being unable to wait for her nephew to be born. She was also experiencing a feeling of excitement related to her unborn nephew's arrival; the excitement was experienced diffusely in her body. LC's other experience that we counted as a feeling was sample 3.4: she was thinking about going to the doctor and was scared about getting a shot. However, this scaredness was specifically located in her arm, in the same place that she also imaginarily felt the sting of getting a shot. We came to understand that she experienced the imaginary sting *and* felt afraid *in the same location of her arm*. Because we understood that she was directly experiencing being afraid, we count that as a feeling; but its specific location in an extremity intertwined with a stinging sensation makes it an unusual feeling.

Similarly, MC had one more-or-less typical feeling, sample 3.4. He was working at his computer and a song came on his computer playlist. He had already heard the song several times that day, and was just at the beginning of the action to click the button on his keyboard that would start a new song. While he did so he felt annoyed. It seemed that he experienced the annoyance, but it was hard to extricate the feeling from the action of clicking the button to end the song.

However, MC's other feeling sample, 2.4, was not typical. He was watching the movie 'Pitch Black', which he had seen several times before. The scene he was watching consisted of the people realizing that the two suns on the planet will be eclipsed; therefore they are doomed. MC's most salient experience was a sensory awareness of the film as it was becoming blackish and losing its purplish hue. The second most salient part of this experience was an unsymbolized thought that the people will not survive,

www.manaraa.com

known from having seen the film before. At the same time MC felt bad, because he knew they were doomed, and yet hopeful, as the characters in the movie would have felt hopeful. Thus the feelings in this sample were by no means the central portion of the experience, and yet were multiple, and, in an important way, were not understood to belong to him—the hopefulness was the movie characters' feeling that MC was sharing, even though he knew that there was actually no hope.

Thus we have seen that feelings in our left-handed subjects were infrequent (occurring 4% overall). Additionally, when feelings did occur, they were not typical of feelings in other subjects. The low frequency of feelings in our subjects, along with the much higher frequency in the general population, leads to a speculation that feelings are infrequent in the inner experience of left-handers. Additionally, the quality of feelings in our left-handed subjects suggests that not only do left-handers rarely experience feelings but, when they do, those feelings are different than feelings experienced by the general population. We emphasize that this speculation is based on very few subjects and is need of additional investigation.

In addition to their feelings samples, our left-handed subjects described experiences that had some emotional valence in 5 of 101 samples, or 5%. These samples were not feelings as DES (and many others) use the term—that is, the subjects were not actually experiencing an emotion at the moment. However there was an emotional aspect to the experience. For example, FM reported valence in 2 of his 19 samples (11%). In both of FM's samples, there was a tone present in his outwardly spoken words. For example, in sample 2.3, he was saying the words "Hurry up, grandma! Hurry up!" out loud to himself. The words were said in a gleeful tone, however FM was not feeling

www.manaraa.com

gleeful at the moment. The gleeful valence was present in the tone of the words. KC experienced valence in 1 of her samples (6%). In sample 3.6 she was noticing a man dance awkwardly among other men on stage. The experience had a positive valence to it—she thought it was cute—but she was not feeling happy or excited or other positive type feelings at the moment. DD also experienced 2 valence samples in his 14 samples (14%). One of DD's samples had a negative valence to it. In sample 4.1 DD was passing time sitting in his car until his next class starts. He was thinking that he has to sit and wait in his car. This thought had a negative valence to it although DD was not actually feeling a negative emotion at the moment. The negativity was present in the thought. His other sample of valence involved the trying to understand his feelings. In sample 3.3 DD had a series of feelings presenting themselves to him. At the moment being slightly annoyed was the emotion that presented itself to him, but he was not feeling slightly annoyed.

Because the emotion was not directly experienced, such valence samples do not count as feelings. However, valence was infrequent, so even if valence and feelings are counted together as "emotional," there are still relatively rare (4 + 5 = 9 of 101 samples, or 9%), substantially less than the 26% frequency of feelings alone reported by Heavey and Hurlburt (2008).

Words and Meaning in Experience

A pattern that emerged across our subjects was the low frequency of words present. Inner speech, discussed in Frequently Occurring Characteristics section, was present 9.5% (recall that in Chapter 10 we were unable to determine if FM experienced inner speech in one of his samples) of the time, a figure substantially lower than Heavey

www.manaraa.com

and Hurlburt's (2008) finding of 26%. Our subjects did experience other worded phenomenon in low frequency.

In addition to inner speech, our subjects experienced Inner Hearing. Inner hearing is an established DES characteristic. Inner hearing involves attending to the auditory characteristics occurring innerly. Inner hearing occurred in 4 of 101 samples, or 4%. Only 2 subjects experienced inner hearing (FM and MC). Inner hearing was not the dominant characteristic in any subjects' experience. FM experienced inner hearing in 3 of his 19 samples (16%). All of FM's inner hearing samples involved innerly hearing his own voice. For example, in sample 4.2 he was innerly hearing the phrase "have a safe trip" in his own voice. MC experienced 1 sample of inner hearing in his 16 samples (16%). MC's only experience of inner hearing consisted of innerly hearing his mom's voice in sample 4.3. MC was innerly hearing his mom say "You didn't take out the trash," and he was innerly saying "Oh yeah," simultaneously.

Taken together, inner speech and inner hearing constitute 13.5% of our subjects' samples. This figure is still substantially lower than Heavey and Hurlburt's (2008) finding of 26%.

The sensory awareness of words also emerged across our subjects. In these samples it was as if the awareness of the subjects specifically ignored the meaning of the words in favor of their sensory aspects. Two subjects (KC and NH) reported one sample of sensory awareness for words each for a total of 2 samples (2%). In sample 3.2, KC was seeing the written words "guitar hero" on her paper calendar. She was attending to the visual presentation of the words and taking in some aspect of the shape of the words. She was interested in the words for their sensory quality and not for their meaning or

www.manaraa.com

function. Similarly at sample 3.3, NH was reading his friend's essay and he was focused on the letter "F" in the word "Forever." Although he could see the rest of the word, he was paying particular attention to the letter "F," which appeared to be larger than the other letters (in actuality, it was the same size). In these samples, the letters or words are not attending to for their meaning or function rather the subject is attending to the letter or word for its sensory qualities.

Another characteristic regarding words was reported in one sample by KC (1%). In sample 2.2, KC's inner experience involved the concentrated doing of understanding words. KC was having a conversation with her friend Sonia. KC was involved in the purposeful, effortful, directed understanding of what her friend was saying. That is, she was not understanding what her friend was saying automatically. KC's awareness consisted of effortfully understanding what her friend was saying. She was experientially involved in the understanding of the words. Most people do not have to experientially invest in understanding the meaning of words, this was not the case in sample 2.2.

One of our subjects reported experiencing another characteristic regarding words. FM experienced the *Happening of Speaking* in 4 or 5 of his samples (21%). In these samples, FM was saying words out loud without those words being directly in his experience. Words were coming out without FM experiencing the creation of the words. In these samples FM had no creation investment in the words, they were just coming out. In these samples, FM is not paying attention to the words or directing the words, it is as if they are just coming out. He has no sense of agency, the words were coming out of his mouth as if a stranger was saying them.

www.manaraa.com

With all the usual caveats regarding small sample size, it does appear that our left-handed subjects experience words in ways much different from the general population: less frequent overall, and instances where the meaning of words is stripped away from the words themselves.

Multiple Experience

Multiple experience consist of two or more separate but simultaneous processes. Multiple experiences occurred in 16 of 101 samples, or 16%. Four of six subjects experienced multiple experiences (FM, KC, DD, and MC). All subjects had multiple experiences with relatively high frequency. FM experienced it in 3 of his 19 samples (16%), KC experienced it in 4 of 18 samples (22%), DD experienced it in 5 of 14 samples (36%), and MC experienced it in 4 of 16 samples (25%). Heavey and Hurlburt (2008) did not provide a specific frequency for multiple experience except to say that no characteristic other than the main five had frequency higher than 3%. Thus we are led tentatively to conclude that left-handed subjects may have higher frequency of multiple experiences than does the general population.

Results Compared to the Literature

The present study found that the inner experience of left-handers is different than the inner experience of the general population. This section will compare the results of this study to the relevant literature on left-handers' experience. More specifically, we will discuss how the experience of left-handers as we discovered it in this study compares to the literature on left-handers' experience.

In 1998, McNamara, Clark, and Hartmann explored dream content as a function of handedness. They reported that left-handers were more likely than right-handers to

www.manaraa.com

report a dream. Additionally, the dream reports of left-handers were more characteristic of right hemispheric related cognitive activity including more high imagery nouns and more affective words than the dream reports of right-handers (McNamara, Clark, and Hartmann, 1998). This finding might be extrapolated as suggesting that the dreams of left-handers may involve more imagery and affective states than the dreams of right-handers, and then further extrapolated as suggesting that the experience of left-handers may involve more imagery and affective states than the experience of right-handers. Our subjects did experience clear and vivid inner seeing samples. In fact, inner seeing was the second most frequently occurring characteristic of our subjects (24%). However, that frequency was lower than the frequency of inner seeing (34%) Heavey and Hurlburt (2008) reported in the general population. Regarding emotion, the present study suggests a large difference between left-handers and the general population but in the opposite direction suggested by McNamara, Clark, and Hartmann. Our subjects experienced feelings far *less* frequently (4%) than did Heavey & Hurlburt's (2008) subjects (26%). McNamara et al. (1998) reported that left-handers were more likely to report that the content of their dreams were not an accurate reflection of their daily life-experience than right-handers (McNamara et al., 1998), so the extrapolations described above may not be valid. It may be that left-handers are actually emotional but do not directly experience feelings in their inner experience—that is, they experience affective states but have very little feeling in their inner experience. Another explanation for the discrepancy between McNamara et al.'s finding and the findings of the present study relates to the theory of wish-fulfillment. According to Sigmund Freud, the dream represents a fulfilled wish or takes the place of some action in life (Freud, 1900). We can extrapolate from this that

www.manaraa.com

dreams may represent a phenomenon that is suppressed in waking life. Our results could then be interpreted as showing that left-handers, who might have ongoing emotion but suppress the experience of it, experience that emotion in dreams instead. An alternative explanation is that McNamara et al.'s participants did not carefully distinguish between the experience of emotion and emotional state.

Research regarding right hemispheric involvement in language processing has identified strong involvement in certain linguistic abilities. Lindell (2006) proposes that the right hemisphere has a primary role in prosody (the rhythmic or intonational aspect of speech) processing, that true intentions are often relayed via emotional tone or prosody thus, when the right hemisphere is damaged, the patient is unable to identify the true intentions of the speaker (Lindell, 2006). This result can be extrapolated to imply that left-handers may have more experience of rhythmic or intonational features than do right-handers. If we extrapolate that once again to hold that rhythm and intonation are instances of sensory awareness, we can observe that our left-handed subjects did have substantially more sensory awareness (35%) than did Heavey and Hurlburt's subjects (22%), as might be predicted from McNamara and colleagues.

Another aspect of the linguistic roles of the right-hemisphere involves processing specific information related to the visual details of words. Lindell (2006) suggests that focus on visual form is one of the strengths of the right-hemisphere orthography. The right hemisphere tends to process words orthographically. Therefore the right-hemisphere tends to benefit from orthographically similar primes whereas the left-hemisphere benefits from phonologically similar primes (Lindell, 2006). We might extrapolate this to suggest that left-handers may be more interested in the shape of letters

www.manaraa.com

and words than are right handers, and this is borne out by our data. Two of our subjects reported samples involving the orthographic processing of words. For example, KC had 2 samples in which she was attending to the sensory qualities of words. She was not attending to the function or meaning of the words, rather she was attending to the sensory aspects of the words. Similarly, NH had 1 sample in which he was attending to the sensory quality of a written letter. He understood himself to be reading the whole word yet, in his awareness, he was only attending to the sensory quality of the first written letter. Such orthographic processing is rare in general (Hurlburt, personal communication).

Lindell (2006) also reports that transient alexia or letter-by-letter reading is a pattern of processing reflecting the performance of the healthy right hemisphere (Lindell, 2006). This pattern of letter-by-letter reading was explicitly present once in the inner experience of our subjects. In sample 2.4 DD was innerly seeing trajectories of sentences going forward from the back of his head. The letters of each word were presenting themselves sequentially. In sample 3.3, NH was attending to the sensory quality of the letter "F" in the written word "Forever." NH was paying particular attention to the letter "F" and he was seeing the rest of the word. It is difficult to know if he was engaging in letter-by-letter reading or if he was simply interested in the sensory qualities of the letter "F."

Inner Experience: Summary

Our results suggest that sensory awareness may be more frequent in left-handers than in the general population. Left-handers experience substantially more samples of sensory awareness than the general population (Heavey and Hurlburt, 2008). Our

www.manaraa.com

subjects experienced inner speech at a much lower frequency than discovered by Heavey and Hurlburt (2008). There was a low frequency of words in general in the inner experience of left-handed subjects. Additionally, when words were experienced, they had atypical presentations. For example, they were not explicitly attended to for their function or meaning or they were just happening—that is, they were being spoken outside of awareness. Feelings also occurred at a much lower frequency in our left-handed subjects than the general population. We found that our subjects expressed emotions through the tone of their speech, and understood that some of their thoughts are emotionally valenced, rather than actually experiencing an emotion.

In addition to our findings on the five main characteristics, novel characteristics emerged across our subjects. Our left-handed subjects' inner experience have a relatively high frequency of searching (actively involved in the searching of something) and concentrated doing (carefully and concentratedly engaged in a physical activity). We also observed that just doing occurred with greater frequency in our sample than the general population. This suggests that left-handers engage in activities outside of their awareness with more frequency than the general population. Finally, we observed that the majority of our subjects had multiple experiences.

Our findings are consistent with the literature in that the experience of left-handers is different than the experience of right-handers; however, the present study was inconsistent with findings regarding affect. The present study found that emotion is an infrequent characteristic in the experience of left-handers. Additionally, the present study suggests that left-handers experience words and meaning in experience differently than the general population supporting a right-hemispheric involvement regarding linguistic

www.manaraa.com

ability. The present study is preliminary and exploratory in nature and requires further investigation.

Study Limitations and Suggestions for Future Research

The process of Descriptive Experience Sampling (DES) yields inevitable study limitations. One of the major limitations of the present study is the small sample size (N=6). DES studies are time and labor intensive both for the subjects and investigators. Subjects are asked to wear the beeper and collect beeps for period intervals of 3 hours on 4 separate occasions. They are also asked to meet in the DES lab on the UNLV campus within 24 hours of each beep collection interview for a 1-hour long expositional interview. The sampling phase alone results in a dedication of 16 hours from each subject. The investigators are involved in coordinating the meetings, introducing the method, training the subject, conducting the expositional interviews, digitizing the interviews, writing narrative descriptions of each sample, coding the samples, writing idiographic narrative descriptions of the inner experience of each subject, and writing a narrative description of the characteristics that emerged across subjects. This time consuming and labor intensive process makes it difficult to collect data on larger sample sizes.

The nature of DES regarding small sample sizes contributes to the second limitation of this study. Because of the small sample sizes, statistically significant conclusions cannot be drawn from the data. In addition, data from the present study are the samples of inner experience. These samples cannot easily be collapsed into numbers and analyzed. We did take frequency counts of characteristics that occurred within

www.manaraa.com

subjects and across subjects, however, we would need larger samples of left-handers to conduct tests of statistical significance.

The third limitation of the present study involves the possibility that we inaccurately or incorrectly captured the subjects' experience. One of the potential contributors involves our own presuppositions. For example, it is possible that our prior knowledge or belief systems interfered with our apprehension of the subjects' experience. It is unlikely that two separate investigators share the same presuppositions thus our inclusion of two investigators during the expositional interviews should account for this possibility. The possibility of incorrectly apprehending the subjects' experience may also be due to the subjects' presuppositions. It is possible that the subjects presented their individual samples in a way that is consistent with their own belief systems about themselves. In addition, even if we got the experiences right, we may have categorized them idiosyncratically.

The fourth limitation of the present study relates to the fact that DES is an exploratory procedure. The aim of this study was to explore the samples of inner experience of left-handers. Our rationale for this approach was that by applying DES to left-handers as a group we might discover characteristics of inner experience that were not previously discovered. Prior to conducting this study, there was no literature exploring or describing the inner experience of left-handers. Because of the exploratory nature of the present study, no hypotheses were made at the outset.

Two investigators, a student and her advisor (Hurlburt, the originator of DES), collected the data together and reviewed the data independently and together. Despite

www.manaraa.com

this, the present study may have benefited from review from an additional rater. Thus, the fifth limitation of this study is the lack of interrater reliability.

Our findings in the present suggest that more research on left-handers' inner experience using DES would be worthwhile. Research exploring the inner experience of left-handers while taking into consideration hemispheric specialization in the brain would shed light on how the left and right cerebral hemispheres contribute to inner experience.

www.manaraa.com

APPENDIX

SUBJECTS' SAMPLES

The following sample summaries were not included in the chapters:

KC's Samples (see chapter 5)

Interview: 1
Date: 11/03/09
Interviewers: AM & RH
Number of Beeps: 6

Sample 1.1: KC was in her car applying black eyeliner under green eyeliner on her eyelid. At the moment of the beep, she was seeing the two colors blend.

Sample 1.2: She was writing the first letter "e" in the word beep. She was also innerly saying "ee" in her own voice. The "ee" was part of the word "beep" however only the sound "ee" was in her awareness at the moment of the beep. She referred to this inner voice as "inner hearing," but changed to inner speaking perhaps in response to our pressure. There is no question that "inner hearing" is a natural phrase for her; it remains to be seen what that actually means.

Sample 1.3: KC had just seen a squirrel on the computer screen and looked away to get her binder out of her backpack. As she was unzipping her backpack, she was seeing of the binder inside her backpack. At the same time, she had some recollection of the squirrel that she had seen on the computer screen; this recollection was not a seeing and did not apparently involve any symbol. She was also innerly saying (which she originally called "inner hearing") "Oh that's cute" in her own voice referring to the recalled squirrel.

Sample 1.4: KC was trying to put crinkled papers into a folder. She was engaged in the task of putting the papers inside the folder without the papers folding. There was nothing else in her awareness.

Sample 1.5: KC was walking, and as she walked she was innerly seeing her and her friend sitting next to her, both viewed from the back right, as they sat in her Women's Studies classroom. The perspective was as if from the back right corner of the room, and she saw the whole classroom including the students, teacher, teacher's desk, etc. in the background. The seeing was in motion and in color. She was also innerly hearing her own voice describe their Women's Studies' assignment to her friend/classmate. This was separate but related to the inner seeing of her and her friend.

Sample 1.6: KC was innerly seeing a scene from the movie 'From Dusk 'Til Dawn' in color. She was seeing the character Sex Machine sitting at a table. She was seeing this scene from the front as if she was looking at a TV screen but not seeing the TV. The

www.manaraa.com

seeing was “fuzzy,” not as clear as the inner seeing of herself and her friend in sample 1.5.

Interview: 2
Date: 11/05/09
Interviewers: AM & RH
Number of Beeps: 6

All sample summaries from interview day 2 were included in Chapter 5.

Interview: 3
Date: 11/10/09
Interviewers: AM & RH
Number of Beeps: 6

Sample 3.5: KC was experiencing the urge to urinate which presented itself as a physical sensation. There was nothing else in her experience. She was putting materials related to going to the bathroom in her backpack, but that was not in her experience.

Interview: 4
Date: 11/12/09
Interviewers: AM & RH
Number of Beeps: 6

Sample 4.1: KC was using a flat iron to straighten her hair. She was holding the flat iron with her right hand and using the fingers of her left hand as a comb to make sure there are no tangles in her hair. She was feeling her hair in her left hand, feeling its smoothness. At the same time she was seeing in the mirror the section of hair above the flat iron. She was also seeing, somewhat indistinctly, the rest of her hair, but her focus was on the portion above the flat iron.

Sample 4.2: KC was putting moisturizer on her forehead. She was feeling her hand spreading the moisturizer on her forehead, and was also seeing her forehead in the mirror. That is, she was not seeing her hand, even though it was physically present; she was seeing the forehead around (and perhaps through) the hand.
.
Sample 4.4: KC was painting a sorority paddle. At the moment of the beep she was seeing the texture of the paint, the stripes of the brush strokes as they had been left by the brush. She was *not* seeing the part of the paddle. She was seeing the brush strokes.

Sample 4.5: She was writing the word “idiots.” In her experience was the seeing of the written word. I don’t know whether this seeing is merely a part of the doing of the writing or whether there is some interest in the shape of the letters.

Sample 4.6: KC was putting on her backpack. She was experiencing the contact of the backpack with her arm. She was also experiencing an awkward feeling in her back.

www.manaraa.com

MC's Samples (see Chapter 6)

Interview: 1
Date: 1/08/10
Interviewers: AM & RH
Number of Beeps: 4

Sample 1.1: MC was playing the video game Tatsunoko vs Capcom. He was holding down the right button on the control pad of the controller with his left hand and pressing the A button with his right hand. These combination of buttons resulted in the character doing a hadouken in which a ball of flame comes out of the character's hands. In his experience, he was mentally directing his hands to complete this task. He was particularly focused on his left hand. This was a sort of mental driving of his hands. That is, it was not merely that he felt his hands move; instead, he was planfully directing his hands to make the specific motion. He was also focused (but somewhat less so) on the power meter on the screen. He was mostly paying attention to the part of the meter that was not yet filled. He was also experiencing some happiness because he almost fulfilled what he was supposed to. This was a mental happiness because he had gotten so far. The mental direction of his hands was more salient in his experience than the seeing of the meter or the feeling happy, 40-30-30 by his estimation.

Sample 1.2: He was still playing the video game and he was nearing the end. A giant orb appeared on the screen. He was watching the orb and reacting to its appearance. In his experience was a thought process consisting of wondering what the meaning or significance of the orb is. This thought process did not involve words, images, or any other symbolic representation. The orb was glowing red, but it is not clear whether he was paying particular attention to the redness. He was also seeing what was happening on the screen but this was less salient than the thought process.

Sample 1.3: MC was watching a pre-game show of the Super Bowl on TV. The pre-game show was showing Bourbon Street filled with many people. He was wondering what the experience of the people on Bourbon Street is like. At the moment of the beep, he was having a cognitive experience that the people on Bourbon Street must be excited. He was also feeling excited with them. He experienced this excitement on the surface of his whole body, from head to toe, like a chill.

Sample 1.4: MC was watching the Super Bowl game on TV. Peyton Manning was throwing the football down the field. His mom was cooking hot wings. At the moment of the beep, he was smelling the hot wings. He was smelling a hot but flavorful scent, both smelling it and also experiencing from it a physical tingling in his nostrils. He was mostly attending the smell of the hot wings. The notion that the wings are going to be good was also present. He was also experiencing a thought related to a conversation he had previously had regarding what he would do if Freddy Krueger was in his dreams. He was imagining the content of what he would say if he had that conversation again. This did not involve words, images, or any symbolic representation. He was also seeing

www.manaraa.com

Peyton Manning throwing the ball on TV but this was less salient in his experience than the smelling of the hot wings and thinking of Freddy Krueger.

Interview: 2
Date: 1/10/10
Interviewers: AM & RH
Number of Beeps: 6

Sample 2.5: MC was watching the movie 'Pitch Black'. At this point, Vin Diesel was fighting another character, X. At the moment of the beep, MC was watching Vin Diesel fight X on the screen. MC was attending both to the physical struggle and the plot struggle between the characters. He was also experiencing the parts of the movie that led up to this point and realizing that X is not the protagonist and that Vin Diesel is the good guy. He was experiencing this realization as a sense of all the scenes in the movie without words or images. This was a new take on the movie that he had not had before.

Interview: 3
Date: 2/16/10
Interviewers: AM & RH
Number of Beeps: 5

Sample 3.3: MC was typing an essay on 'Buffy the Vampire Slayer' and recalling the episode he was writing about. He was recalling the episode where Buffy the Vampire Slayer fights Kendra and he was trying to figure out who struck who first. At the moment of the beep, he was innerly seeing the scene where Buffy and Kendra were fighting. As far as he could tell, the scene was an accurate recreation of the actual scene. He could not say what he was innerly seeing at the moment of the beep other than that Kendra was on the left and Buffy was on the right. He was innerly seeing the scene vividly, in motion, and in color. There was no sound. He was not aware of the typing, it was as if his fingers were doing their own thing.

Interview: 4
Date: 2/01/10
Interviewers: AM & RH
Number of Beeps: 5

All sample summaries from interview day 4 were included in Chapter 6.

DD's Samples (see Chapter 7)

Interview: 1
Date: 2/01/10
Interviewers: AM & RH
Number of Beeps: 4

www.manaraa.com

Sample 1.1: DD was watching the Boston Celtics vs. the Los Angeles Lakers basketball ball on TV. He was also having a conversation with a friend next to him about their mutual friends who had gotten pregnant. At the moment of the beep, the real conversation had lulled, and he was innerly saying "My friends are stupid" in his own voice. He was innerly saying it the same way he would've said it externally with the accent on the first syllable of "stupid." The game was somewhat in his awareness, but less so than the innerly spoken words. His eyes were directed at the TV and he was tracking the game but he was not involved in the game.

Sample 1.2: DD was thinking about a song he had heard earlier today that he had not heard in a long time. He may have been innerly seeing the title of the song, but was far from confident about that. In his experience was a slightly mental, euphoric emotion. The emotion was not extreme and he described it as a "small, tiny blessing" about hearing the familiar but not recently heard song. He was standing up with his elbows on the counter and he was also experiencing the hardness of the counter against his elbows. The pressure of the counter against his elbows was less in his awareness than the song, but both were present at the moment of the beep.

Sample 1.3: DD was reading a Facebook conversation on his phone in which his friends mentioned they would like for him to learn how to play the bass. At the moment of the beep, he was thinking he should learn how to play the bass. This thought was present without words, images, or any other symbolic representation. He was also seeing the whole phone and the Facebook conversation but he was not attending to the details of the conversation. Also in his awareness was a physical comfortable feeling related to the position his body was in. The comfortable feeling was less in his awareness than the learning to play bass and the seeing of the phone.

Sample 1.4: DD had just moved his head to the left and was experiencing a physical muscle pain in the back, left side of his neck. At the moment of the beep, all that was in his awareness was the physical muscle pain on the back, left side of his neck.

Interview: 2
Date: 2/03/10
Interviewers: AM & RH
Number of Beeps: 4

All sample summaries from interview day 2 were included in Chapter 7.

Interview: 3
Date: 2/08/10
Interviewers: AM & RH
Number of Beeps: 5

All sample summaries from interview day 3 were included in Chapter 7.

www.manaraa.com

Interview: 4
Date: 2/11/10
Interviewers: AM & RH
Number of Beeps: 5

All sample summaries from interview day 4 were included in Chapter 7.

NH's Samples (see chapter 8)

Interview: 1
Date: 10/08/09
Interviewers: AM & RH
Number of Beeps: 4

Sample 1.1: NH was studying for his midterm in a library study room. At the moment of the beep, he was watching his friend plug the USB drive into the monitor instead of the computer. At the moment of the beep, he was thinking it would not work. This thought was not in words or pictures. He was also innerly seeing the computer, seen at an angle so he could see the back and the side. This was a detailed inner seeing; for example, he saw the Dell label and the green hole for the keyboard. This seeing was a recreation of what he had seen in reality a few seconds earlier. It was very difficult in the interview for us to clearly make the distinction between what is seen in imagination and what is in reality. For example, he said he was seeing the computer, and we wanted to know whether this was an imaginary seeing or a real seeing. He said he was seeing the real computer, not an imaginary computer. Yes, but is that real computer actually seen in the real world, or seen in your imagination? That was still difficult, but eventually we came to believe that it was an imaginary seeing.

Sample 1.2: NH was writing a word and innerly checking the spelling of the word as he wrote it. At the moment of the beep, he had just finished writing the letter '*e*'. His eyes were focused on the written letter *e* and it appeared larger than it was actually written, apparently as if each letter while it was being written appeared larger, but it receded to normal size as he moved to the next letter. He was also somehow innerly saying "*e*", but the details of this saying were not clear. It seemed to be more innerly said than innerly heard, but the voice of the saying was not directly experienced. It seemed to be *not* his own voice, but also not any other particular voice; for example, he could not specify whether the voice seemed male or female. He did seem confident that he was saying "*e*" exactly the way he *always* said "*e*" while writing that letter—as if there were some fixed vocalization of "*e*" that was invoked every time he wrote "*e*" and that this vocalization was always the same from one occasion to the next.

Sample 1.3: NH was looking at a picture on the computer screen of a woman his age (18 years old), who had a two year old son. He was focusing on her face but was still seeing the whole picture including her son and her boyfriend. Also in his awareness was some kind of thinking about consequences, the effect on one's life of having responsibility for a child.

www.manaraa.com

Sample 1.4: NH was laying in bed listening to music. At the moment of the beep he was reaching for a piece of gum. There was nothing in his awareness other than the act of reaching, and it was not clear how that was present to him.

Interview: 2
Date: 10/15/09
Interviewers: AM & RH
Number of Beeps: 6

Sample 2.4: NH was watching a TV show, being carried along by the show. At the moment of the beep, on the TV was a child sitting on a street with houses surrounding waiting for his dad to take him to Disneyland. He saw the entire scene, including the houses and the street. That is, he was not focused only on the child.

Sample 2.5: NH had just read a text message from his friend regarding her desire to eat at the dining commons on the UNLV campus. At the moment of the beep, he was innerly seeing the front part of the dining commons building. He was seeing the commons at an angle from the front, so he saw the street, front doors, column, trash can, and items surrounding the building. The seeing was understood to be an accurate recreation of the view of the front of the building from the angle that he generally approaches it. It was a still image and in color.

Sample 2.6: NH was wondering what time it was. At the moment of the beep, he was innerly seeing the time display and the screen saver of his iPhone; the clock read 2:30. The inner seeing seemed accurate; he did not see the case of the phone or anything in the background.

Interview: 3
Date: 10/29/09
Interviewers: AM & RH
Number of Beeps: 6

Sample 3.4: NH was sitting in Spanish class waiting for his professor to enter and was looking around the classroom. At the moment of the beep, he was seeing the blond girl's photo on the cover of a UNLV planner positioned upright on the teacher's desk. He was seeing her whole picture, not focused on some aspect thereof.

Interview: 4
Date: 11/02/09
Interviewers: AM & RH
Number of Beeps: 6

Sample 4.4: NH had just given his RebelCard to a cashier in the dining commons. He was seeing her swipe his card in the register. This was a just seeing, just observing her perform the action.

www.manaraa.com

Sample 4.5: NH was walking in a hallway back to the dorms with his roommate. His eyes were aimed at the floor but as best we could ascertain there was nothing in his awareness. The tiles of the floor were doubtless being projected on his retina, but apparently he was not experiencing them.

LC's Samples (see Chapter 9)

Interview: 1
Date: 11/11/09
Interviewers: AM & RH
Number of Beeps: 4

Sample 1.1: LC was wondering why people kill. Somehow the concept of why people kill was present to her. This was a thought that did not involve words or images.

Sample 1.2: LC was wondering why people lie. This was more of a thought than a question. There were no words or images. The thought was the same as in beep 1.1. She was also possibly experiencing some knowledge of being angry but was not feeling angry at the moment of the beep; we were not confident about the existence of the experience of anger in any way.

Sample 1.3: LC was wondering how people could still be racist and act in racist ways. This wondering did not involve words or images. She had been innerly seeing a series of images before the beep had sounded but, at the moment of the beep, there were none. The concept of sadness may have also been present to her, but, like 1.3, we were not at all sure about that.

Sample 1.4: LC was innerly seeing one of a series of images representing the idea of all the things she can do with her left-hand. She was seeing herself brushing her hair with her left hand. At the moment of the beep, she was innerly seeing both herself and her reflection in the mirror. She was seeing the right side of her body from the shoulders up looking at the mirror. She saw both herself and her reflection equally but mostly saw her hand brushing her hair in the reflection. Thus she saw herself from the right side--nose aimed to her right--so that the left hand was blocked from view by her head. The reflection was required to see the hand. This seeing was in accurate color and in motion, but was not completely clear.

Interview: 2
Date: 11/17/09
Interviewers: AM & RH
Number of Beeps: 6

Sample 2.3: LC was wondering if babies know that what they are laughing about is funny. This question was in her experience without words or images.

www.manaraa.com

Interview: 3
Date: 11/18/09
Interviewers: AM & RH
Number of Beeps: 6

Sample 3.6: LC was seeing her phone bill and thinking that she needs to change her plan because her phone bill is too high. This was a thought that was somehow present to her, without words and without images.

Interview: 4
Date: 11/24/09
Interviewers: AM
Number of Beeps: 6

Sample 4.6: At the moment of the beep, LC was reminding herself to write down that she has a doctor's appointment. The words "Don't forget to write down the date" were present but she was unable to specify if they were innerly spoken, heard, or present without representation.

FM's Samples (See Chapter 10)

Interview: 1
Date: 10/06/09
Interviewers: AM & RH
Number of Beeps: 6

Sample 1.1: FM was reading an article about his favorite football team (Oakland Raiders) online. He was innerly seeing the Raiders' quarterback overthrowing the ball to the receiver. He was looking down on the scene from an angle above and behind the receiver. He saw the quarterback, the receiver, and the ball in flight moving from the right towards the left. He saw the green grass, but no other players (offensive or defensive) were seen, even though this was a recreation of an actual play from a previous game. The seeing was realistic, was in accurate color and had no border. The seeing was an illustration of the content of the article.

Sample 2.2: He was tired. His eyes were closed and he was lying down. He was also thinking that he was tired. This thinking was not in words or images.

Sample 2.3: He was talking to his friend while a commercial was on TV. There was nothing in his awareness. He was doing the talking. That there was nothing in awareness may be the result of first-sampling-day failure to attend.

Sample 2.4: He was watching a football game on TV. He was seeing the game and involved in what was going on. There was nothing else in his awareness.

www.manaraa.com

Sample 2.5: He was talking about the football game to his friend. There was nothing in his awareness. He was doing the talking. That there was nothing in his awareness may be the result of first-sampling-day failure to attend.

Sample 2.6: He was thinking about an English assignment due next week. At the moment of the beep, he was innerly hearing the words "I've gotta get the paper started." The words were in his own voice with a matter-of-fact inflection. He was also innerly seeing the first page of an essay paper. He saw a whole piece of paper with typed, black letters forming the header, title, and body of the document. He could not tell what the words. He was also brushing his teeth; however, this was not in his awareness at the moment of the beep.

Interview: 2
Date: 10/13/09
Interviewers: AM & RH
Number of Beeps: 5

Sample 2.1: FM was talking to his younger brother at the kitchen table. At the moment of the beep, he was saying "get another book from the library tomorrow" out loud to his brother. He understood himself to be the speaker of these words. He was seeing the WebCampus home page appear in his left periphery. He was also hearing the stirring of the spoon in the pot. The speaking to his brother was the most salient aspect in his experience, followed by the WebCampus home page, and , lastly, the stirring spoon.

Sample 2.5: FM was watching sports analysts talk on TV. The analysts were talking about Jon Gruden and his former coaches; as they talked thy showed a video of Bill Callahan (one of Gruden's former coaches) writing on a white board. At the moment of the beep, he was recalling when Gruden led his new team to defeat his former team in the 2002 Superbowl. This was present without words or images. Thus the thought was related to but not identical to what the analysts were talking about.

Interview: 3
Date: 10/16/09
Interviewers: AM & RH
Number of Beeps: 3

All sample summaries from interview day 3 were included in Chapter 10.

Interview: 4
Date: 10/20/09
Interviewers: AM & RH
Number of Beeps: 5

Sample 4.5: FM was watching a highlight tape of Knowshon Moreno on TV. He was taking in what he was seeing and watching the clip unfold, Moreno catching himself with one hand on the ground and protecting the ball with the other.

www.manaraa.com

Interview: 5
Date: 10/27/09
Interviewers: AM & RH
Number of Beeps: 6

Sample 5.1: At the moment of the beep, FM was pointing to his physics book on a table and saying "saved one-hundred dollars on the book right there" out loud. There was no one else in the room.

Sample 5.3: FM had asked his dad a question and, at the moment of the beep, they were saying the words "in school" at the same time. His verbalization was not in his experience at the moment of the beep.

www.manaraa.com

REFERENCES

Aanstoos, C. (1983). The think aloud method in descriptive research. *Journal of Phenomenological Psychology*, 14(2), 243-264.

Alliger, G. &Williams, K. (1993). Using signal-contingent experience sampling methodology to study work in the field: A discussion and illustration examining task perceptions and mood. *Personnel Psychology*, 46, 525-549.

Beck, S. (1953). The science of personality: nomothetic or idiographic? *The Psychological Review*, 60, 353-359.

Beaton, A.A. (1997). The relation of planum temporale asymmetry and morphology of the corpus callosum to handedness, gender, and dyslexia: a review of the evidence. *Brain and Language*, 60, 255-322.

Bergin, A. (1961). Psychology as a science of inner experience. *Discussion Papers*, 4, 95-103.

Bishop, D.V.M. (1990). Handedness, clumsiness and developmental language disorders. *Neuropsychologia*, 28(7), 681-690.

Bogaert, A. (2001). Handedness, criminality, and sexual offending. *Neuropsychologia*, 39, 465-469.

Botros, M., Atall, S., & El-Islam, F. (2006). Schneiderian first rank symptoms in a sample of schizophrenic patients in egypt. *International Journal of Social Psychiatry*, 52, 424-431.

Cacioppo, J., Glass, C., & Merluzzi, T. (1979). Self-statements and self-evaluations: A \ cognitive-response analysis of heterosocial anxiety. *Cognitive Therapy and Research*, 3, (249-262).

www.manaraa.com

Cacioppo, J. & Petty, R. (1981). Social psychological procedures for cognitive response assessment: The thought-listing technique . Merluzzi, T.V., Glass, C.R., & Genest, M. (Eds.). *Cognitive Assessment*, (pp. 309-342). New York: Guildford Press.

Chemtob, C., & Taylor, K. (2003). Mixed lateral preference and parental left-handedness possible markers of risk for ptsd. *The Journal of Nervous and Mental Disease,*191(5), 332-338.

Choudhary, C., & O'Carroll, R. (2007). Left hand preference is related to posttraumatic stress disorder. *Journal of Traumatic Stress*, 20(3), 365-369.

Christensen, T., Barret, L., Bliss-Moreau, E., Lebo, K., & Kaschub, C. (2003). A practical guide to experience-sampling procedures. *Journal of Happiness Studies*, 4, 53-78.

Clark, D. (1988). The validity of measures of cognition: a review of the literature. *Cognitive Therapy and Research*, 12(1), 1-20.

Coren, S. (1993). *The left-hander syndrome: The causes and consequences of left handedness*. New York: Vintage Books.

Coren, S., & Halpern, D. (1991). Left-handedness: a marker for decreased survival fitness. *Psychological Bulletin*, 109(1), 90-106.

Costall, A. (2006). 'Introspectionism' and the mythical origins of scientific psychology. *Consciousness and Cognition*, 15, 634-654.

Csikszentmihalyi, M., & Figurski, T. (1982). Self-awareness and aversive experience in everyday life. *Journal of Personality*, 50(1), 15-27.

www.manaraa.com

Csikszentmihalyi, M., & Larson, R. (1987). Validity and reliability of the experience sampling method. *The Journal of Nervous and Mental Disease,* 175(9). 526-536.

Csikszentmihalyi, M., Larson, R., & Prescott, S. (1977). The ecology of adolescent activity and experience. *Journal of Youth and Adolescence,* 6(3), 281-294.

Davison, G., Haaga, D., Rosenbaum, J., Dolezal, S., & Weinstein, K. (1991). Assessment of self-efficacy in articulated thoughts: "States of mind" analysis and association with speech-anxious behavior. *Journal of Cognitive Psychotherapy: An International Quarterly*, 5(2), 83-91.

Davison, G., Navarre, S., & Vogel, R. (1995). The articulated thoughts in simulated situations paradigm: A think-aloud approach to cognitive assessment. *Current Directions In Psychological Science,* 4(1), 29-33.

Davison, G., Robins, C., & Johnson, M. (1983). Articulated thoughts during simulated situations: A paradigm for studying cognition and behavior. *Cognitive Therapy and Research,* 7(1), 17-40.

Davison, G., Vogel, R., & Coffman, S. (1997). Think-aloud approaches to cognitive assessment and the articulated thoughts in simulated situation paradigm. *Journal of Consulting and Clinical Psychology*, 65(6), 950-958.

De Souza Silva, M.A., Topic, B., Lamounier-Zepter, V., Huston, J.P., Tomaz, C., & Barros, M. (2007). Evidence for hemispheric specialization in the marmoset (callithrix penicillata) based on lateralization of behavioral/neurochemical correlations. *Brain Research Bulletin*, 74, 416-428.

www.manaraa.com

Derogatis, L.R. (1994). *Symptom Checklist-90-R: Administration, Scoring, and Procedures Manual*. National Computer Systems, Inc. Minneapolis, MN.

Derogatis, L.R., Lipman, R.S., & Covi, L. (1973). SCL-90: an outpatient psychiatric rating scale – preliminary report. *Psychopharmacology Bulletin*, 9, 13-28.

Dragovic, M., & Hammond, G. (2005). Handedness in schizophrenia: a quantitative revew of evidence. *Acta Psychiatrica Scandinavica*, 111, 410-419.

Eckhardt, C., Barbour, K., & Davison, G. (1998). Articulated thoughts of maritally violent and nonviolent men during anger arousal. *Journal of Consulting and Clinical Psychology*, 66(2), 259-269.

Ehrlichman, H., & Barret, J. (1983). Right hemispheric specialization for mental imagery: a review of the evidence. *Brain and Cognition*, 2, 55-76.

Ehrlichman, H., & Wiener, M. (1980). EEG asymmetry during covert mental activity. *Psychophysiology*, 17(3), 228-235.

Flugel, J.C. (1925). A quantitative study of feeling and emotion in everyday life. *British Journal of Psychology*, 15(4), 318-355.

Foa, E., Cashman, L., & Perry, J. (1997). The validation of a self-report measure of posttraumatic stress disorder: the posttraumatic diagnostic scale. *Psychological Assessment*, 9(4), 445-451.

Freud, S. (1900). *The interpretation of dreams* (3rd ed.) (A.A. Brill, Trans.). United States of America: Plain Label Books.

Gabrielli, W., & Mednick, S. (1980). Sinistrality and delinquency. *Journal of Abnormal Psychology*, 89(3), 654-661.

www.manaraa.com

Geschwind, N., & Behan, P. (1982). Left-handedness: association with immune disease, migraine, and developmental learning disorder. *Proceedings of the National Academy of Sciences of the United States of America*, 79, 5097-5100.

Habib, M., Gayraud, D., Oliva, A., Regis, J., Salamon, G., & Khalil, R. (1991). Effects of handedness and sex on the morphology of the corpus callosum: a study with brain magnetic resonance imaging. *Brain and Cognition*, 16, 41-61.

Hammond, G. (2002). Correlates of human handedness in primary motor cortex: a review and hypothesis. *Neuroscience and Biobehavioral Reviews*, 26, 285-292.

Hatta, T. (2007). Handedness and the brain: A review of brain-imaging techniques. *Magnetic Resonance in Medical Sciences*, 6(2), 99-112.

Heavey, C., & Hurlburt, R. (2008). The phenomena of inner experience. *Consciousness and Cognition*, 17, 798-810.

Herron, J. (1980) Neuropsychology of left-handedness. *Perspective in Neurolinguistics and Psycholinguistics*: Academic Press.

Hicks, R., Bautista, J., & Hicks, G. (1999). Handedness and the vividness of dreams. *Dreaming*, 9(4), 265-269.

Hormuth, S. (1986). The sampling of experiences in situ. *Journal of Personality*, 54(1), 262-293.

Hurlburt, R. (1979). Random sampling of cognitions and behavior. *Journal of Research in Personality*, 13, 103-111.

Hurlburt, R. (1980). Validation and correlation of thought sampling with retrospective measures. *Cognitive Therapy and Research*, 4(2), 235-238.

www.manaraa.com

Hurlburt, R. (1997). Randomly sampling thinking in the natural environment. *Journal of Consulting and Clinical Psychology*, 65, 941-949.

Hurblurt, R. & Akhter, S. (2006). The descriptive experience sampling method. *Phenomenology and the Cognitive Sciences*, 5, 271-301.

Hurlburt, R. & Heavey, C. (2001). Telling what we know: describing inner experience. *Trends in Cognitive Science*, 5, 400-403.

Hurlburt, R. & Heavey, C. (2002). Interobserver reliability of descriptive experience sampling. *Cognitive Therapy and Research*, 26, 135-142.

Hurlburt, R. & Heavey, C. (2004). To beep or not to beep: Obtaining accurate reports about awareness. *Journal of Consciousness Studies*, 11, 113-128.

Hurlburt, R. & Heavey, C. (2006). Descriptive experience sampling codebook manual of terminology. Retrieved December 30, 2009, from http://www.nevada.edu/~russ/codebook.html

Hurlburt, R. & Heavey, C. (2006). *Exploring Inner Experience: The descriptive experience sampling method.* Philadelphia: John Benjamins.

Hurlburt, R., Koch, M., & Heavey, C. (2002). Descriptive experience sampling demonstrates the connection of thinking to externally observable behavior. *Cognitive Therapy and Research*, 26, 117-134.

Johnson, C. & Larson, R. (1982). Bulimia: An analysis of moods and behavior. *Psychosomatic Medicine*, 44(4), 341-351.

Jones-Forrester, S. (2009). *Descriptive experience sampling of individuals with bulimia nervosa* (Unpublished dissertation), University of Nevada, Las Vegas.

www.manaraa.com

Keenan, J.P., Nelson, A., O'Conner, M, & Pascual-Leone, A. (2001). Self-recognition and the right hemisphere. *Nature*, 409, 305.

Keenan, J.P., Rubio, J., Racioppi, C., Johnson, A., & Barnacz, A. (2005). The right hemisphere and the dark side of consciousness. *Cortex*, 41, 695-704.

Kendall, P. & Korgeski, G. Assessment of cognitive-behavioral interventions. *Cognitive Therapy and Research*, 3(1), 1-21.

Kendler, H. (2005). Psychology and phenomenology: a clarification. *American Psychologist*, 60, 318-324.

Klinger, E. (1978). In K. Pope & J. Singer (Ed.s), *The Stream of Consciousness: Scientific Investigations into the Flow of Human Experience* (pp. 225-258). New York: Plenum Press.

Klinger, E. (1978-79). Dimensions of thought and imagery in normal waking states. *Journal of Altered States of Consciousness*, 4(2), 97-113.

Knecht, S., Drager, M., Deppe, L., Bobe, H., Lohmann, A., Floel, E., Ringelstein, B., & Henningsen, H. (2000). Handedness and hemispheric language dominance in healthy humans. *Brain*, 123, 2512-2518.

Lewis, J.W., Phinney, R.E., Brefczynski-Lewis, J.A., & DeYoe, E.A. (2006). Lefties get it "right" when hearing tool sounds. *Journal of Cognitive Neuroscience*, 18(8), 1314-1330.

Lindell, A. (2006). In your right mind: right hemisphere contributions to language processing and production. *Neuropsychology Review*, 16, 131-148.

Lloyd, D. (2002). Functional mri and the study of human consciousness. *Journal of Cognitive Neuroscience*, 14(6), 818-831.

www.manaraa.com

McNamara, P., Clark, J., & Hartmann, E. (1998). Handedness and Dream Content. *Dreaming*, 8(1), 15-22.

Medland, S.E., Duffy, D.L., Spurdle, A.B., Wright, M.J., Geffen, G.M., Montgomery, G.W., & Martin N.G. (2005). Opposite effects of androgen receptor cag repeat length on increased risk of left-handedness in males and females. *Behavior Genetics*, 6, 735-744.

Miller, M.B., & Van Horn, J.D. (2007). Individual variability in brain activations associated with episodic retrieval: a role for large-scale databases. *International journal of psychophysiology*, 63, 205-213.

Moneta, G. & Csikszentmihalyi, M. (1985). The effect of perceived challenges and skills on the quality of subjective experience. *Journal of Personality*, 64(2), 275-310.

Morin, A. (2001). Right hemispheric self-awareness: a critical assessment. *Consciousness and Cognition*, 11, 396-401.

Morin, A. (2005). Possible links between self-awareness and inner speech: theoretical background, underlying mechanisms, and empirical evidence. *Journal of Consciousness Studies*, 4-5, 115-134.

Niebauer, C.L. (2004). Handedness and the fringe of consciousness: strong handers ruminate while mixed handers self-reflect. *Consciousness and Cognition*, 13, 730-745.

Niebauer, C.L., Aselage, J., & Schutte, C. (2002). Hemispheric interaction and consciousness: degree of handedness predicts the intensity of a sensory illusion. *Laterality*, 7(1), 85-96.

www.manaraa.com

Nisbett, R. & Wilson, T. (1977). Telling more than we can know: Verbal reports on mental processes. *Psychological Review*, 84(3), 231-259.

Oldfield, R.C. (1971). The assessment and analysis of handedness: the Edinburgh inventory. *Neuropsychologia*, **9**(1), 97-113.

Ornstein, R. (1997). *The Right Mind: Making Sense of the Hemispheres*. San Diego: Harcourt Brace & Company.

Overgaard, M. (2006). Introspection in science. *Consciousness and Cognition*, 15, 629 633.

Phillips, K.A., & Hopkins, W.D. (2007). Exploring the relationship between cerebellar asymmetry and handedness in chimpanzees (pan troglodytes) and capuchins (cebus apella). *Neuropsychologia*, 45, 2333-2339.

Phillips, K.A., & Sherwood, C.C. (2005). Primary cortex asymmetry is correlated with handedness in capuchin monkeys (cebus apella). *Behavioral Neuroscience*, 119(6), 1701-1704.

Satz, P., & Green, M.F. (1999). Atypical handedness in schizophrenia: some methodological and theoretical issues. *Schizophrenia Bulletin*, 25(1), 63-78.

Scollon, C., Kim-Prieto, C., & Diener, E. (2003). Experience sampling: Promises and pitfalls, strengths and weaknesses. *Journal of Happiness Studies*, 4(5), 5-34.

Searleman, A., & Fugagli, A. (1986). Suspected autoimmune disorders and left handedness: evidence from individuals with diabetes, crohn's disease and ulcerative colitis. *Neuropsychologia*, 25(2), 367-374.

www.manaraa.com

Shiffman, S. & Stone, A. (1998). In D. Krantz & A. Baum (Eds.), *Technology and Methods in Behavioral Medicine* (pp. 117-132). New Jersey: Lawrence Erlbaum Associates.

Shiffman, S., Stone, A., & Hufford, M. (2008). Ecological momentary assessment. *Annual Review of Clinical Psychology*, 4, 1-32.

Singer, J. (1975). Navigating the stream of consciousness: Research in daydreaming and related inner experience. *American Psychologist*, 727-738.

Singer, J. & Kolligian, J. (1987). Personality: Developments in the study of private experience. *Annual Review of Psychology*, 38, 533-574.

Smyth, J. & Stone, A. (2003). Ecological momentary assessment research in behavioral medicine. *Journal of Happiness Studies*, 4, 35-52.

Smyth, J., Wonderlich, S., Crosby, R., Miltenberger, R., Mitchell, J., & Rorty, M. (2000). The use of ecological momentary assessment approaches in eating disorder research. *International Journal of Eating Disorders*, 30(1), 83-95.

Sommer, I., Aleman, A., Ramsey, N., Bouma, A., & Kahn, R. (2001). Handedness, language lateralization and anatomical asymmetry in schizophrenia. *British Journal of Psychiatry*, 178, 344-351.

Sperry, R. (1984). Consciousness, personal identity and the divided brain. *Neuropsychologia*, 22(6), 661-673.

Stein, R., Kendardy, J., Wiseman, C., Dounchis, J., Arnow, B., & Wilfely, D. (2007). What's driving the binge in binge eating disorder?: a prospective examination of precursors and consequences. *The International Journal of Eating Disorders*, 40(3), 195-203.

www.manaraa.com

Vasterling, J., Brailey, K., Allain, A., Duke, L., Constans, J., & Sutker, P. (2002). Attention, learning, and memory performances and intellectual resources in vietnam veterans: ptsd and no disorder comparisons. *Neuropsychologia*, 16(1), 5 14.

Verdoux, H., Liraud, F., Droulout, T., Theillay, G., Parrot, M., & Franck, N. (2004). Is the intensity of schneiderian symptoms related to handedness and speech disorder in subjects with psychosis. *Schizophrenia Research*, 67, 167-173.

Vogeley, K., Bussfeld, P., Newen, A., Herrmann, S., Happe, F., Falkai, P., Maier, W., Shah, N.J., Fink, G.R., & Zilles, K. (2001). Mind reading: neural mechanisms of theory of mind and self-perspective. *NeuroImage*, 14, 170-181.

Ward, J., Alvis, G., Sanford, C., Dodson, D., & Pusakulich, R. (1989). Qualititative differences in tactuo-spatial motor learning by left-handers. *Neuropsychologia*, 27(8), 1091-1099.

Watson, D., Friend, R. (1969). Measurement of social-evaluative anxiety. *Journal of Consulting and Clinical Psychology*, 33, 448-457.

Westerhausen, R., Kreuder, F., Sequeira, S.D.S., Walter, C., Woerner, W., Wittling, R.A., Schweiger, E., & Wittling, W. (2004). Effects of handedness and gender on macro- and microstructure of the corpus callosum and its subregions: a combined high-resolution and diffusion-tensor MRI study. *Cognitive Brain Research*, 21, 418-426.

Witelson, S.F., & Nowakowski, R.S. (1991). Left out axons make men right hypothesis for the origin of handedness and functional asymmetry. *Neuropsychologia*, 29(4), 327-333.

www.manaraa.com

Yoshiuchi, K., Yamamoto, Y., & Akabayashi, A. (2008). Application of ecological momentary assessment in stress-related diseases. *Biopsychosocial Medicine*, 2(13), 1-6.

Zotter, D. & Crowther, J. (1993). The role of cognition in bulimia nervosa. *Cognitive Therapy and Research*, 15(5), 413-426.

www.manaraa.com

VITA

Graduate College
University of Nevada, Las Vegas

Aadee Mizrachi

Degrees:

Bachelor of Arts, Psychology, 2004
University of Nevada, Las Vegas

Bachelor of Arts, Criminal Justice, 2004
University of Nevada, Las Vegas

Thesis Title: Examining the Inner Experience of Left-Handers using Descriptive Experience Sampling.

Thesis Examination Committee:

Chairperson, Russell Hurlburt, Ph. D.
Committee Member, Jeffrey Kern, Ph. D.
Committee Member, Murray Millar, Ph. D.
Graduate Faculty Representative, Terance Miethe, Ph. D.

www.manaraa.com