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## Descriptive Experience Sampling Interactive Multi-media Training Tool for Subjunctification and Illustrative Interviews

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DESCRIPTIVE EXPERIENCE SAMPLING INTERACTIVE MULTI-MEDIA  
TRAINING TOOL FOR SUBJUNCTIFICATION  
AND ILLUSTRATIVE INTERVIEWS

By

Stacy Lynne Reger

A thesis submitted in partial fulfillment  
of the requirements for the

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College of Liberal Arts  
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May 2012**



THE GRADUATE COLLEGE

We recommend the thesis prepared under our supervision by

**Stacy Lynne Reger**

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Tool for Subjunctification and Illustrative Interviews**

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## ABSTRACT

Modern experience sampling methods attempt to understand the phenomenology of inner experience through a variety of methods, including questionnaires, diaries, and verbalization of ongoing cognitive processes. The goal of such studies is to minimize potential roadblocks to accessing inner experience, such as retrospective recall, memory failures, and bias. The current project focuses on one such method, Descriptive Experience Sampling (DES). DES is an idiographic, exploratory, and ecologically valid method of studying inner experience. In this method, participants wear a beeper with an earphone that emits a random beep. When the beep sounds, the participant is to write down notes about whatever was in his or her experience at the last uninterrupted moment before the beep. Once six of these beeped moments are collected, the investigator conducts an expositional interview to gain a faithful account of the participant's inner experience at each moment of each beep. The interviewing process requires from the investigator a great deal of skill in helping the participant to accurately report his or her experience. The current project continues the development of a DES interview training tool, presented in a multi-media format to teach interested persons how to do the DES method. The current project created a training module on how to recognize subjunctification in participants, which is an important indicator that the participant is not talking about direct experience. The current project also created a multi-media presentation of full DES interviews with commentary from the interviewers that allows the student to understand the process of the interviewer in a real sampling interview.

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## CHAPTER 1

### INTRODUCTION

The field of psychology was aimed from the beginning at understanding the characteristics of consciousness. The frequently named “father” of psychology, Wilhelm Wundt, described psychology in 1912 as the discipline whose goal was to discover “the facts of consciousness, its combinations and relations, so that it may ultimately discover the laws which govern these relations and combinations” (Wundt, 1912, p. 1). Thus psychology was intended to understand the pieces of human consciousness before attempting to interpret the puzzle. Wundt also acknowledged that there were two distinct components of conscious experience: the content of what is experienced and the individual’s interpretation of that experience (Blumenthal, 1975).

In pursuit of a pure understanding of inner experience, early psychologists, including Wundt, those at Würzburg in Germany, and those at Cornell in America, used a method of experimental self-observation called introspection, in which participants were presented with a stimulus for a short duration and then were immediately to describe their experience of that stimulus (Boring, 1953). Whereas these early studies of introspection endeavored to capture and understand experience, they were limited in several ways. One hindrance was the researcher’s reliance on theories about the various elements of experience and consequent search for pre-determined aspects of consciousness, rather than an exploration of consciousness without preconceptions about what might be found. The studies also required well-trained participants who had engaged in introspection on thousands of occasions before they were included in published studies.

Compounding these theoretical and methodological limitations, there was ongoing debate between the introspectionist scholars at Cornell and those at Würzburg over the specific content of inner experience, including a disagreement over whether thoughts could exist without images (Hurlburt & Heavey, 2006). The dispute over the nature of the basic elements of thought spanned several decades at the turn of the 20<sup>th</sup> century, and the failure to resolve that dispute was eventually taken as evidence that introspection was not a legitimate method of examining consciousness (Danziger, 1980). Contemporaneously, the psychoanalytic emphasis on the unconscious mind became popular among psychologists, weakening interest in introspection's examination of conscious experience (Lieberman, 1979). Reacting both to psychology's focus on the unconscious and introspection's failure to resolve disputes such as imageless thought, behaviorism began to gain influence among psychologists. This new way of psychological investigation focused entirely on outwardly observable phenomena: overt behaviors that could be publicly observed and counted. Behaviorists criticized the subjective reports and intangible phenomena of introspective studies (Danziger, 1980; Lieberman, 1979). Because of the rise in regard for the psychoanalytic and behavioral viewpoints (which criticized introspection) and the disagreement among introspective researchers surrounding the phenomena of consciousness, psychology largely abandoned introspection and the study of consciousness by about 1925 (Danziger, 1980).

The criticisms of early introspective methods are useful for modern psychologists interested in inner experience because they highlight potential hindrances to accessing accurate reports of experience. Such hindrances include the fallibility of memory over time, potential inability of participants to differentiate between distinct inner experiences,

and the possibility of receiving reports of interpretations rather than pure content of experience. All of these issues increase the difficulty of apprehending the true components of inner experience (Lieberman, 1979). Behaviorist theory acknowledges the existence of mental events as private behaviors but questions the scientific usefulness of those private behaviors because the verbal articulation and accurate, consistent labeling of internal experiences may be difficult or impossible for people (Skinner, 1974; Natsoulas, 1978; Hurlburt & Heavey, 2001).

Though the methodology of introspection has been criticized, the importance of its goal has not diminished, and modern psychology has seen a resurfacing of interest in studying inner experience (Lieberman, 1979). Modern introspective research seeks a deeper understanding of an individual's internal experience (Schooler & Fiore, 1997), an aim that remains essential to the discipline of psychology (Hurlburt & Heavey, 2001). Rather than a complete dismissal of introspective research, psychology requires a renovation of the methodology of introspection that circumvents the problems of early methods while providing results that are both reliable and replicable (Hurlburt & Heavey, 2006).

Several modern methods for conducting introspective research have emerged in response to the need for an improved way to access inner experience. Such methods (including the Experience Sampling Method, Ecological Momentary Assessment, Automatic Thoughts in Simulated Situations, thought listing, diary method, and Descriptive Experience Sampling) attempt to allow the researcher to explore the inner experience of individuals while avoiding the hindrances encountered by early introspective research (Hurlburt, 1993). These methods may provide an opportunity to

study the inner experience of an individual in a systematic way that offers a distinctive insight into his or her internal world, unlike the information gathered using traditional methods in psychology (Hurlburt, 1997).

The current project focuses on one of these methods: Descriptive Experience Sampling (DES). This method of exploring inner experience was developed in response to the need for a technique to access an individual's inner experience and provide careful descriptions of it (Hurlburt, 1990, 1993; Hurlburt & Heavey, 2004). DES is an idiographic method that uses a beeper to sample random moments of inner experience everyday life. The focus of DES is to describe faithfully each of those single moments, working toward an understanding of characteristics of an individual based on a collection of momentary experiences (Hurlburt & Akhter, 2006). Such observations provide a unique view of an individual's experience that simply cannot be apprehended using common assessment methods in psychology (Hurlburt, 1997).

Whereas observations of single moments in an individual's experience are fundamental to understanding consciousness, they are not easily acquired. The interview process to capture the details of momentary experience in a faithful way requires knowledge and skill, and proficiency in these skills requires practice (Hurlburt & Heavey, 2003). *Exploring Inner Experience* (Hurlburt & Heavey, 2006), provides written details of techniques and concepts essential to DES, as well as descriptions of DES interviews, and so might be useful in the training of DES investigators. In addition, Hurlburt & Schwitzgebel (2007) provides complete printed transcripts of DES-type interviews with commentary about the advantages, disadvantages, and adequacy of the questions and answers. However, neither Hurlburt & Heavey (2006) nor Hurlburt & Schwitzgebel

(2007) were designed specifically as training manuals, and even if they were, the print medium is inherently limited in its effectiveness as a DES training tool because the written word is at times inadequate for communicating the nuances of an interview method that depends on understanding the intention of subjects as they imperfectly struggle to describe experience that is not itself directly available to the investigator.

Thus the DES interviewer requires substantial skill that must be acquired with substantial guidance and practice, but the written format may be inadequate in providing the materials necessary for that guidance and practice. In the effort to provide accessible training in the DES methodology in a more expressive format, the current project developed a multimedia training tool that focuses on specific components of DES and presents potential interviewers with real life examples and interactive learning. This project is intended to complement the existing literature as an in-depth and experiential training instrument that allows interested parties the opportunity to see the written material about DES in action.

## CHAPTER 2

### MODERN EXPERIENCE SAMPLING METHODS

#### **Questionnaires**

The modern psychology of experience relies heavily on questionnaires, objective retrospective self-report measures that collect ratings of their inner experience from research participants. Psychologists have developed a number of questionnaires for assessing various components of inner experience since Galton first created a measure of mental imagery in 1883 (Klinger, 1978).

Questionnaires that relate to inner experience may focus narrowly on specific aspects of inner experience or may attempt a more comprehensive understanding of inner experience. One such “comprehensive” measure of inner experience is the Phenomenology of Consciousness Inventory (PCI; Pekala & Levine, 1981), which contains questions related to 12 areas of consciousness: state of awareness, altered experience, volitional control, self-awareness, rationality, internal dialogue, positive affect, negative affect, imagery, attention, memory, and arousal (Pekala, 1982). The respondent is asked to rate 53 items on 7-point Likert scales. By contrast, some questionnaire measures of inner experience focus on quite specific topics and ask the responder to indicate his or her degree of identification with statements about that topic. One such scale, the Inner Experience Questionnaire (IEQ; Brock, Pearlman, & Varra, 2006) attempts to measure the concept of self-capacities, including subscales dedicated to affect tolerance, self-worth, and inner-connection. Participants mark their agreement with statements such as “Knowing someone loves me comforts me” on Likert scales (Brock, Pearlman, & Varra, 2006).

In recent years, researchers have made efforts to incorporate neuroimaging technology, such as functional Magnetic Resonance Imaging (fMRI), into the process of assessing experience with questionnaires. One such assessment, the Resting State Questionnaire (ReSQ; Delamillieure et al, 2010), inquires about inner experience while in the fMRI magnet in a semi-structured manner, exploring five predetermined categories of mental activity: visual mental imagery, inner language (split into two subtypes, inner speech and auditory mental imagery), somatosensory awareness, inner musical experience, and mental manipulation of numbers. Each participant in this study was

asked, after undergoing an 8-minute fMRI session, to report the proportion of that time spent on each of the five categories of mental activities. The participants rated their times spent on each activity on a 0 -100% scale such that ultimately their reports had to add up to 100%. After these proportions were reported, the researchers asked a series of questions for each category of inner experience. For thoughts, researchers used a decision-tree intended to determine whether the participant's thoughts were related to ongoing learning, memory, or thoughts about the future. At each branch of the decision tree, the researcher asked whether the reported thought had an emotional charge (positive or negative). For reported inner musical experience, participants were asked whether the experimental context had induced the musical experience or the music was independently generated. For numerical manipulation, researchers asked about the complexity of the activity (e.g., counting, simple math, or complex math). In addition to the category-specific questions, researchers asked questions to gather more details about the inner experience, such as "Were the mental images in color?" and "Was the inner speech related to object/place/people?" (Delamillieure et al, 2010).

The main benefit of questionnaires is that the items are always identical for all participants. Additional benefits include their ease of use for both subject and researcher, the small amount of time required for administration, the cost-efficiency in terms of time, training, and energy from the researcher, and the end result of quantitative data that may be more easily analyzed and interpreted than open-ended data.

However, questionnaires may not fully capture an accurate account of an individual's inner experience, as the phrasing of the questions and the answer choices may influence a participant's answers (Schwarz, 2008). For example, Norenzayan and

Schwarz (1999; 2006) studied the influence on participants' responses of changing one word on a questionnaire. In one group, the 20-question measure was printed on letterhead reading "Institute of Political Research," while in a second group, the same questionnaire was printed on "Institute of Psychological Research" letterhead. Participants were asked to respond to open-ended questions. The results (2006) showed significantly more responses focused on socially meaningful aspects of the self (such as political party affiliation and ethnicity) when participants believed the questionnaire originated in the Institute of Political Research than when they believed the questionnaire originated in the Institute of Psychological Research. These findings are a clear example of the tendency of participants to answer questionnaires in a socially desirable way (Ferrando & Anguiano-Carrasco, 2010). Certainly, the wording of a given questionnaire impacts the respondent to some degree, thus clouding the apprehension of pure accounts of inner experience.

A second disadvantage of questionnaires in consciousness research is the fallibility of human memory. As time passes between an event and the recollection of that event, the memory of it decays (Ericsson & Simon, 1980; Kahneman & Tversky, 1982). In particular, memory for personal events (autobiographical memory) becomes less accurate over time, with specific details fading so that self-memories become increasingly general (Conway & Pleydell-Pearce, 2000; Williams, 2006). Also, research suggests that life events can interfere with the accessibility of memories over time, which indicates that recall of subjective experience should be recorded as close in time as possible to the experience itself (Robinson, 1976).

Thus the limitations of memory interfere with the accuracy of information provided on questionnaires with regard to the ability to recall specific instances of a particular behavior. For example, a questionnaire might ask a person to recall the approximate number of times over a specific period that he or she engaged in inner speech. Research indicates that when asked frequency questions, people do not recall individual instances and count them; rather, they recall one specific instance and estimate based on that (Bradburn, Rips, & Shevell, 1987; Sudman & Schwarz, 1989). In addition to the likely inaccuracy of such estimations, this type of recall and extrapolation is problematic for inner experience research in particular because participants may be unaware of some instances of an inner experience within a few seconds of its occurrence. Without having been asked previously to pay special attention to each instance of inner speech, a person may engage in inner speech at some particular time and a few seconds later be unaware that they had done so or engage in non-inner-speech experience and mistake it for inner speech.

Thus questionnaires have the advantage of time- and cost-effectiveness, place minimal demands on subjects, and produce quantifiable results. Despite these advantages, questionnaires are limited in their ability to capture unbiased reports of inner experience, due to the effects of question and answer choice wording, imperfect memory for inner experience, and imprecise heuristics for recalling subjective experiences. These disadvantages make questionnaires an undesirable methodology for apprehending high fidelity accounts of subjective experience.

### **Experience Sampling Method (ESM)**

Because of the limitations of retrospective measures such as questionnaires, some researchers have turned to methods designed to reduce or nearly eliminate retrospection. One such method, the Experience Sampling Method (ESM), was developed in the mid-1970s by Csikszentmihalyi, Larson, and Prescott (1977) in hopes of gaining a deeper understanding of the relationship between inner experiences, behaviors, and situational factors in a participant's everyday environment (Hormuth, 1986; Csikszentmihalyi & Larson, 1987).

ESM provides participants with a programmed electronic device such as a pager or a wristwatch that produces a signal on a preset but quasi-random (unpredictable) schedule. When signaled, the participant is to answer a self-report questionnaire (Experience Sampling Form; ESF) about his or her experience, including close-ended Likert scale questions about affect, activity level, cognitive efficiency, and motivation, as well as open-ended questions pertaining to social context, engagement in activity, thought content, location, and time of day. This form takes approximately 2 minutes to complete, and participants are typically signaled approximately 7 to 10 times per day for seven consecutive days. The immediacy of reporting is intended to reduce errors in describing experience that result from the passage of time and fallibility of memory (Csikszentmihalyi & Larson, 1987). Using immediate reporting, and both scaled and open-ended questions, ESM obtains information about inner experience that is difficult to capture using standard psychological measures (Klinger & Kroll-Mensing, 1995).

ESM has typically been completed using a pencil-and-paper method, in which case the participant completes a paper copy of the ESF questionnaire in response to the signal by marking answers to each question. This method is cost-effective, as many

subjects can simultaneously participate in ESM, and there is no risk associated with the possibility of lost or damaged equipment. It does not provide the opportunity to randomize the order of questions, nor does it provide any data related to participant compliance with regard to timeliness of responses. In more recent ESM studies, the questionnaires are presented on handheld electronic devices (e.g., a Palm Pilot), which allows for randomized order of the questions. This method also provides the researcher more control over compliance, as it records the times at which the signal was delivered and the questionnaire was answered. In addition to these advantages, computer devices reduce the opportunity for human error in handling the data, and studies indicate that their use increases the likelihood of timely responding when the signal sounds (Barrett & Barrett, 2001). The disadvantages to this method include the risk of electronic malfunctions, problems in programming, setup, and maintenance of each device; and the initial cost of the devices (Stone, Kessler, & Haythornthwaite, 1991).

The aim of ESM is to gain an understanding of a person's experience and behaviors in light of situational factors (Csikszentmihalyi & Larson, 1987), and the method has been used across various populations to explore inner experiences in relation to outside factors (Hormuth, 1986). ESM has been used primarily to study participants' emotions and motivations, and how these affect behavior, as well as the influence of situational factors on behavior. For example, ESM has been used to explore what activities adolescents engage in, how they felt about the activities, and why they engaged in these activities (Csikszentmihalyi, Larson, & Prescott, 1977). ESM researchers have studied a wide variety of issues, including the amount of freedom people perceive themselves to have in daily life (Csikszentmihalyi & Graef, 1980); variations in emotional states of

adolescents (Csikszentmihalyi & Hunter, 2003); gender differences (Graef, 1979); the inner experience of schizophrenia (Delespaul, 1995; Kimhy, Delespaul, Corcoran, Ahn, Yale, and Malaspina, 2007); moods and emotions of mothers with infants (Wells, 1988); and differences in positive and negative emotional experiences among culturally diverse individuals (Scollon, Diner, Oishi, & Biswas-Diner, 2004).

ESM holds several advantages over traditional psychological methods. As evidenced by the wide array of topics and populations studied using this method, there are many possible uses for this type of data collection. ESM can be used to collect information in single cases studies, providing idiographic information, or in larger samples of individuals, rendering more generalized data (Csikszentmihalyi & Larson, 1987). The ability to respond to ESM probes is relatively unaffected by age, SES, education, and mental health state, which makes the method useful in many populations. ESM also places minimal demands on participants, who generally must be able to read, write, and comply with research requirements (e.g., respond in a timely manner to the signal; answer questions truthfully). Another important benefit resulting from the use of ESM is ecological validity: ESM investigates experiences in daily life rather than in artificial laboratory environments. Because ESM gathers data on each participant so frequently, the method makes it possible to collect a large amount of information across a matter of days. In combination with the “in situ” nature of the method, the sheer amount of data collected allows researchers insight into a given subject’s experiences and behaviors in a variety of settings. This can provide an idea of a participant’s typical daily life and patterns of behavior as well as allowing for an examination of how behaviors, cognitions, and affects are influenced by situational variables (Hormuth, 1986).

ESM also has limitations. As with any particular method, it is possible that the participants willing to be a part of ESM studies (which are quite time consuming, and require the disclosure of highly personal information) differ in some significant way from those persons unwilling to participate in such studies (Larson & Csikszentmihalyi, 1983). The ESF questionnaire is a self-report measure, making it susceptible to the drawbacks inherent in any method that relies on self-report: reporting biases and the possibility of purposefully inaccurate reporting, especially when dealing with sensitive information (Klinger & Kroll-Mensing, 1995). ESM also relies heavily on the participant's ability to report accurately about his or her inner experience with no guidance during the data collection about whether he or she is capturing the information of interest to the researcher. Data is not monitored as it is collected, thus, the final result may not be consistent across subjects (Hormuth, 1992).

The nature of the ESF questionnaire also creates potential problems with obtaining pure accounts of experience. While the ESF contains many questions and is intended to be thorough, it is simply impossible to include a question pertaining to every possible participant experience, thus information may be missed due to failure to ask the right question (Stone et al., 1991). Indeed, the questions must be limited out of respect for participant time and willingness to complete the measure many times.

The ESF typically asks both open-ended and closed-ended questions. The open-ended questions on the ESF must be coded into categories by a researcher after all the data is collected. This process leaves room for various interpretations of participant responses on the part of the researcher, as well as wide disparities in respondent style (e.g., a narrative and detailed style as opposed to a factual, minimalist style) that, rather

than the actual content of the response, may influence the way a response is coded. Self-censorship is also a factor in open-ended questions, as participants may under-report phenomena that they find embarrassing or too personal, and may over-report experiences that they consider more socially desirable (Stone, Kessler, & Haythornthwaite, 1991). Because the data are not monitored as they are collected, there is no system of ensuring accurate reporting, or correcting participant or researcher misunderstandings during the process.

While the open-ended questions may leave much room for interpretation from the researcher and participants, the closed-ended questions may limit the participant in responding freely and truthfully (Stone et al, 1991). Though closed-ended questions require less effort from participants, there cannot exist an exhaustive list of possible choices that reflect the experiences of participants, and there is no opportunity to express an experience that is not listed as an option. Because of this, participants may be forced to choose between entirely omitting a report of an experience and choosing an option that is similar but does not truly capture the experience (Klinger & Kroll-Mensing, 1995). As with any closed-ended questionnaire, there is also the risk that participants will interpret a question differently than the researcher intended, and as subjects in ESM studies typically meet with the researcher only prior to and after data collection, there is no opportunity to discuss interpretation discrepancies.

In addition to limitations of the questionnaire itself, the paper-and-pencil format of the ESF also provides no way of knowing whether a participant has responded in a timely manner each time the signal sounds (Barrett & Barrett, 2001). This raises the issue of attempting to recall the moment several minutes after it has passed, a reliance on memory

which the immediate response was designed to avoid. In fact, compliance data for ESM indicates that most participants (as many as 65%) report responding to the signal immediately most of the time, but that 80 to 90% report responding late to the signal on occasion. These participants reported responding up to 18 minutes after the signal at times, which leaves the report susceptible to the fallibility of memory, attempts at reconstruction of the experience, and possibly false reports (Csikszentmihalyi & Larson, 1984; Hormuth, 1986). The use of an electronic device to record responses (and response time) decreases this risk; however, the cost of laboratory equipment and maintenance concerns may pose a problem for many researchers attempting to use the ESM methodology.

### **Ecological Momentary Assessment (EMA)**

The Ecological Momentary Assessment (EMA) method was developed as a modified version of ESM to allow the study of specific behaviors or events in the natural environment. EMA utilizes a similar signaling system to that of ESM (such as a wristwatch, pager, or Palm Pilot) to alert the participant, who is then to fill out an experience questionnaire or take a physiological measurement (e.g., blood pressure) (Shiffman, 2000). Participants are typically signaled several times over the course of a day for a week or more.

EMA was developed as a tool for investigating behavioral medicine with the intention of obtaining ecologically sound information about how people experience various medical illnesses and interventions in their everyday lives (Shiffman & Stone, 1998; Stone & Shiffman, 1994). To this end, EMA was designed to utilize several structured reporting schedules, rather than solely the random schedule of ESM. Researchers may

choose to have the participant respond contingent upon time, in which case reports of experience are given on a pre-fixed time schedule (e.g., every five hours, or each day at noon). A second possible reporting schedule in EMA is similar to that of ESM: participants are asked to respond to a random signal emitted from some electronic device (such as a beeper or wristwatch) with no predetermined schedule. Third, researchers with interest in a particular event or activity may choose to collect response on an event-contingent schedule, in which the participant reports only after the event of interest has occurred (e.g., after a meal or when pain is experienced). Researchers have the option to tailor the participant's reporting schedule to best fit the question of interest in an EMA study (Wheeler & Reis, 1991; Stone & Shiffman, 1994).

As EMA was originally developed to assist in gathering data within the field of behavioral medicine, it has been widely used to measure experience related to medical illnesses, health behaviors, and physiological states (e.g., blood pressure, heart rate, pain, or symptom levels; Stone & Shiffman, 1994). EMA has been used to study a wide variety of health-related topics, including the relationship between smoking and drinking (Shiffman, Fischer, Paty, & Gnys, 1994), the psychological antecedents of migraines (Sorbi, Honkoop, & Godaert, 1996), stress and coping (Bolger & Zuckerman, 1995), eating disorders (Smyth et al., 2001), and cardiovascular disease (Kamarck, Schwartz, Janicki, Shiffman, & Raynor, 2003). EMA studies have included participants aged 10 years to 85 years, and have typically studied their respective phenomena in the context of a specific domain (e.g., behavior, mood, or cognition as related to the particular phenomenon of interest; Stone, Schwartz, Neale, Shiffman, Marco, et al., 1998).

One of the EMA method's most valuable contributions to the experience sampling literature is its body of comparison research that evaluates EMA against traditional (retrospective) methods in psychology. For example, researchers have used EMA to examine the accuracy of pain reporting in patients with chronic pain due to rheumatoid arthritis (Stone, Broderick, Kaell, Delespaul & Porter, 2000). In this study, patients with rheumatoid arthritis were asked to monitor their pain using EMA by responding to several signals each morning, answering questions about their pain experience at the moment of the signal. Participants in this study reported on their momentary pain using the EMA method for seven days prior to an appointment with their primary physician, who then conducted a traditional pain assessment including administering several commonly used retrospective scales that asked the patient to rate his or her pain over the past week on a rating scale. The study found that whereas EMA reports of pain varied according to the moment in which they were assessed, retrospective recall reports tended to over-represent the patient's memory of their highest pain level throughout the week and to over-represent the patient's most recent experiences of pain (Stone, Broderick, Kaell, Delespaul & Porter, 2000).

Another important comparative study was conducted by Stone et al. (1998), examining coping experiences assessed by EMA as compared to retrospective recall. The researchers used a sample of men and women who reported high levels of work or marital stress; they were to use a palm-top computer to answer a questionnaire immediately at being signaled during a two day period, and then to recall their coping strategies for a specific stressful event 1 to 2 days after the event. In the EMA process, when the signal sounded, participants were first asked whether they were thinking about,

discussing, or doing something about a conflict or issue. They were then asked to choose what type of stressor it was from a list of common stressors related to work, marital stress, or other problems, and to rate their level of stress on an 11-point scale.

Participants were asked about coping for only one stressor at each signal, even if multiple stressors were reported. Coping was assessed using questions selected from two commonly used coping questionnaires. In the retrospective recall phase, participants were asked to recall their coping strategies for the most stressful event that they had reported during the two days. Participants recalled their coping both in a brief interview and by filling out the same questionnaires as they had during the EMA phase. The study indicated that there were discrepancies in reporting of coping between items the recall and EMA assessments, ranging from 8.6% to 40.2% of participants for different questions. Behavioral coping items were more likely to be over-endorsed on retrospective recall, whereas cognitive coping items were more likely to be under-endorsed on recall as compared to the response on the original EMA report. Overall, the correspondence between the EMA report of coping and the retrospective recall showed a notable change in reporting across a matter of days.

Another comparative study that reveals the utility of a momentary sampling method such as EMA was conducted by Anestis, Selby, Crosby, Wonderlich, Engel, and Joiner (2010) and examined reporting of mood lability in women with bulimia nervosa. This study compared EMA reports of affective lability with self-report questionnaires about affective lability as predictors of bulimic behaviors and global eating disorder scores. Participants in this study used a palm-top computer to respond to six semi-random prompts each day for two weeks. Once signaled, participants answered the same set of

questions about mood, stress, and bulimia-related behaviors between that moment and the previous prompt, so that each day was divided into six roughly equal time periods. In addition to the prompted responses, participants answered the set of questions immediately after engaging in any of a list of bulimia-related behaviors. The same women also filled out several self-report measures of affective lability. These methods were then compared as predictors of global eating disorder scores on the Eating Disorder Examination (EDE) and number of binge eating episodes. The results indicated that the EMA affective lability data predicted both global EDE scores and number of binge eating episodes, whereas the self-report measure (Dimensional Assessment of Personality Pathology-Basic Questionnaire, Affective Lability subscale, DAPP-BQ) was an accurate predictor of EDE score but not of the number of actual binge eating episodes. This study suggests that using EMA to gather information about affective lability was more effective as a predictor of binge eating than was the self-report questionnaire information on affect lability (Anestis et al, 2010).

EMA research has contributed greatly to comparison literature examining this method versus retrospective recall methods of gathering data, and there are notable benefits to using EMA. This method obtains data about the phenomena of interest in the real world, as they occur, which lends ecological validity and generalizability to the results (Stone, Shiffman, & DeVries, 1999). Also, EMA gathers information about how symptoms, behaviors, and events are experienced in daily life. Such information is difficult or impossible to access in a laboratory setting (Stone et al., 1999). The immediate reporting aspect of EMA also lessens the impact of memory and retrospective biases on the information gathered (Hufford, Shields, Shiffman, Paty, & Balabanis, 2002; Stone &

Shiffman, 1994). The phenomenon of interest is measured at several time points throughout the day, over the course of several days or weeks, which provides a picture of the phenomenon in a variety of contexts. This also allows the researcher to observe how different circumstances and events may influence or change the phenomenon of interest (Stone & Shiffman, 1994). Because EMA data are typically collected using palm-top computers, researchers have access to the time of prompting for a response as well as the time at which responses were posted. This provides the researcher with valuable information about response latency (Hufford et al., 2002; Stone & Shiffman, 1994). This technology also allows for subsequent questions to change depending on answers to preceding questions, serving as a sort of customized question sequence (Stone & Shiffman, 1994). Furthermore, EMA is ecologically valid, accessing phenomena in a naturalistic setting (Stone & Shiffman, 1994).

There are also limitations in the use of EMA. In particular, response latency has been a factor across studies, with widely variable times between prompting and response entry. Farchaus and Corte (2003) reported that in their study of eating disordered behaviors, only 45% of participants recorded their information within a timely manner, and at least 15% reported recording data within 2 hours of the prompt. While a 2 hour delay is shorter than the time delay typical of most retrospective self-report measures, even a short delay can lead to the loss of particular details, especially when reporting a complex phenomenon. The loss of details could lead to inaccurate reporting about the target phenomenon (Friedman & deWinstanley, 1998). The response latency issue may raise some concerns about the validity of EMA data. Additionally, because EMA uses palm-top computers to record data, researchers interested in this methodology must make a

significant financial investment as well as have a fairly sophisticated understanding of technology. Participants must also have enough technological understanding and training on the device to use it properly (Stone et al, 1999). The use of palm-top computers also cannot prevent the loss of data associated with participants forgetting to carry the device, silencing it, or rushing through the questionnaire due to time pressure from other responsibilities (Farchaus & Corte, 2003).

In addition to palm-top computer drawbacks, there are inherent obstacles in the repeated-measures design of EMA. Because data is gathered numerous times over the course of many days, the resulting data set for one participant can be extensive. This puts a burden on the researcher to manage large amounts of data. In addition, EMA requires participants to train in self-monitoring, then record responses repeatedly each day for the duration of the study (Stone & Shiffman, 1994). This type of time commitment in order to participate can create a selection bias and may increase attrition rates (Stone et al, 1999). For instance, participants with high stress jobs in which they cannot stop at any given moment (e.g., professional drivers, construction workers) may have more difficulty recording data at a semi-random prompt (Shiffman, Stone, & Hufford, 2008). There is also the question of reactivity, that is, whether the mere act of observing and monitoring one's own behavior, affect, and cognitive processes may somehow impact those same phenomena (Hufford et al., 2002). The possibility of reactivity in the EMA design may make it difficult to gather an accurate report of the phenomena, making predictions about dependent variables based on the observations of those phenomena suspect.

In fact, several studies have examined reactivity in EMA with mixed results. Hufford et al. (2002) found that a participant's motivation to change (in this case, reduce drinking

behavior) acted as a moderator on the effects of reactivity. Farchaus and Corte (2003) and Litt, Cooney, and Morse (1998) found little evidence of the impact of reactivity on their results.

A final disadvantage that arises in using EMA is that gathering accurate data depends on the participant's willingness to disclose honestly (Shiffman, 2000). As in any self-report-reliant research, there is the potential for distortions in data due to purposeful or inadvertent biases in self-presentation due to embarrassment, shyness, or incorrect perceptions (Farchaus & Corte, 2003). This may be particularly problematic when participants are signaled to respond while they are in a public place or a place where others might see their responses.

### **Think Aloud (TA)**

The Think Aloud (TA) method is used to assess cognition, what and how a person is thinking as he or she is engaged in a prescribed task (Davison, Vogel, & Coffman, 1997; Ericsson & Simon, 1984). This method generally involves having a participant verbally express thoughts as they occur during a task. TA has been used for many years, including in the 1950's to study problem-solving skills in college students (Bloom & Broder, 1950) and in the 1960's to study the thought processes of average and superior chess players (de Groot, 1965). The TA method grew out of a need for a modified take on the failed methods of introspectionism and was aimed at accessing the ongoing lived experience of the participant (Aanstoos, 1983).

In TA studies, participants are asked to perform some task, such as a math problem, and describe their concurring thoughts as they do so, to "think aloud." The TA technique assumes that people have an ongoing inner monologue, a stream of constantly

flowing thoughts that can be articulated out loud. Participants are recorded as they engage in this activity and the recordings are subsequently transcribed and content coded by a researcher (Davison, Navarre, & Vogel, 1995).

TA studies have focused on cognition during a wide variety of tasks. For example, one study recorded the think aloud procedure in low-income African American women as they purchased fruits and vegetables (Reicks, Smith, Henry, Reimer, Atwell, & Thomas, 2003). Other studies have used the think aloud strategy as a tool in understanding how participants evaluate a self-report questionnaire while filling it out (Darker & French, 2009; French, Cooke, McLean, Williams, & Sutton, 2007). Additionally, studies have used TA as a tool in attempting to change thinking, focusing on various populations and tasks (e.g., Camp, Blom, Hebert, & van Doorninck, 1977).

Recent TA studies have focused on using this technique to assess cognitive processes in educational research. Such studies have examined attention and reading comprehension (Davison et al, 1997), as well as assessing the effectiveness of educational tools. For example, one study asked students to navigate through a learning website and verbalize their thoughts as they did so. The results of this study suggested that TA was potentially useful in assessing e-learning tools, but that certain methodological obstacles needed to be addressed. These included the problem of varying abilities of participants to attend to their inner monologue and to verbalize their thoughts as they occurred (Cotton & Gresty, 2006).

Other TA studies have examined thinking aloud in particular clinical groups. For example, Barnhofer, de Jong-Meyer, Kleinpa, and Nikesch (2002) studied depression using the TA method. Participants were shown a positive or negative cue word (happy, safe, lonely, sad) and asked to recall an autobiographical event. In the two minutes after

viewing the cue word, participants verbalized their thoughts as they came into consciousness. The process was recorded, transcribed, and coded for the number of memories verbalized and how detailed each memory was. Participants who were diagnosed with depression reported experiencing fewer specific memories, and more general memories of events in a particular category, suggesting that the depressed individuals tended to over-generalize during memory retrieval.

The TA method has the advantage of collecting information immediately as it occurs, notably minimizing the problem of imperfect retrospective recall. Because cognitions are verbalized as soon as they occur, there is very little time lapse between the experience and its description, which decreases the need for speculation about the participant's thought process in a given moment (Davison, Navarre, & Vogel, 1995). TA is also relatively unstructured, which lends flexibility to the process that allows it to be used in a wide variety of settings, and does not stunt the participant's response by asking specific, possibly limiting questions.

The TA technique also has limitations. A major drawback to using this method arises in the laboratory setting in which participants are asked to behave. Because this method occurs in a laboratory rather than participants' everyday lives, it has been criticized for lacking ecological validity (Genest & Turk, 1981). Indeed, there is no way to know whether thinking in a laboratory setting occurs in the same way as thinking in the natural environment. In addition to the manipulated environment, critics of TA note that attending to cognitions and verbalizing thoughts while inner experience is happening may be a difficult task for many participants, and a person's ability (or lack thereof) to divide attention in this way may affect the outcome (Davison, Navarre, & Vogel, 1995).

It has also been suggested that participants may only be able to express a small portion of their thought process, since thoughts can come into and leave awareness so rapidly. Additionally, the process of verbalization may interfere with the thought process, leaving the participant to report only some of his or her cognitions (Klinger, 1975). Participants may also exclude some thoughts that they deem irrelevant because they are not related to the task they have been asked to do, limiting their verbalized thoughts to only what has to do with the task at hand and keeping potentially important information from the researcher (Davison, Navarre, & Vogel, 1995). In addition to the complications with accessing thoughts and getting complete information about thoughts, there is also the issue of inner experiences that are not cognitive in nature. Research indicates that inner experience can consist of many phenomena, including feelings, inner hearing, inner speech, sensory awareness, imagery, and other experiences that do not lend themselves easily to verbalization (Hurlburt & Heavey, 2006). In light of this, the TA technique seems particularly poorly suited for accessing the full breadth of inner experience that may or may not come in the form of thoughts that can be stated rapidly enough to keep up with the pace of the task. And even if non-verbal types of inner experience are expressed during a TA task, it is likely that the process of converting, for example, a visual image into a thought spoken aloud would destroy the richness of that phenomenon as it was experienced.

### **Articulated Thoughts in Simulated Situations (ATSS)**

The Articulated Thoughts in Simulated Situations (ATSS) paradigm was developed as a modified form of the Think Aloud method (Davison, Robins, & Johnson, 1983), and, like TA, assumes that people have an ongoing stream of thoughts to which a

person can easily attend (Davison, Navarre, & Vogel, 1995). In ATSS studies, participants are exposed to a hypothetical scenario either on a video or audio recorder and asked to imagine themselves in that scenario, either as an active participant or as an engaged observer. While so imagining, participants verbalize their ongoing thoughts. The hypothetical situations may be designed to elicit a variety of emotions from the participant (Eckhardt, Barbour, & Davison, 1998; Zanov & Davison, 2009).

Because the emotional content of hypothetical situations can be manipulated, ATSS has been used in many studies examining emotions in a variety of populations. In particular, ATSS has contributed to the literature on anger and aggression. Eckhardt and Kassino (1998) presented maritally distressed violent and marriage-satisfied non-violent men with a scenario in which they overheard a conversation in which their wife criticized them to a female acquaintance and one in which another man flirted with the participant's wife. The men in the study articulated their thoughts as they occurred, and the results were recorded and coded according to content and structure. Maritally violent men expressed more irrational and dysfunctional thoughts during the simulated situations, whereas the non-violent men verbalized more thoughts related to anger control strategies. In further studies, Barbour et al. (1998) found that for maritally violent men, a self-report measure of the use of psychological and physical aggression in dealing with marital conflict significantly correlated with their ATSS verbalizations of aggression in reaction to the same scenarios described above. In addition to the large body of ATSS studies on marital violence, researchers have examined anger and aggression in adolescent populations (e.g., DiLiberto et al., 2002; Rayburn et al., 2007).

ATSS has been used in a wide variety of research areas, including studies of anti-gay bias (Rayburn & Davison, 2002), phobia of flying (Moller, Nortje, & Helders, 1998), distorted and irrational thinking (Eckhardt & Kassionove, 1998), and smoking cessation (Pearlman, 2004). Some studies have also used ATSS before and after therapy to assess cognitive change (Szentagotai, Lupu, & Cosman 2008).

Some of the advantages to using ATSS are similar to other experience sampling methods, including a minimization of retrospective recall errors and immediate responding (Zanov & Davison, 2009). Another important advantage to the use of the ATSS paradigm is the specificity of situations that can be used in imaginary research, which allows for examining quite particular (albeit imaginary) situations, and also allows flexibility in the subject matter that can be explored using this method (Zanov & Davison, 2009). ATSS, like TA, also allows for unrestrained responding on the participant's part, as there are no specific questions to be answered (Zanov & Davison, 2009).

The drawbacks to the ATSS paradigm are similar to those encountered in TA: ATSS is not an ecologically valid method; the cognitive processes observed in the laboratory setting may not accurately reflect cognition in the real world. This is a particular problem because in ATSS, people are asked to respond in a hypothetical manner to an imagined scenario. Responses during this process may or may not be characteristic of responding in a similar real-world situation. There is also the potential that scenarios presented to participants may not be realistic or powerful enough to allow the participant to become engaged in imagining or react in the way researchers intend. ATSS also has the problem of potential reactivity; the act of observing and verbalizing

one's thought process may change the nature of the thought process itself. And, like TA, this method may not capture all of a participant's inner experience. There may be censored reporting of thoughts that seem off-topic or socially unacceptable.

Additionally, the thought process of a participant is accessed in a very limited period of time, so cognitions that occur infrequently are unlikely to be observed, though they may be relevant to the research question. Another limitation to ATSS is that as with TA, the act of observing and commenting on one's own experience may be quite taxing for some individuals (Zanov & Davison, 2009; Davison et al, 1997).

A further problem with ATSS is that because responding is open-ended, the recorded responses are interpreted by a researcher. This may lead to misunderstandings or misinterpretations of the participant's responses that distort understanding of the participant's actual experience (Davison et al, 1997).

### **Thought Listing**

The Thought Listing approach to experience sampling presents participants with some stimulus (e.g., a description of an immediately upcoming experience, an audio recording, or a problem to solve), and then asks that participants list everything about which they had been thinking in a short period of time after presentation of the stimulus. Typically, the time in which participants are to respond ranges from 45 seconds to 10 minutes, with the ideal response time being around 2 minutes, as too little time may result in incomplete reporting and too much time can lead to listing of thoughts that are unrelated to the stimulus (Cacioppo & Petty, 1981). Thought listing is intended to access an individual's thoughts in response to a stimulus, with the underlying assumption that the thoughts listed represent the internal cognitive process elicited by the stimulus

(Cacioppo, von Hippel, & Ernst, 1997). After thoughts are listed, judges rate the thoughts on a variety of dimensions, including content, thought target (e.g., self vs. others), and valence (Cacioppo, von Hippel, & Ernst, 1997).

Thought listing has been used to study a variety of areas ranging from social phobia (Heimberg, Bruch, Hope, & Dombek, 1990), to test anxiety (Blankstein & Flett, 1990), romantic relationships (Van Lange & Rusbult, 1995), and assertiveness training (Bruch, Hamer, & Kaflowitz-Linder, 1992). In a thought listing study of social anxiety, Mahone et al. (1993) showed male participants a picture and personal statement from an attractive female and told each participant that he would be having a conversation with the woman in a few minutes. Participants were then asked to list their thoughts about themselves and their future conversation partner. Afterward, participants engaged in a 5 minute conversation with the woman, in which they were observed for anxiety behaviors. In this study, negative thoughts about the self-predicted lower self-efficacy and higher reported social anxiety. Greater numbers of positive thoughts about the future conversation partner predicted a greater number of observed anxious behaviors. The authors concluded that the focus of attention played an important role in understanding the nature of cognitions about social anxiety.

Advantages of thought listing include that the thought lists are created after the task is complete, so the thought listing process does not impact the task itself (Blackwell, Galasso, Galassi, & Watson, 1985). This method can also be administered to many participants at once, and seems to be useful for accessing the evaluative cognitive process (Blackwell et al., 1985). There is also a minimal time period between presentation of the stimulus and creation of the thought list, which presumably decreases the impact of

retrospective recall errors. Additionally, the thought listing method does not require a notable amount of training beforehand and is economical in terms of time and equipment.

There are also disadvantages to thought listing. That participants list their thoughts after the stimulus has concluded invites retrospective recall errors, particularly in cases of complex inner experience that are not easily recalled. There also may be limitations to having participants write their cognitions, as the writing process could prove cumbersome, may lead to abbreviated or less-than-thorough reports of cognitive processes, and may be difficult or impossible if the original cognition was not verbal. In addition, because thought listing occurs after the fact, post-task thoughts may interfere with the listing process (Cacioppo, von Hippel & Ernst, 1997).

### **Diary Methods**

Diary methods consist of any methodology that requires participants to keep a self-report narrative over the course of some amount of time (Bolger, Davis, & Rafaeli, 2003; Breakwell & Woods, 1995). Diary methods generally aim to do two things: to capture phenomena as they occur over time in everyday life, and to examine specific phenomena (Bolger et al, 2003). Participants in a diary study are instructed to record their thoughts, emotions, or behaviors related to a particular phenomenon over time, in contrast to a personal diary, in which subject matter could vary greatly across time, and focus on many aspects of a person's life.

In inner experience studies, participants record their experiences at several times throughout the day on a protocol sheet that lists categories determined by the experimenter (Bolger, Davis, & Rafaeli, 2003). There are three types of diary contingencies that designate when a participant should record information: interval-contingent, signal-contingent, and event-contingent. In an interval-contingent study, participants record data at fixed times

throughout the day for a predetermined period of time (e.g., twice daily for two weeks). In a signal-contingent diary study, participants respond each time a signal (wristwatch, pager) sounds. Signals may be set to sound randomly, at a fixed ratio, or a mix of random and fixed ratio schedules. In an event-contingent study, participants are to record diary information whenever a specific event occurs, as set by the experimenter (e.g., an anxiety attack, an episode of pain, or the bingeing or purging of eating disorder).

Some researchers also use electronic devices to record diary information. Such devices can include palm top computers, like those used in ESM and EMA studies, and personal digital assistants (PDA's, Bolger et al, 2003; Suveg, Payne, Thomassin, & Jacob, 2010). Paper-and-pencil diary methods are still more commonly used, largely due to the prohibitive cost of electronic diary methods (Bolger et al., 2003). There is some evidence to suggest that electronic diaries lead to higher compliance rates from participants. One study by Stone et al. (2002) placed photosensors on the paper diary to record the times it was opened, and compared paper-and-pencil diarists to those using the electronic device. In this study, 90% of paper-and-pencil participants reported full compliance, whereas information from the photosensors showed actual compliance rates as low as 11%. This suggests that some participants fabricated diary entries that should have been recorded at a specific time about a specific event. By contrast, diarists who had used the palm top computer had a 94% compliance rate as measured by time stamps on the device itself. This set of results suggests there is notable value in utilizing electronic diary tools in these types of studies.

One example of a diary study examined household water-use habits by comparing water diaries with free recall and prompted recall methods (Wutich, 2009). In the diary method, participants were given forms on which to record their water use each day for a week, filling in information when they did one of thirteen water-specific behaviors

(related to food preparation, hygiene, cleaning, etc). In the prompted recall condition, participants were to answer questions about their use of water in the same thirteen categories over the preceding seven days. In the free recall group, participants were asked to report how much water they used but were not prompted with specific types of water use. The reports were then compared to objective water use statistics from the local department of water. In this study, the diary method provided the most accurate report of water use, based on known parameters. The prompted recall method was accurate for some types of water use (hygienic and food preparation), but not accurate for others (household cleaning tasks). The free recall condition was the least accurate of the three, with participants notably underestimating their water use. The comparison of methods in this study indicated substantial utility in using diary methods over retrospective methods.

Diary studies have been used to investigate many aspects of everyday life such as chronic pain (Turunen, 2008), family and marital relationships (Laurenceau & Bolger, 2005), and work motivation (Navarro, Arrieta, & Ballen, 2007). This method has also been used to study clinical behaviors, such as sexually risky behaviors (Morrison-Breedy, Carey, Feng, & Tu, 2008), alcohol use in adolescents (Koning, Harakeh, Engels, & Volleberg, 2010), and the relationship between cannabis use and psychosis (Kimhy, Durbin, & Corcoran, 2009). The use of diary methods covers a wide variety of topics and can be used in accessing information about many types of behaviors.

The diary method has some notable advantages. First, diaries reduce the errors that may arise from retrospective recall, as it is assumed that participants record their information immediately at the time they are supposed to (Bolger et al, 2003). Diary

studies gather information on how a phenomenon may present differently over the course of a single day as well as changes that may occur over a longer period of time (Bolger et al, 2003). Perhaps the most important advantage to using diary methods is their capability to collect rich narratives in which participants disclose highly personal information over the course of time (Thiele & Baumann, 2002). Such detailed qualitative information would be extremely difficult to gather using closed-ended questionnaires, one-shot methods, or retrospective recall tasks (Hektner & Csikszentmihalyi, 2002).

There are also disadvantages of diary methods. A major obstacle in diary studies is the time commitment required from participants. Typically, participants are expected to fill out the same diary form multiple times per day for the course of anywhere from a week to months (Bolger et al, 2003). The task of staying interested and motivated to report accurately can be trying for participants, and though some researchers have attempted to shorten the response requirements, the trade-off is that the data collected is less in-depth. In addition to the inherent obstacle of time, some studies may be designed to measure phenomena during which recording in a diary will be intrusive, such as work habits, social interactions, or being in class. Researchers must then design studies that will be as unobtrusive as possible, which may create a selection bias in who is able and willing to participate. There also appears to be a diminishing return over time, as the quality of responses decreases the longer a person is involved in a study (Stone et al., 1991). Because of the sizeable commitment of time and effort, diary studies may have high attrition rates (Bolger et al., 2003), and there may be some qualitative difference between participants who stay the duration of the study and those who drop out (Stone et al., 1991).

Diary methods also face the problem of adherence to the protocol. Over time, participants may habituate to the protocol and rush through the questions rather than fully attending to each question each time they respond. There is also the problem of ensuring timely responses. Research on compliance indicates that people may be recording outside the ideal window of time, or perhaps even fabricating entries when they have forgotten to record (Stone et al., 2002), and this type of responding will likely only worsen in longer studies (Stone et al., 1991).

Another important drawback to the use of diary methods lies in the potential for self-presentation and reactivity bias (Bolger et al, 2003). The experimenter and participant in most diary studies meet once at the beginning and once at the end of data collection. Because the actual data is collected separate from the researcher, there is little control over how data is recorded, how well the participant adheres to response times, and whether or not participants report completely and accurately. With no monitoring of data collection, a participant could be doing something incorrectly from the beginning, and never be corrected. The lack of interaction between the researcher and participant also makes it difficult to know whether the participant was truthful in reporting (Thiele & Baumann, 2002). In some cases, participants may have some embarrassing experiences that they do not wish to record, and may be tempted to fabricate some other experience or leave out sections of information. This problem would not be discovered until data collection had concluded (Thiele & Baumann, 2002). The problem of reactivity may be especially influential in studies of sensitive phenomena, as participants who are made more aware of the phenomenon through the act of recording may become increasingly sensitive or embarrassed in their recording (Thiele & Baumann, 2002).

## **Descriptive Experience Sampling (DES)**

Descriptive Experience Sampling (DES) is an idiographic, exploratory variation on inner experience sampling methods developed by Hurlburt (1976, 1990, 1993). DES is intended to gather faithful descriptions of an individual's inner experience at a given point in time (Hurlburt & Heavey, 2006), and describes inner experience as whatever is present in conscious awareness at any moment (Hurlburt & Heavey, 2002, 2006). DES attempts to gather descriptions of an individual's inner experience at random, single moments in time, and collects a series of these at-the-moment experiences to create an idiographic characterization of a person's inner experience.

The DES procedure requires that participants carry a beeper in their everyday environments. The beeper emits a beep randomly through an earphone, and participants are asked to respond immediately to that beep by writing down notes about whatever was in their inner experience at the last uninterrupted moment before the beep sounded, which DES calls the "moment of the beep." The participant then resets the beeper and continues on with the everyday activities. This process is repeated several (usually 6) times on a sampling day. As soon as possible after the beeps are collected, within 24 hours, an "expositional" interview takes place. During this interview, experimenters discuss each beeped moment with the participant in an effort to develop as clear, detailed, and precise an understanding of each moment as possible. Participants are also allowed to decline to discuss any beep for any reason they wish.

In DES studies, participants collect beeps and are interviewed on several different days, to allow the "iterative" building of the skills necessary to apprehend and report inner experience (Hurlburt, 2009). This multiple-day process also allows subjects to

obtain a sampling of experience at different points in time, in addition to obtaining samples of different moments in the same day. DES does not place any specific demands on what type of experience the participant should focus on, but samples whatever experience naturally happens to be ongoing in an individual's daily activities. At the end of the data collection period, the investigator has four or five sampling days of beeped experiences to examine thoroughly for salient experiential similarities across the samples. Examining these characteristics of the experience at each beep can allow for the creation of an idiographic description of an individual's inner experience.

Hurlburt and Heavey (2002) demonstrated that DES can be a reliable method in a study of 10 participants who were interviewed about the same beeped moments by two independent interviewers. In this study, the samplewise (interobserver) and participantwise reliability was measured for five common elements found in inner experience (inner speech, feelings, unsymbolized thinking, sensory awareness, and images; Hurlburt & Heavey 1999; 2006). The samplewise reliability ranged from .52 to .92 for this study, and the participantwise reliability ranged from .91 to .98. The observer agreement fell between 83% and 97%.

DES is an idiographic and exploratory method in that it focuses on a single individual at a time and does not impose parameters on the types of experience or activities in which the experimenter is interested. This method allows for in-depth exploration of a person's inner experience, resulting in vivid and unique idiographic descriptions that provide the groundwork for hypotheses that can later be tested empirically and/or clinically. The question of validity in the case of DES lies in whether DES actually apprehends a faithful account of experience, and whether that experience can be validated with the participant

(Hurlburt & Heavey, 2006). DES is an ecologically valid method that collects data from participants in their natural environments, rather than laboratory settings. Because the experience apprehended in DES studies is extracted from an individual's daily life, the experience is likely characteristic of that person's everyday experience and generalizable to the real world. In fact, it is an essential aspect of DES that every effort is made to generate descriptions that are characteristic of the reality of an individual's experience in his or her natural environments (Hurlburt, 1997; Hurlburt & Heavey, 2006).

In DES interviews, several topics are of note to the interviewer. The interviewer must help the participant pinpoint the exact moment of the beep. Without accomplishing this first step, interviewing can be difficult, as the interviewer and the subject may not be talking about the same moment in time or about experience at all (Hurlburt & Heavey, 2006). Interviewers must also be able to identify when participants are engaged in responding and when they appear to be off track or unsure of what they are saying, as this could indicate that the interview has not yet focused on the moment of the beep or is not aimed at the subject's experience.

One tool that the interviewer uses in this regard is the identifying of "subjunctification," any vocalization or behavior that indicates that the subject has strayed from describing experience at the moment of the beep. That is, subjunctification is a term used to describe anything that gives an indication that the subject's words should not be considered a faithful, straightforward description of experience (Hurlburt, 2011). Some common examples of subjunctifiers include any verb form in the subjunctive mood (e.g., "If I were to describe..."), as this verb form indicates that what follows is contrary to fact. Subjunctification can also appear in the form of generalities

and theoretical statements (e.g., “I usually...”, or “I must have thought...”), which indicate that the subject is in fact not describing exactly what was experienced at the specific moment of the beep. Undermining expressions, such as “like” or “I guess” can also indicate subjunctification, as can behaviors that indicate uncertainty, such as shrugs or looking up and away from the interviewer while describing experience (Hurlburt, 2011). The interviewer must be aware of subjunctification and often interprets its presence to mean that the participant is not yet talking about his or her experience at the moment of the beep. Subjunctification “density,” the frequency with which subjunctification occurs, is one way the interviewer can determine whether the subject is talking about direct experience at the moment of the beep. If the use of subjunctification is frequent (dense), the interviewer may remain skeptical that the subject is describing experience. If the subjunctification density is low (that is, the use of subjunctifiers is infrequent), the interviewer can be more confident that the subject is indeed talking about direct experience. Subjunctification density is not a perfect barometer of whether the subject is giving a straightforward account of experience, but it provides evidence for the interviewer to consider. Recognizing subjunctification during a DES interview is an important skill in interviewing with the aim of accessing faithful accounts of experience.

DES studies vary widely in their population of focus. Though DES investigators do not typically ask participants to focus on any particular time, behavior, emotion, or event, DES has been used in many populations to gather information about inner experience. Some DES studies focus on one individual’s experience, describing in detail the unique experience of one unique person (Hurlburt & Akhter, 2006; Hurlburt & Schwitzgebel, 2007). Other DES studies investigate particular clinical populations, such

as individuals with depression (Hurlburt, 1993), schizophrenia (Hurlburt, 1990), Asperger's syndrome (Hurlburt, Happe', & Frith, 1994), or bulimia nervosa (Hurlburt & Jones-Forrester, 2011), or people who share some trait or characteristic, for example rapid speech (Hurlburt, Koch, & Heavey, 2002) or left-handedness (Mizrachi, 2009). In these types of studies, participants each complete some number of sampling days and DES interviews and each individual subject is considered idiographically, just as described above. Then the sampled experiences from all the shared-trait participants are examined for salient characteristics inner experience that emerge across participants (Hurlburt & Akhter, 2006). Thus the across-participant procedure begins at the bottom, with the idiographic faithful apprehending of a single moment of experience from a single person, and then proceeds upward to the "nomothetic" characterization of the inner experiences of a group of same-trait individuals.

Here are some examples. DES has been used to investigate the inner experiences of individuals with psychiatric diagnoses in common. Some studies have focused on participants diagnosed with schizophrenia (Hurlburt & Melancon, 1987, Hurlburt, 1990), which have found a tendency to experience distorted, tilted, or inaccurate images, and also to experience exceptionally clear emotions. Another study investigated the inner experience of individuals with a diagnosis of Asperger's disorder (Hurlburt, Happé, & Frith, 1994), finding that the participants either had no inner experience or had images but little or no other features of inner experience. This is consistent with reports by teachers of individuals with Asperger's syndrome that imagery is the preferred method of problem solving (Schoper et al., 1980), by parents of individuals with Asperger's syndrome (Park & Youderian, 1974), as well as by Asperger's syndrome individuals

themselves (Grandin, 1992). In addition to this predominantly visual pattern of experience, participants in this study were not curious about whether their experience was like that of others; most DES participants are quite curious about that (Hurlburt, Happe', & Frith, 1994). DES studies of anxiety (Hebert & Hurlburt, 1993) have suggested that anxious individuals experience higher proportions of self-criticism and criticism of others. DES studies of depression (Hurlburt, 1993) have suggested that depressed individuals experience more unsymbolized thinking (thinking that is not characterized by words or images) than those who were not depressed.

DES has also been used in exploring the relationship between inner experience and externally observable variables. For example, Hurlburt, Koch, and Heavey (2002) investigated the link between inner experience and external speech rate (measured in words per minute). In this study, participants who had higher speech rates experienced more multiple awarenesses (25.9%) when compared to controls (7.1%). Participants with high speech rates also experienced a higher frequency of “just doing” whatever activity in which they were engaged, with no accompanying inner experience.

Thus DES has been used to examine inner experience in a variety of populations, and, similar to other experience sampling methods, is focused on ongoing-at-particular-moments experience. DES differs from other methods conceptually and methodologically in important ways.

**Focus on experience at the moment of the beep.** DES, like other sampling methods, aims to access experience at the moment it occurs. DES uses a device that provides the participant with an unambiguous signal (beep) to cue responding and delineate the “moment” of interest (Hurlburt & Heavey, 2002). In DES, the beep sounds

at a random moment and is not contingent on any particular event, behavior, or experience. DES also distinguishes clearly between the last uninterrupted moment before the beep sounds (“the moment of the beep”), what comes into awareness as a result of the beep, what was happening in the environment, and what was being experienced before the moment of the beep (Hurlburt & Heavey, 2006). DES focuses entirely on experience at the moment of the beep. Precision about the moment of the beep reduces the risk of retrospection, interpretation, or explanation on the part of the subject, as anything not directly experienced in the moment is eliminated from consideration in DES. This highly specific demarcation of the parameters of the moment also assists in ensuring that the interviewer and interviewee are focused on and talking about the same instant, and thereby, the same inner experience.

**Iterative.** DES is an iterative process (Hurlburt, 2009), due to the fact that introspection is a learned skill (Hurlburt, Koch, & Heavey, 2002) that is not easy but that may be possible with training (Hurlburt & Heavey, 2003). Attending to and reporting on the moment of the beep is a process that benefits from practice over several attempts. Because the topic of DES interviews depend entirely on a person’s unique experiences, participants may not have a clear idea of what types of questions they will be asked before collecting their first sampling day’s beeps. During the first-day interview, the participant is asked specific questions to get closer to an understanding of what was in his or her experience at the moment of the beep. This process, while foreign on the first day, allows the participant to learn, over the course of several days, what exactly the experimenter is interested in knowing about his or her experience.

Typical participants are able to become competent in attending to and describing their experience in a satisfactory amount of detail within about 3 interviews. The process allows for progressive improvements in apprehending the moment of the beep with each iteration of the interview. At times, participants take longer to gain a working understanding of what is being asked of them, but the majority of participants are able to successfully complete the task (Hurlburt & Heavey, 2006).

**Bracketing presuppositions.** Presuppositions are preconceived ways of apprehending something. Presuppositions exist and are maintained without evaluation, and interfere with the ability to experience the world as it is (Hurlburt & Heavey, 2006). The term “bracketing presuppositions” refers to the setting aside of these preconceived assumptions in order to approach phenomena with openness to any possibility. In DES, bracketing presuppositions is imperative for accessing and understanding the inner experience of a unique person who is no doubt different from the interviewer. By bracketing presuppositions, DES experimenters are able to encounter phenomena that go against their preconceptions without discarding any phenomenon because it might seem strange or foreign. This is vitally important to allowing for reports of experience that are unlike one’s own, or unlike anything expected.

The bracketing of presuppositions is important not only for the interviewer, but also for participants as they apprehend and describe their inner experience. Thus it is the task of the DES investigator to help the participant acquire the taste for and skills of bracketing presuppositions. This is another reason that the DES procedure must be iterative.

**Performance art.** DES is an acquired skill not only for the participant, but for the experimenter who interviews to clarify and obtain details about experience that result in a faithful account of experience at each moment. There are written descriptions of the process of DES (Hurlburt, 1990; 1993 2011; Hurlburt & Akhter, 2006; Hurlburt & Heavey, 2001; 2002; 2004; 2006; Hurlburt et al., 2002; Hurlburt & Schwitzgebel, 2007), that depict the skills needed to conduct a DES study, but a written medium is inadequate for fully capturing the nuance involved in the difficult task of helping a participant provide a faithful description of his or her experience at the moment of the beep. The current project speculates that in fact, the experiential nature of DES interviewing could be better expressed through the use of an interactive multi-media tool that breaks down important components of DES interviewing and gives real-life examples for those who are interested in learning how to do DES. The end result of the current project was to develop such a tool.

## CHAPTER 3

### INTERACTIVE TRAINING TOOLS

Other researchers have created interactive learning tools intended to assist in teaching psychological skills. For example, Ekman's (2006) subtle expression and micro expression training tools are designed to teach potential researchers how to identify facial expressions associated with seven emotions: sadness, anger, fear, surprise, disgust, contempt, and happiness. These multi-media tools are on CD-ROM, and include computer-generated faces that alternate between the target expression and neutrality. The learner is expected to identify and label an emotion after its corresponding micro expression passes across a neutral face. The learner then receives immediate feedback

stating that they are either correct or wrong, and at the end of the training, the learner is given a total correct score. The subtle- and micro-expression training tool was one of the first stimulus sets available to be used in experimental work (Ekman, Friesen, & Tomkins, 1971).

### **The DES Interactive Multi-Media Training Tool**

The DES laboratory at University of Nevada, Las Vegas has begun an ongoing project to create an interactive training tool for individuals who want to learn how to do DES. To this end, Hurlburt (2007) created a prototype for the training tool to be called the Descriptive Experience Sampling Interactive Multimedia Professor (DES-IMP). The goal of the IMP is to provide individuals interested in learning how to do DES with a hands-on, highly descriptive, interactive learning opportunity. When the DES IMP is complete, the training modules will include three basic kinds of training modules, (a) those aimed at teaching DES skills; (b) those aimed at teaching how to recognize particular experiential phenomena; and (c) those that provide complete illustrative DES interviews with commentary.

The skill-training modules (a) include (1) Recognizing the moment of the beep, (2) Recognizing an engaged response, (3) Recognizing a disengaged response, and (4) Recognizing subjunctification. The content-training modules (b) will focus on helping the learner gain an understanding of frequently occurring phenomena of inner experience including (5) Recognizing sensory awareness, (6) Recognizing inner speech, (7) Recognizing inner seeing (aka images), and (8) Recognizing unsymbolized thinking. The illustrative interviews (c) will present complete interviews with commentaries inserted at relevant places with the intention of giving the learner some insight into how DES

interviews take place and why the interviewer is asking particular questions or interpreting particular answers.

Bensaheb (2009) developed the IMP architecture by presenting an early version of the IMP to 12 focus groups to get feedback on what could be changed in the structure of the IMP or its interface to make the tool better, easier to navigate, clearer, and so on. Changes included adjusting the location of navigation buttons so they could be seen simultaneously with the training materials, adding numbers to the command buttons (e.g., 1 – Play) to indicate the order in which the learner should click through the tool, and adding an introduction to give an overview of the feature of experience being presented and provide context at the beginning of the module.

As the result of this process (and the evaluation of two IMP modules by Bensaheb, 2009, described below), a general architecture of the IMP was developed. The IMP would be a series of modules presented by a computer. For each module, the IMP will show a brief introductory video-lecture on the concepts to be covered and then a series of 10 to 20 video clips, each culled from real DES interviews (that is, not staged or acted). Because the clips are from actual DES interviews, they will contain a variety of subjects and interviewers and show individual differences in the presentation of the same phenomenon. The clips will be arranged in order of complexity to build the learner's skill progressively.

The goal of the IMP is to present a DES topic in a way that facilitates learning on several levels, and allows the learner to play an active role in the learning process. To this end, the tool is interactive; the learner is able to play and replay portions of all materials as they please, and receive feedback on their input.

**Evaluation of the IMP.** Bensaheb (2009) evaluated the effectiveness of the IMP architecture by examining two of its (part b) content-training modules, (5) Recognizing sensory awareness and (8) Recognizing unsymbolized thinking. Sensory awareness is a phenomenon in which an individual is focused on a sensory feature (e.g., color or texture), rather than an instrumental aim (Hurlburt 1990, 1993; Hurlburt & Heavey, 2006; Hurlburt, Heavey, & Bensaheb, 2009). For example, if you are walking out the door and reach for the door handle to open it, that is *not* sensory awareness—you are reaching for the handle for its instrumental function as a door-opening device. By contrast, if you are walking out the door and as you reach from the door handle you notice the particular golden glint of the reflection of the nearby light fixture, then that *is* a sensory awareness—the golden glint has no particular instrumental function and yet it occupies your experience. Sensory awareness can be focused on events within a person (e.g., a pain or itch) or events outside the person (e.g., the grayness of rain clouds). Sensory awareness is a distinct phenomenon, not just a part of normal perception, as the individual's experience centers around the sensory aspect of an event or item (Hurlburt, Heavey, & Bensaheb, 2009).

In unsymbolized thinking, an individual experiences a clear, precise thought that has no symbols as part of the experience. That is, there are no words, images, sensory awareness or any other defined, symbolic aspect of experience (Hurlburt 1990, 1993; Hurlburt & Heavey, 2006; Hurlburt & Akhter, 2008). The experience of an unsymbolized thought is clear and unambiguous; you have direct conscious access to the content of the thought even though there are no symbols that present that thought to you.

To evaluate the sensory awareness module of the IMP, Bensaheb (2009) had one group of participants use the IMP sensory-awareness module and another group read an essay describing sensory awareness. Then the mastery of sensory awareness concepts was compared between groups. That process was repeated, with different subjects, for unsymbolized thinking. For both sensory awareness and unsymbolized thinking, the group that had used the IMP exhibited a significantly better understanding of the phenomenon. In fact, the results showed that for sensory awareness, no single essay participant showed as much mastery of the sensory awareness concept as did the average IMP user. For the unsymbolized thinking module, only 24% of the essay group participants mastered the concept as well as did the average IMP learner. These results indicate that the IMP is an effective training medium for the mastery of concepts important to DES, and that there may be substantial value in continuing the development of modules to extend the range of DES topics that can be trained using the IMP.

## CHAPTER 4

### DESIGN OF SUBJUNCTIFICATION AND INTERVIEW MODULES

#### **Methods**

The process of creating the subjunctification and interview modules of the DES IMP began with selecting DES interviews to feature. The tasks required for the subjunctification and for the interview modules differed; each will be described below.

For the subjunctification module, the task of selecting clips involved searching through hours of unscripted DES interviews with a variety of interviewees to find examples where the interviewee's description of experience is heavily subjunctified as well as other instances where the interviewee's description of experience is not

subjunctified, approximately 30 in all (not all of which were included in the final product). Then the task was to weave these clips together into an effective training tool. Because there is no widely accepted template for such a training tool, the design of the subjunctification module required a number of iterations. Serving as writer, producer, and editor, the author filmed Dr. Hurlburt providing an introductory video lecture, which provides a brief introduction to subjunctification so the learner has a foundation from which to begin the training tool. To this was appended the first attempt at a sequence of subjunctified and unsubjunctified video clips.

We viewed this first draft and sought feedback. As a result, we concluded that the module needed a turning point to transition the learner from looking for individual instances of subjunctification to becoming sensitive to overall subjunctification density. Therefore the author (again serving as writer, producer, and editor) and Dr. Hurlburt created the mid-module lecture video lecture designed to provide a review and an introduction to subjunctification density.

That, we judged, was an improvement, but we still sought ways of improving the impact of the video presentations. We tried a variety of formats: including or not including a title, description, or question for each clip; including or not including an on-screen transcript of the audio; long and short forms of feedback; including and not including lists of subjunctifiers present; including and not including specific questions for the learner to answer; including and not including an explanation of why a particular subjunctifier was counted as a subjunctifier; and so on. The iterative evolution was mainly through joint considerations by the author and Dr. Hurlburt; on two occasions versions were presented to the DES lab at UNLV for feedback. All these iterations

resulted in alterations of format, exchanges of some clips for others, adjustments to the scripts accompanying clips, and editing of the timing and progression of the module.

This procedure evolved into the final module. In the first half of the module, we created a sequence where each clip would be presented as it had originally occurred, then presented again with verbal subjunctifiers marked in real time on the clip, so that the learner could recognize exactly what counted as a subjunctifier as it was happening; and then presented a third time with the behavioral subjunctifiers marked on the clip for the same immediate-feedback reason. These marked clips were created using video editing software. The clips presented after the mid-module lecture focus on subjunctification density, therefore were not marked with specific instances of subjunctifiers. Toward the end of the module, examples of the same interviewee engaged in subjunctification and engaged in unsubjunctified descriptions of experience were presented so that the learner could practice the discrimination between them.

Like the subjunctification module, the interview modules were the result of an iterative approach to determining how to capitalize on the video medium to present effectively an entire DES interview (or large portion thereof). The first part of this task involved selecting interviews that were fair representations of typical DES interviews process and recording commentary for those interviews. These selections and commentaries were typically made either immediately after the interview was completed or within 24 hours. After we had created six of these interview/commentaries, we selected the two that seemed most representative.

Once full interviews were selected, we experimented with a variety of ways of presentation, including with and without transcripts of the audio commentary, with and

without time stamps on the original interviews, and so on. Eventually this evolved into a procedure where the interviews were divided into clips that coincided with the timing of interviewer commentary, using video and audio editing software. These clips were manually labeled with 15-second timing notations using the editing software in order to maintain the continuity of the interview for the learner despite the interview's division into short clips. Video and audio clips were also edited for sound quality and volume. After the clips were edited and the timing notations set, an html file in a similar format to the previous IMP modules was created. To individualize this format to each interview, page titles, questions or commentary reflecting the content of the page, and clip file names were added to the html file.

## CHAPTER 5

### RESULTS

Bensaheb (2009) created two part-b modules of the IMP (5: Recognizing sensory awareness and 8: Recognizing unsymbolized thinking). The current project advanced the IMP by designing one part-a training module (4: Recognizing subjunctification) and three part-c illustrative interviews with commentary (Clinton Day 3, Clinton Day 4, and Michael Day 1 beep 1). These four modules are themselves the main results of this project; they are included in a DVD that is attached.

#### **Subjunctification module**

The part-a training module that the current project created teaches the skill of recognizing subjunctification. The module is 55 electronic pages in length and teaches the learner two main skills: recognizing specific instances of subjunctification and becoming sensitive to overall subjunctification density.

The module begins with an introductory video that presents Dr. Russell Hurlburt describing in a brief lecture format the concept of subjunctification and why it is important to DES interviewing. He provides examples of different types of subjunctification (e.g., verbs in the subjunctive mood, approximations, behavioral subjunctifiers) and how to recognize them.

After the lecture video, the learner interacts with a series of video clips that show real DES subjects engaged (or not engaged) in subjunctification. The series begins with a very straightforward example of subjunctification, and the clips become progressively more sophisticated as the module continues. For each clip in the series, the learner views the clip and then answers a question about that clip (i.e., What verbal subjunctifiers did you identify in the clip?) by typing her response into a text-entry cell provided by the computer. Then she advances to the next screen to receive feedback about her answer. Here, the learner can advance immediately to the next clip or replay the current clip.

The first two clips are each presented in a five-part format. (1) The learner watches the clip to answer the question of whether there is subjunctification in the clip. (2) Then the learner is shown the clip again and asked to list the verbal subjunctifiers they observe. At both these steps, the computer gives the learner written feedback. (3) The learner then watches the same clip with a transcription of each verbal subjunctifier (e.g., “um, you know...”) superimposed on the screen at the time the verbal subjunctifier occurs. The transcription is presented at the top of the screen at the exact time it occurs to show the learner exactly what she is to be observing. (4) The original clip is then presented again, this time with the instruction that the learner is to list the *behavioral* subjunctifiers they observe. As in step 2, she receives feedback in the form of a list of

behavioral subjunctifiers. (5) The learner then watches the same clip with a description of each behavioral subjunctifier (e.g., “shrugs” or “looks up”) superimposed on the screen at the time the verbal subjunctifier occurs.

This five-part presentation (general sense of subjunctification, identify verbal subjunctification, view clip with verbal subjunctifiers transcribed, identify behavioral subjunctifiers, view clip with behavioral subjunctifiers marked) is repeated across a total of five clips. Then there is an additional series of three sets of clips, now in four parts, omitting the original general sense. All these have the pedagogical aim of helping the learner develop the skill of recognizing specific instances of subjunctification. Though listing individual instances of subjunctification is not required in conducting a DES interview, the learner must be able to recognize specific instances in order to get a general sense of subjunctification in the broader context of the subject’s response.

After these five specific-instance sequences of clips, the learner sees Dr. Hurlburt present a lecture that reviews the concept of subjunctification and introduces the notion of “subjunctification density,” the relative frequency with which subjunctification occurs. The main subjunctification skill in DES is not so much to identify specific instances of subjunctification but to learn to recognize immediately when subjunctification is frequent (“dense”) and not.

After this lecture, the learner is presented with 10 new video clips, each with the task of determining whether the clip shows high or low density subjunctification. The clips alternate irregularly, showing both high and low density examples, often showing the same subject engaged in both densities of subjunctification. The pedagogical goal of this sequence is to attune the learner’s overall sense of subjunctification, a skill which is

important in conducting real DES interviews. For these clips, the learner is asked to answer the question “Is this high or low density subjunctification?” and receives feedback after their answer.

After navigating through both the recognize-specific-instances and the recognize-subjunctification-density sequences, the learner is presented with a final video montage of clips of subjects engaged in subjunctification.

### **Illustrative interview modules**

In addition to the module on subjunctification in DES, the current project created three part-c modules that each present illustrative DES interviews with commentary. Two of these are full DES interviews; one presents only the interview from the first sample on the first sampling day. All provide commentary from the interviewer(s). The pedagogical aim of these interviews-with-commentary modules is to provide learners the opportunity to observe examples of real DES interviews, hear the interviewer’s rationale for asking a particular question, expose the interviewer’s interpretation of the process of the portions of the interview, and to hear the interviewer’s comments on other aspects of the interview. Each interview video is presented in its entirety, but each is interrupted frequently for audio commentary from the interviewer. This format allows the user to see the flow of questions in an interview embedded within the perspective of the DES interviewer. These are typical examples of DES interviews, and were not chosen due to any notable ease or difficulty of the interview in comparison to other interviews.

Each illustrative interview begins with a brief introduction of the subject and interviewer as well as the context of the interview. Then the interview video is presented from beginning to end, broken up into segments. Each video segment is marked with a

time stamp that moves in 15-second intervals. Accessible on the same page as the time-stamped video segment, an audio recording of the skilled interviewer's commentary on the preceding segment is presented. Commentaries include the interviewer's rationale for asking a particular question, his or her perspective on something the subject has said, and so on. Timing notations are provided so that the learner can see the progress of the interview from beginning to end. After the audio commentary, the learner can replay anything of interest or proceed to the next segment of interview video and commentary.

The two full interviews with commentary came from the subject Clinton's third and fourth days of sampling. By the third and fourth day, subjects typically have a grasp of what DES interviewers want to know about their experience, and how to discuss experiential moments with a bit more sophistication than on previous days, and that was also true for Clinton. Dr. Hurlburt was the sole interviewer for these interviews, and he provides commentary on both interviews. The third illustrative interview component of this project consists of the first day, first sampled moment for Michael with commentary from the interviewers. His interview was conducted by Dr. Hurlburt and two graduate students, Johanah Kang and Stacy Reger. This particular day and beep illustrates the difficulty of the open-beginning approach of the DES procedure. It also illustrates the common pitfalls encountered by interviewers in the process of learning how to do DES interviews.

The results of this project are intended to provide DES training tools and information for researchers and students interested in learning how to perform DES. The subjunctification module trains a DES interviewing skill and the three illustrative interviews provide examples of typical DES interviews. As part of the DES IMP

project, these components contribute to the ongoing efforts of the DES laboratory at UNLV to allow other researchers access to DES.

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# Stacy Lynne Reger, M.A.

## Curriculum Vitae

### CONTACT INFORMATION

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### EDUCATION

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- August 2008-present      Doctor of Philosophy, Clinical Psychology  
*University of Nevada, Las Vegas (UNLV)*  
Major Advisor: Russell T. Hurlburt, Ph.D.  
Expected Date of Completion: May 2013
- May 2008                      Master of Arts, Clinical Psychology  
*California State University, Northridge (CSUN)*  
Major Advisor: Luciana Laganà, Ph.D.  
Thesis Title: "Stress and PTSD Symptomatology in  
Ethnically Diverse Elderly Women."
- June 2005                      Bachelor of Arts, Psychology (*Magna Cum Laude*)  
*Pepperdine University, Malibu, CA*

### AWARDS AND HONORS

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- 2011    Poster Presentation Award, Third Place, Nevada Psychological Association 2011  
Annual Conference
- 2011    Poster Presentation Award, Fourth Place, 3<sup>rd</sup> Annual Meeting of the American  
College of Professional Neuropsychology
- 2010    Elected Member, The Honor Society of *Phi Kappa Phi*
- 2008    Robert V. Rainey Memorial Award: Outstanding Graduate Student, California  
State University Northridge
- 2008    Student Travel Award, California State University Northridge, \$500
- 2007    Selected for Teaching Intern Program, California State University, Northridge
- 2004    Elected Member, Golden Key International Honor Society
- 2004    Elected Member, *Alpha Chi* Honor Society
- 2003    Elected Member, *Psi Chi* Honor Society

### RESEARCH EXPERIENCE

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- 8/08-12/11    **Master's Thesis:** *Descriptive Experience Sampling Interactive Multi-  
Media Training Tool for Subjunctification and Illustrative Interviews*  
University of Nevada, Las Vegas  
Supervisor: Russell Hurlburt, Ph.D.

This project continued the development of an interactive multi-media methodological training tool for researchers learning the Descriptive Experience Sampling (DES) method. The training module I created was part of an ongoing DES lab project focused on training researchers to recognize the phenomenon of “subjunctification” in DES expositional interviews. Participants in DES studies sample moments of their inner experience using a beeper that sounds randomly. After collecting six beeps, DES investigators conduct an interview to gather a faithful account of the participant’s inner experience at the moment of each “beep.” The term “subjunctification” refers to any cue that informs the researcher that the subject is not giving a straightforward description of experience (e.g., speaking in generalities, inferring causation for his or her experience, behavioral indicators of uncertainty). The subjunctification training module includes a series of video clips of real participants engaged in subjunctification, and allows the learner to interact in the learning experience presented on a computer. This project also includes video examples of full expositional DES interviews with commentary from the interviewer.

08/06-05/08    **Master’s Thesis: *Stress and PTSD Symptomatology in Relation to Physical Health in Ethnically Diverse Elderly Women***  
California State University, Northridge  
Supervisor, Luciana Laganà, Ph.D.

This study examined the correlations between PTSD symptomatology and physical health, and between perceived stress and physical health in elderly women. A sample of 124 community-dwelling, cognitively healthy women age 65 and over were assessed for PTSD symptoms, perceived stress, and physical health status along four dimensions. Results indicated that stress is a significant predictor for poor general health perceptions, but not role limitations or physical functioning, while PTSD symptoms significantly predicts limitations in role fulfillment, and impaired physical functioning, but not the poorer perception of health. Age and income also predicted physical health. Results indicated that perceived stress and PTSD symptomatology manifest differently in terms of physical health, with implications for the mechanism behind each, and for how each should be treated within the population of elderly women from diverse ethnic backgrounds. A manuscript based on this research was published (see below).

02/03-05/05    **Undergraduate Research Project**  
Pepperdine University  
Supervisor: Tomàs Martinez, Ph.D.

This study examined the relationship between trauma and psychopathology in youth on probation in the California court system as compared to the relationship between trauma and psychopathology in youth incarcerated in juvenile hall. The study used The Massachusetts Youth Screening Inventory-Second Version (MAYSI-2) to examine symptoms of PTSD, along with other psychopathology in 103 participants aged 11 to 18 who were either on probation or incarcerated in juvenile hall. Results of the study indicated that youth with more justice system experience (the incarcerated group) reported significantly higher frequency of trauma experiences than the probation group,

as well as significantly higher rates of depression and anxiety symptomatology. This pattern of results suggests that juveniles in the justice system are exposed to trauma anxious and depressive symptoms across time in the justice system.

### **PEER-REVIEWED PUBLICATIONS**

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Laganà, L., & **Reger, S.** (2009). A pilot study on perceived stress and PTSD symptomatology in relation to four dimensions of older women's physical health. *Aging & Mental Health, 13* (6), 885-893.

### **MANUSCRIPTS UNDER REVIEW**

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Thaler, N. S., **Reger, S. L.**, Ringdahl, E. N., Mayfield, J., & Allen, D. N. (submitted). Neuropsychological profiles of six children with anoxic brain injury. Submitted to *Child Neuropsychology*.

### **PUBLISHED ABSTRACTS**

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**Reger, S. L.**, Thaler, N. S., Mayfield, J., & Allen, D. N. (2011). Constructs mediating Trail Making Test for Children performance in pediatric traumatic brain injury. *Applied Neuropsychology, 18*, 236.

### **PROFESSIONAL PRESENTATIONS**

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Hurlburt, R. T., & **Reger, S. L.** (June 2011). *Aspects of Pristine Experience*. Invited presentation at "First-Person Methods of Exploring Consciousness" convention, Berkeley, CA.

**Reger, S. L.** & Hurlburt, R. T. (April, 2011). Descriptive experience sampling interactive multi-media training tool for subjunctification and illustrative interviews. Poster presented at the 2011 Nevada Psychological Association Annual Conference.

**Reger, S. L.**, Thaler, N. S., Mayfield, J., & Allen, D. N. (March, 2011). Constructs mediating Trail Making Test for Children performance in pediatric traumatic brain injury. Poster presented at the 3rd Annual Meeting of the American College of Professional Neuropsychology, March 11-13, 2011, Las Vegas NV.

Martinez, T. & **Reger, S.** (April, 2005). Trauma in probation youth: The need for mental health services. Poster presented at the 85<sup>th</sup> Annual Western Psychological Association Conference, Portland, Oregon.

Martinez, T. & **Reger, S.** (May, 2004). Trauma in probation youth. Symposium presentation at the 2<sup>nd</sup> Annual Family Violence and Sexual Assault Institute "Violence in the World of Our Youth" Conference, San Diego, California.

### **CLINICAL TRAINING**

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Pre-Doctoral Practicum Training

8/11-present **UNLV Counseling and Psychological Services**

**Las Vegas, Nevada**

*Supervisor: Shauna Landis, Psy.D.*

I conduct intakes and provide supervised brief psychotherapy to a diverse university student body presenting with a variety of psychological concerns, commonly including depression, anxiety, and relationship problems. I conceptualize cases from a psychodynamic and interpersonal perspective, and conduct psychotherapy using interpersonal, psychodynamic, and solution-focused approaches.

8/10-8/11 **Desert Regional Center**

**Las Vegas, Nevada**

*Supervisors: Leanne Earnest, Ph.D., and Brian Lech, Ph.D.*

I conducted eligibility assessments with individuals with intellectual disabilities and developmental disabilities to determine whether or not each person is appropriate for state-funded developmental services. Each assessment typically consisted of a cognitive measure, an adaptive measure, and if indicated, an autism rating scale. My assessment clients ranged from young children to older adults. I also maintained an individual therapy caseload of between two and four clients presenting with psychological concerns including anxiety, depression, adjustment difficulties, relationship problems, and behavioral dysregulation. At DRC, I was trained in a variety of theoretical approaches, including interpersonal, cognitive-behavioral, and behavioral, as my DRC clients had a wide range of concerns and intellectual functioning levels. I co-led three 8-week Dialectical Behavior Therapy skills training groups with my supervisor, Dr. Earnest. I also presented cases for consultation to both the group of psychologists working at the Las Vegas DRC and to all the psychologists at regional centers statewide in Nevada as part of routine case consultation practices at DRC.

08/09-8/11 **Center for Individual, Couple, and Family Counseling, UNLV**

**Las Vegas, NV**

*Supervisors: Marta Meana, Ph.D., Michelle Carro, Ph.D.*

I provided supervised long-term individual psychotherapy in a department-based community mental health clinic. My caseload consisted of seven adult clients at a time from diverse backgrounds with a variety of Axis I and Axis II diagnoses. I was responsible for conducting intakes, case conceptualization, treatment planning, diagnosis, and crisis intervention. Supervision was from an integrative approach, drawing from psychodynamic, interpersonal, and cognitive-behavioral theories to plan treatment.

05/09-05/10 **Psychological Testing and Assessment Clinic, UNLV**

**Las Vegas, NV**

*Supervisors: Paula Emke-Franics, Ph.D., Michelle Carro, Ph.D.*

I conducted psychodiagnostic assessments with adults and children, typically to determine the presence of attention and hyperactivity problems and learning disorders. Assessment batteries typically included testing for cognitive and achievement abilities, as

well as personality, memory, and DSM-IV-TR symptoms. I was responsible for conducting clinical intake interviews, testing, report writing, and providing feedback to clients.

#### Pre-Masters Practicum Training

01/07-05/07 **Parent Child Interaction Program, California State University, Northridge**  
**Northridge, CA**

*Supervisors: Dee Shepherd-Look, Ph.D., Ellie Kazemi, Ph.D.*

I conducted training in Applied Behavior Analysis to parents of children with autism. I co-lead parenting training groups that covered topics in behavioral training of children with autism. I also conducted in-home training with one family for ten weeks that included a functional analysis, data collection, behavior planning with the parents and implementation of the behavior plan. As part of this practicum experience, I also prepared lectures for and taught two foster-parent education classes.

08/06-08/07 **Anxiety and Mood Disorders Clinic, California State University Northridge**  
**Northridge, CA**

*Supervisor: Jill Razani, Ph.D.*

I provided individual therapy to adults with mild mood disorders, including anxiety, depression, and panic disorder. Supervision and treatment were from a cognitive-behavioral perspective, and I received training in specific CBT techniques, such as progressive muscle relaxation, thought journaling, and assisting clients with behavioral activation.

#### Other Clinical Work Experience

11/05-09/06 **Los Angeles Jewish Home for the Aging, Reseda, CA**

*Position: Social Worker*

I was the primary social services worker for the board and care residence of a nursing home, with a caseload of 105. My primary responsibilities were to advocate for patients living in the home, act as a liaison between the home and residents' families, and provide practical and emotional support for both residents and their family members. In this position, I worked closely with the nursing staff, psychologists, nutritionists, physicians, and rabbi in coordinating care for each resident.

08/05-02-07 **Daybreak Day Center-Santa Monica, CA**

*Position: Relief Staff Member*

I worked as the weekend staff member at a day shelter for homeless women with dual diagnoses. My responsibilities included meal preparation, crisis intervention, and assisting clients with finding resources for housing, job training, mental health treatment, and medical care.

#### **SUPERVISION EXPERIENCE AND TRAINING**

05/11-08/11 **Center for Individual, Couple, and Family Counseling**  
**Las Vegas, NV**

*Supervisor: Michelle Carro, Ph.D.*

I provided supervised supervision of a junior clinical psychology doctoral student at UNLV as she provided individual psychotherapy to clients of diverse backgrounds and diagnoses at a psychology-department-operated community mental health center. Supervision included weekly meetings with my supervisee to monitor her caseload and process with each client, case conceptualization, conceptualization of my supervisee's developmental level and needs, and keeping notes on each client, treatment plans, and the supervision process. Training in supervision consisted of weekly group classes dedicated to learning supervision models, techniques, and research, as well as weekly individual supervision of the supervision process with my supervisee.

## **TEACHING EXPERIENCE**

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08/11-present **Adolescent and Adult Developmental Psychology (PSY 434)**

**Instructor of Record**

**University of Nevada, Las Vegas**

I independently teach two psychology courses per semester aimed at a focused study of psychological aspects of adolescent and emerging adult development. I created lectures, activities, discussions, a paper topic, exams, and assignments for this course.

08/10-05/11 **Introductory Psychology (PSY 101)**

**Instructor of Record**

**University of Nevada, Las Vegas**

I independently taught two psychology courses per semester aimed at providing a basic overview of important topics in psychology. I created lectures, assignments, discussions, class activities, and exams to help students gain an understanding of psychological concepts and research.

08/08-06/10 **Statistical Methods in Psychology (PSY 210)**

**Graduate Assistant to Russell Hurlburt, Ph.D.**

**University of Nevada, Las Vegas**

I assisted in teaching an introductory statistics class for six semesters. My responsibilities included teaching weekly statistics labs, grading quizzes, homework, and exams, teaching substitute lectures for the instructor of record, and keeping grade records throughout the course.

06/07-05/08 **Introductory Psychology (PSY 150)**

**Instructor of Record**

**California State University, Northridge**

I independently taught two semesters of an introductory psychology course providing a basic overview of important topics in psychology. I created lectures, assignments, discussions, class activities, and exams to help students gain an understanding of psychological concepts and research.

06/07-05/08 **Teaching Intern Program**  
**California State University Northridge**  
*Supervisor: Gabriela Chavira, Ph.D.*

I received training in teaching strategies, lecture creation, test development, and building a teaching philosophy. During my year teaching at CSUN, I attended weekly teaching group supervision meetings with Dr. Chavira and four other teaching interns.

## **CLINICAL WORKSHOPS AND TRAINING SEMINARS**

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08/10-present **Psychology Consultation Meetings, Desert Regional Center (DRC)**

Weekly 1 to 2 hour psychology team consultation meetings at a state agency providing services to individuals of all ages with developmental disabilities. I presented cases for consultation and acted as part of the consulting team (consisting of 8 psychologists and myself) when other DRC psychologists presented cases.

2010 **Dialectical Behavior Therapy (DBT) Certification Training**

4-part, 12-day workshop, Nevada Psychological Association, Las Vegas, NV

This training series was led by Alan Fruzzetti, Ph.D., and consisted of one year's worth of training and independent assignments. Requirements for certification at the end of the year included developing a DBT case conceptualization, participating in a DBT consultation team, and co-leading DBT groups. I attended all training seminars, participated on a DBT consultation team at DRC, created DBT case conceptualizations, and provided individual DBT for clients. Supervised at DRC by Leanne Earnest, Ph.D.

2010 **Introduction to Acceptance and Commitment Therapy (ACT)**

1-day workshop, Nevada Psychological Association, Las Vegas, NV  
This workshop was led by Victoria Follette, Ph.D., and focused on the theory and application of ACT.

## **PROFESSIONAL AND SERVICE ACTIVITIES**

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2011 Student Member, Nevada Psychological Association Diversity Committee  
2011 Graduate Student Interviewer, Clinical Psychology Department  
Admissions Interviews, UNLV  
2010-2011 Co-chair, Clinical Student Committee, Psychology Department, UNLV  
2008-2009 Cohort Representative, Clinical Student Committee, Psychology  
Department, UNLV  
2009-2011 Incoming Graduate Student Mentor, UNLV  
2008 Graduate Student Interviewer, Teaching Intern Program, California State  
University Northridge

2004-2005 Secretary, Pepperdine University Psi Chi Psychology Honor Society

### **PROFESSIONAL AFFILIATIONS**

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2009-present Student Member, Nevada Psychological Association

2004-present Student Member, American Psychological Association

### **RECOMMENDATIONS AVAILABLE UPON REQUEST**

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