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## Can Questionnaires Capture Inner Experience? A Validation Study of the Nevada Inner Experience Questionnaire

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CAN QUESTIONNAIRES CAPTURE INNER EXPERIENCE? A VALIDATION STUDY OF  
THE NEVADA INNER EXPERIENCE QUESTIONNAIRE

By

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Bachelor of Arts – Psychology  
College of the Holy Cross  
2009

A thesis submitted in partial fulfillment  
of the requirements for the

Master of Arts – Psychology

Department of Psychology  
College of Liberal Arts  
The Graduate College

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## Abstract

Self-report questionnaires that explore human experience sometimes produce substantially discrepant results from careful sampling-based methods such as Descriptive Experience Sampling (DES). One explanation is that questionnaires may not be inquiring about the same phenomena that sampling discovers. To investigate this, we conducted two studies. Study 1 ( $N=260$ ) created the Nevada Inner Experience Questionnaire (NIEQ), designed to measure the frequency of the same five phenomena of inner experience that DES frequently finds (the “5FP”: inner speaking, inner seeing, unsymbolized thinking, feeling and sensory awareness). Study 1 explored the construct validity of the NIEQ, finding it to be reliable and psychometrically valid. Study 2 ( $N=16$ ) investigated the NIEQ’s criterion validity by engaging participants from Study 1 to participate in DES, exploring the extent to which participants’ DES sampled experience frequencies matched their NIEQ frequency ratings. Correlations between DES and NIEQ frequencies were close to zero, despite the fact that both methods were designed to measure the frequency of the same 5FP. We conclude that there is reason to be cautious about the extent to which questionnaire self-reports provide accurate accounts of actual inner experience.

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## Chapter 1: Introduction and Literature Review

Do people know the characteristics of their own inner experience? The frequent answer is “yes” because people are constantly immersed in their own experiences. Based on the assumption that people have access to their own inner experience, self-report questionnaires are commonly used to explore human experience. However, Hurlburt and Heavey (2015) challenge this assumption and argue that questionnaires, although they may appear to investigate inner experience, may instead investigate judgments, generalizations, beliefs, and so forth, about inner experience (Hurlburt & Heavey, 2015). These judgments, generalizations, and beliefs about inner experience may be presuppositions that interfere with the apprehension of naturally occurring and ongoing inner experience. Self-reports based on presuppositions are not faithful reports of ongoing inner experience, but rather are reports of what one believes/assumes/generalizes to be true about one’s inner experience. Thus there is reason to be cautious about the extent to which self-reports given on questionnaires provide accurate accounts of actual ongoing inner experience.

Hurlburt and Heavey’s (2015) argument is analytical, rather than empirical. They have elsewhere provided some evidence using Descriptive Experience Sampling (DES) that people are sometimes mistaken (perhaps often, and perhaps dramatically mistaken) about their own inner experience (Hurlburt, 2011b; Hurlburt & Heavey, 2006), but those studies do not directly compare DES results to those of questionnaires. For example, Hurlburt, Heavey, and Kelsey (2013) concluded that questionnaires overestimate the frequency of inner speech by comparison to DES results, but that conclusion may be the result of differing definitions of inner speech, and furthermore is not the result of any direct comparison of questionnaires with DES results.

Additionally, any head-to-head comparison of questionnaire reports with DES descriptions are problematic in two important ways. First, questionnaires are not designed to

target what DES claims are the frequent characteristics of inner experience. For example, there are no existing questionnaires that measure unsymbolized thinking (Hurlburt & Akhter, 2008), which Heavey and Hurlburt (2008) claim to be frequent; and even when there are questionnaires in relevant areas such as inner speech (e.g., the Self-Talk Scale or STS; Brinthaupt, Hein, & Kramer, 2009), the targeting is not as precise as in DES—for example, the STS does not distinguish between aloud self-talk and inner speech, whereas DES does make such a distinction. Second, questionnaires are not generally designed to inquire directly about the frequency of characteristics. Questionnaires often provide scenarios and inquire about experience in such situations without regard for the frequency of such situations. For example, the STS is a series of items that start with the stem “I talk to myself when...” and then continue with a series of situations such as “...I should have done something differently” (Brinthaupt et al., 2009, p. 92). The frequency of self-talk therefore depends on the frequency of (for instance) the occasions when one should have done something differently, and that may vary dramatically from one person to the next.

The present study aims to compare questionnaire and DES results head to head while using a questionnaire that overcomes the disadvantages described in the previous paragraph: that is, we need a questionnaire that measures the same phenomena—the five frequent phenomena (“5FP”; Kühn, Fernyhough, Alderson-Day, & Hurlburt, 2014)—that DES describes, and that enquires about the frequency of those phenomena. Such a questionnaire did not exist, so we created the Nevada Inner Experience Questionnaire (NIEQ) and discuss here its adequacy and validity.

Regarding the NIEQ’s adequacy, we examined its factor structure to confirm that the NIEQ was, indeed, measuring the five distinct factors of inner experience included in the 5FP.

Additionally, because there are no other self-report questionnaires that investigate all five phenomena that DES describes, we investigated how well the NIEQ items that measure one distinct and frequently investigated phenomenon—inner speech—correlated with a validated and widely used questionnaire that is often taken as measuring the frequency of inner speaking, the Self-Talk Scale (STS; Brinthaup et al., 2009).

Regarding the NIEQ's validity, we investigated the extent to which the NIEQ predicted DES sampling results.

There are two other studies that directly compare questionnaire and experience sampling results. Hurlburt, Alderson-Day, Fernyhough, & Kühn (2015) examined how a semi-structured resting state questionnaire designed to characterize inner experiences in an fMRI scanner—the Resting State Questionnaire (ReSQ; Delamillieure et al., 2010)— correlated with DES results of sampled experiences in the scanner during resting state. The ReSQ (Delamillieure et al., 2010) is a 62-item questionnaire arranged into five types of mental activity: visual mental imagery, inner speech, auditory mental imagery, somatosensory awareness, inner musical experience, and mental manipulation of numbers. Participants complete the ReSQ using visual analog scales rating the proportion of time spent in each mental activity while in the resting state in an fMRI scanner. Although the ReSQ is not designed to target the five frequent characteristics of inner experience that DES claims to be the most common, two of the mental activity types of the ReSQ (visual mental imagery and inner language) seem directly comparable to DES's inner seeing and inner speaking, respectively. Regarding these two categories, Hurlburt et al., (2015) found discrepancies, including some very large discrepancies, between participants' ReSQ results and their DES sampling results.

Alderson-Day and Fernyhough (2015) also compared questionnaire and experience sampling results, investigating how a generalized self-report measure of inner speech—the Varieties of Inner Speech Questionnaire (VISQ; McCarthy-Jones & Fernyhough, 2011)—correlated with results from a smartphone experience sampling study of inner speech. The VISQ is an 18-item questionnaire that asks participants to rate on likert scales the general characteristics of their inner speech. The app randomly sampled participants twice a day and prompted them to answer four questions about their inner speech at that current moment. The four questions were the highest loading items from each of the four VISQ factors, modified to inquire about the current moment rather than general characteristics. Alderson-Day and Fernyhough (2015) found that smartphone-sampled reports of inner speech were generally of lower frequency than reports of inner speech on the VISQ, and suggested one explanation for the VISQ over-estimation of inner speech: the VISQ does not directly ask about the frequency of inner speech.

There are three main differences among Alderson-Day and Fernyhough's (2015) study, Hurlburt et al.'s (2015) study, and the present study: 1) the present study aims to use a questionnaire that directly measures the frequency of inner experience phenomena; 2) the present study investigates directly the five most frequent phenomena described in previous DES studies (Heavey & Hurlburt, 2008; Hurlburt, 1990, 1993; Hurlburt & Heavey, 2002), thus presumably increasing the relationship between the questionnaire and sampling results; 3) the present study uses an experience sampling method that attempts to apprehend naturally occurring, ongoing inner experience in high fidelity, following the recommendations of Hurlburt and Heavey (2015; cf. Hurlburt, 2011b): a) limit the investigation to specific, clearly identified moments; b) limit examination to pristine experience; c) bracket presuppositions of the participant and the

investigator(s); and d) iteratively increase skill in apprehending experience. These four characteristics distinguish DES from other experience sampling methods including that used by Alderson-Day and Fernyhough (2015).

### **DES and Its Four Distinguishable Methodological Characteristics**

DES is an approach developed by Hurlburt (1990, 1993). The aim of DES is to capture in high fidelity individuals' ongoing inner experience, which Hurlburt (2011b; Hurlburt & Akhter, 2006) termed "pristine inner experience." *Inner experience* refers to one's ongoing thought, feeling, sensation, and so on, that is directly apprehended at some particular moment. *Pristine* inner experiences are undisturbed phenomena that occur naturally in everyday environments (Hurlburt, 2011b). Pristine inner experience in this sense is not to be thought of as clean or immaculate, but rather as natural, uncontaminated, and unaffected by the act of observation and reflection (Hurlburt, 2011b; Hurlburt & Heavey, 2015). A forest that is pristine in the sense that it has been untouched by human exploitation is composed of parts that may be orderly or messy, clean or dirty. Similarly, pristine inner experience can be messy, complex, clean and/or simple, but is pristine to the extent that it is apprehended in its original condition (Hurlburt & Akhter, 2006). Furthermore, pristine inner experience differs from person to person—my pristine experience may differ from yours because we ultimately have different ways of apprehending the world.

DES aims to apprehend its participants' pristine inner experience with high fidelity, meaning this method tries to limit distortions as it glimpses inner experience. DES asks the participant to wear a beeper for 3-4 hours in the natural environment. The beeper randomly delivers a 700 Hz beep through an earpiece; the beep cues the participant immediately to jot down in a notebook what was in experience at the moment before the beep interrupted that

experience; this last-undisturbed-moment-before-the beep is also called “the moment of the beep.” (Of course, it is not entirely undisturbed; the aim is to minimize the disturbance; Hurlburt, 2011b.) During this 3-4-hour period, the participant collects approximately 6 samples of ongoing-at-the-moment-of-the-beep inner experience. Within 24 hours, the participant meets with the DES investigator(s) for an “expositional” interview, designed to help the participant apprehend the naturally occurring experience. This interview uses open-beginninged (Hurlburt & Heavey, 2006, p. 1221) and open-ended questions such as “What, if anything, was in your experience at the moment of the beep?” Participants on their first sampling day typically cannot (or at least do not) discriminate among a) their naturally occurring (pristine) inner experiences, b) what they believe should be in their experience, c) what they believe the investigator wants to hear, and d) their assumptions about the typical characteristics of their experience (Hurlburt, 2011b). DES investigators use the initial (and later) sampling day(s) and expositional interview(s) to train participants to cleave to pristine experience and avoid contaminating its description with anything else. This sample and expositional interview process is iterated (that is, successively approximated, each time with more skill and more fidelity; Hurlburt, 2009, 2011a,b), for typically four to six days until a series of descriptions of high fidelity inner experience moments are obtained

Now that we have given a brief overview of the DES method, we consider in more depth four methodological characteristics that distinguish DES from questionnaires and other typical experience sampling methods. (For more on the methodological characteristics of DES, please refer to Appendix A)

### **Limiting Investigation to Specific, Clearly Identified Moments**

Pristine inner experience is fleeting, evanescent. At this moment you might be reading this article; a bit later, you might be drawn to the overheard conversation in the next room; a second after that, you feel a slight cramp in your left leg; a bit later, you recall the birthday cake from your party last week. That is, within the span of a few seconds, your experience changes dramatically: from the external to the internal, from the present to the past, from the bodily to the visual, and so on. As a result, any attempt to apprehend experience in high fidelity must very carefully identify the moment that is to be apprehended (Hurlburt, 2011b). DES uses a 700 Hz beep, an unambiguous, rapid-rise-time signal delivered through an earphone so that the moment is delineated as unequivocally as possible. The aim is to investigate the experience that was “inflight”: ongoing at the last moment before the beep disturbs the natural environment.

### **Limiting Investigation to Pristine Inner Experience**

The term “experience” has many different meanings. For example, we could meaningfully refer to the *experience* of traveling through India (Caracciolo & Hurlburt, in press); or to the amount of *experience* necessary to be an airline captain. Of all the things that might be called *experience*, DES investigates just one, which it calls *inner experience*: thoughts, feelings, sensations, hearings, seeings, and so on, that are directly experienced at some moment (for a discussion of why external hearings and seeings might be considered part of *inner* experience see Hurlburt & Schwitzgebel, 2007, p. 15). *Pristine* inner experience refers to inner experience as it naturally occurs in everyday environments, undisturbed by the act of apprehending it (Hurlburt, 2011b; Hurlburt & Akhter, 2006; Hurlburt & Heavey, 2006). Apprehending pristine experience is an ideal; the DES beep does indeed disturb experience. It is the *aim* of DES to limit itself to pristine inner experience, an aspiration that, while never actually achieved, can be successively and successfully approximated (Hurlburt, 2011b).

It is the aim of DES to limit itself to the investigation of pristine inner experience—that is, to investigate experiences that are ongoing at the moment of beeps. DES avoids conversations about other meanings of *experience*, avoids speculation about cause or effect, avoids speculation about generalities. For example, DES participants frequently state beliefs about their inner experience (for instance, “I *always* say the words in my head as I type”). Such beliefs often turn out to be untrue; DES calls them faux generalities (Caracciolo & Hurlburt, in press; Hurlburt, 2011b; Hurlburt & Akhter, 2006). In practice, this cleaving to experience is a challenge, because people often stray away from describing what actually was ongoing in favor of interpretations, speculations, and explanations.

### **Bracketing Presuppositions**

Despite the fact that individuals are immersed in their own experience every waking moment, most hold specific beliefs about their own inner experience that are inaccurate (Hurlburt et al., 2013) and sometimes hugely inaccurate (Hurlburt, 2011b). These misapprehensions about one’s own experience result from presuppositions about the nature of experience (Hurlburt, 2011b; Hurlburt & Heavey, 2015; Hurlburt & Schwitzgebel, 2011). DES aims to help its participants “bracket” these presuppositions, a concept borrowed from the phenomenologists. To bracket is to set aside, to put out of play, to limit the influence of. Nearly every aspect of DES can be said to be in the service of bracketing presuppositions (Hurlburt, 2011b). Here are some examples: DES selects moments at random. Randomness ensures that the investigation focuses on actually occurring phenomena rather than phenomena that the investigator and/or the participant believe (for whatever reason) to be important (Hurlburt, 2011a). DES uses a beep to identify the precise moment to be investigated, again to urge a dispassionate choice of subject matter to be discussed. If the participant’s focus is allowed to



stray to a few seconds before or after the beep, the advantages of randomness are defeated and the participant again may decide what is important (Hurlburt, 2011a). The DES cleaving to experience described above is in the service of the bracketing of presuppositions: faux generalities and speculations about causation arise from presuppositions about experience, rather than from the actual apprehension of experience.

### **Iteratively Obtaining Apprehension Skills**

Hurlburt (2009, 2011b,c) holds that any investigation that aims to apprehend inner experience in high fidelity must be iterative, meaning that the participant must be helped to acquire skills as successive approximations. Just as a screw needs to be rotated a certain number of times before it sits tightly in place, the DES method relies on an ever-deepening succession of sample attempts and subsequent interviews to train the participant to apprehend pristine inner experience with higher and higher fidelity. The aim of the first expositional interviews is less about apprehending a participant's pristine experience than it is about acquiring the skills of bracketing presuppositions and cleaving to experience at the moment of the beep (Hurlburt, 2009; Hurlburt & Heavey, 2006). The first-day sampling and its subsequent expositional interview are tainted with confusion, miscommunications, assumptions, and so on. However, during the first expositional interview, the participant typically begins to learn what is the moment of the beep, begins to learn what is pristine inner experience, begins to acquire the skill of apprehending it, and begins to learn how to describe what has been apprehended. As a result, the second sampling day's apprehensions are typically more skillful than were the first-day apprehensions. As a result, participants enter the (second day) expositional interview with higher fidelity descriptions of their inner experience, enabling the (second) interview to require less use of probing clarifying questions and to be more effective than was the first. This ever-

deepening recurrent process allows even higher fidelity on subsequent sampling days (Hurlburt 2009, 2011b, c).

### **The Five Frequent Phenomena of Inner Experience**

DES is an essentially idiographic method that attempts to describe in high fidelity the specific characteristics of a person's inner experience that was ongoing at one moment, whatever those characteristics happen to be, regardless of whether the experience is or is not typical of the particular individual or typical of people in general (Hurlburt & Akhter, 2006). After a series of an individual's (typically randomly selected) moments of experience have each been apprehended and described in high fidelity, the investigator may attempt to identify "salient characteristics" that emerge from the individual's collection of experiences. The description of salient characteristics again aims to be an entirely idiographic process, describing an individual's experiences regardless of whether that individual is or is not typical of other individuals or of people in general.

Some DES studies (Hurlburt, 1990, 1993, 1997, 2011b; Hurlburt, Koch, & Heavey, 2002; Jones-Forrester, 2006, 2010; Lefforge, 2011; Mizrachi, 2014; Raymond, 2012; Reger, 2016) investigate salient characteristics of inner experience that emerge from a group of individuals who share an external characteristic (e.g., psychiatric diagnosis). In these studies, the procedure continues one step further from identifying salient features of inner experience for each participant to examining and extracting salient characteristics that emerge from the collective group of inner experience (Hurlburt & Heavey, 2002; Hurlburt & Akhter, 2006). (For more background on common inner experience characteristics across individuals, please refer to Appendix A)

In the early 1990's, Hurlburt had identified 16 common characteristics of inner experience across subjects (Hurlburt, 1990, 1993) and created a codebook for these 16 categories of inner experience descriptions. Hurlburt and Heavey (2002) investigated the inter-rater reliability of DES and its coding system of inner experience descriptions, and, in so doing, identified five frequent features of inner experience. They independently used the 16 characteristics from the codebook to code six inner experience samples from each of ten individuals, and found five characteristics rated by both investigators as occurring in 25% or more in these samples; the remaining characteristics occurred with low frequency. The interobserver reliability was measured for these five characteristics. The investigators concluded that independent observers could reliably rate these five most frequently occurring inner experience characteristics with Spearman-Brown adjusted interobserver reliabilities ranging from .92 to .98. The names for these five characteristics have evolved since the original study, and are now called inner speaking (Hurlburt, et al., 2013), inner seeing (Hurlburt, 2011b), unsymbolized thinking (Hurlburt & Akhter, 2008a, b), feeling (Heavey, Hurlburt, & Lefforge, 2012), and sensory awareness (Hurlburt, Heavey, & Bensaheb, 2009). Together, these are now referred to as the five frequent phenomena or 5FP (Kühn et al., 2014). (For more background on the validity of the DES method, please refer to Appendix A)

Heavey and Hurlburt (2008) quantified the frequency of the 5FP using a data set of 295 inner experience samples drawn from a stratified random sample of undergraduates at a large urban university. The researchers determined for each sample if one or more of the 16 common forms of inner experience discovered by Hurlburt (1990, 1993) were present. Because the nature of DES is exploratory, Hurlburt and Heavey did not limit the coding to the five most common phenomena identified in their 2002 inter-rater reliability study. The researchers were also open to

the possibility of new forms of experience emerging in samples that did not fit within the codebook. Replicating Hurlburt and Heavey (2002), there was a clear split with the five phenomena (i.e., inner speaking (aka inner speech), inner seeing, unsymbolized thinking, feelings, and sensory awareness) occurring at least at approximately one quarter of sampled moments (22% or more) and the other 11 phenomena occurring infrequently (3% or less).

### **Inner Speaking**

Inner speaking refers to speaking without producing external sounds (Hurlburt et al., 2013). The literature often refers to “inner speech” (see Morin, 2005); however, Hurlburt et al. (2016) held that *inner speech* fails to distinguish between two very different phenomena: inner speaking and inner hearing. Hurlburt et al. (2013) said that inner speaking usually has characteristics similar to external speaking, for example, is usually (but not always) in one’s own naturally inflected voice. Sometimes a person’s inner speaking is aimed at another (imagined) particular person, sometimes it is intended for self, and sometimes has no particular target.

### **Inner Seeing**

Inner seeing refers to seeing something in imagination that is not actually present. The literature often refers to “seeing images”; however, *seeing images* has the undesirable connotation that the image is separate from the seeing, which Hurlburt denies (Hurlburt & Schwitzgebel, 2007). Hurlburt and Heavey (2006) stated that inner seeing generally has characteristics similar to external seeing, such that there is a focal point that is clear and becomes less clear at the peripheries. Inner seeings can occur in color or black and white. They can be accompanied with sounds and may or may not have elements of movement. Inner seeings can be of things, scenarios, encounters, and so forth that have already been seen in the external world,

but frequently are of impossibilities (as in seeing oneself from the back, seeing through objects as if they were invisible, etc.).

### **Unsymbolized Thinking**

Unsymbolized thinking (Hurlburt & Akhter, 2008a, b) refers to the experience of thinking which is not accompanied by any experience of visual imagery, words, or any other symbols. For example, if Chris is unsymbolizedly thinking about whether to have a hot dog or hamburger for dinner tonight, he experiences himself as thinking (this is *not* “unconscious,” “implied” or “a cognitive processing”); the thinking is specific about the distinction between hamburger and hot dog (this is *not* a “general,” a “hinty,” or a “background” phenomenon), but he does not see (innerly or outerly) a hot dog or hamburger, does not experience the words “hot dog” or “hamburger,” does not experience the feeling of hunger or the sensual taste of meat. Instead, he is thinking in a way that is immediately, directly, unambiguously apprehended as thinking. Many scientists believe this form of experience is impossible (Hurlburt & Akhter, 2006; Hurlburt & Heavey, 2006). Hurlburt and Akhter (2008) suggest two reasons for this belief: 1) both investigators and participants often share the common (but mistaken) presupposition that all thinking takes place in words; and 2) unsymbolized thinking usually emerges gradually in the iterative expositional interviews, but most studies do not engage in iterative interviews.

### **Feeling**

Feeling refers to the experiential aspect of emotion (Kagan, 2007; Niedenthal, Krauth-Gruber & Ric, 2006). DES has found over multiple studies that there are large individual differences in the frequency of feelings as directly apprehended features of inner experience (Heavey et al., 2012). DES studies show that the experiential aspects of emotion range from distinct to vague—participants sometimes have difficulty distinguishing whether a feeling exists.

Feelings may or may not include bodily sensations or some physical aspect that also ranges from distinct to vague (Heavey et al., 2012). Participants also may have difficulty determining whether various feelings are blended together in their ongoing experience or if different feelings exist simultaneously (Heavey, Lefforge, Lapping-Carr, & Hurlburt, in press).

### **Sensory Awareness**

Sensory awareness refers to the particular focus on a sensory aspect without particular regard for functionality (Heavey & Hurlburt, 2008; Hurlburt et al., 2009). Sensory awareness is the direct attention to a particular sensory characteristic, and not merely a perception of an object. For instance, if Judy is dialing her phone but primarily attending to the perfect-circles-shape of the display, she is experiencing sensory awareness. However, if she is dialing, using the circles to guide her tapping but not particularly interested in their perfect-circle-ness, she is *not* experiencing sensory awareness. In both situations, the retinal image may be the same, but the experience is very different.

### **The Current Studies**

As we have seen, DES characterizations of inner experience are often quite discrepant from those reported by questionnaire studies. Hurlburt and Heavey (2006, 2015; Hurlburt, 2011b; Hurlburt & Schwitzgebel, 2007) have held that a fundamental explanation for the discrepancies is that questionnaires do not adequately (or at all) bracket presuppositions about experience. However, an alternative explanation is that questionnaires measure different aspects of experience from those that DES investigates. In the two studies reported here, we explore that second alternative by creating a self-report questionnaire, the Nevada Inner Experience Questionnaire (NIEQ), which aims directly at the five phenomena of inner experience that DES frequently finds: inner speaking, inner seeing, unsymbolized thinking, feeling and sensory

awareness. The NIEQ is designed to measure the extent to which a person believes that each of these five phenomena are common features of their inner experience; thus, the NIEQ is a retrospective questionnaire measure of frequencies that can be derived from DES investigations. To the extent that the correlations between the NIEQ and DES results are high, then previous discrepancies might be explained by differences in what is measured; to the extent the correlations are low, then previous discrepancies might be explained by the failure to bracket presuppositions.

We explored the NIEQ in four ways, two in each study: (1a) We asked whether the NIEQ actually measures the 5FP factors of inner experience; (1b) We examined one aspect of the NIEQ's convergent validity, asking how well the NIEQ inner speaking items correlated with a widely used self-talk questionnaire; (2a) We analyzed the split-half reliability of the DES results to discover whether low correlations between DES and other methods might be due to the unreliability of DES; and (2b) We explored the NIEQ's criterion validity, using DES sampling results as the criterion.

## Chapter 2: Study 1—Construct Validity of the NIEQ

Study 1 had two objectives: (1a) to confirm the factor structure of the NIEQ, and (1b) to take one step toward establishing the NIEQ's convergent validity with other inner experience questionnaires. Because there are no other self-report questionnaires that investigate all five frequent phenomena (5FP) of inner experience, in the convergent validity objective (1b) we focused on one aspect, inner speech, and correlated the NIEQ inner speaking items with the Self-Talk Scale (STS; Brinthaupt et al., 2009), a questionnaire that has been validated as a measure of inner speech.

### Method

#### Participants

260 undergraduates taking introductory psychology courses at a large public university were recruited via a subject-pool advertisement (mean age = 20.6 years, range = 18 to 49 years; 28.5% identified as male, 63.5% identified as female, 8% did not provide gender information; 39% self-identified as white, 17% Hispanic, 15% African American, 15% Asian, and 8% Pacific Islander). Participation was rewarded with course credit.

#### Measures & Apparatus

**Nevada Inner Experience Questionnaire.** The Nevada Inner Experience Questionnaire (NIEQ) is a 10-item set of visual analogue scales developed to measure the frequency of five frequent phenomena (5FP; inner speaking, inner seeing, unsymbolized thinking, feeling, and sensory awareness) found by DES. The NIEQ was designed specifically for this series of studies as a way to compare as directly as possible inner experience as apprehended by DES to inner experience as reported by questionnaire. The NIEQ has one pair of items for each of the 5FP, a *Frequently* item and a *Generally* item. All items ask the respondent to make a mark on a visual-



analog scale. The *Frequently* item of each pair begins with the stem “How frequently do you...” and uses visual-analog anchors *Never* and *Always*; the *Generally* item of each pair begins with the stem “Generally speaking, what portion of your inner experience is...” and uses anchors *None* and *All*. Ratings for each item pair were averaged to produce a frequency score for each of the five characteristics. This score is thus a self-reported approximation of the amount of time respondents believe they innerly experience each characteristic.

The complete questionnaire is shown in Appendix D. For example, the two inner speaking items are: “How frequently do you talk to yourself in your inner voice?” and “Generally speaking, what portion of your inner experience is in inner speech (thinking in words)?”

**Self-Talk Scale.** The Self-Talk Scale (STS; Brinthaup et al., 2009) is a 16-item questionnaire designed to measure the occurrence of both inner speech and self-talk/private speech in diverse situations (e.g., “I talk to myself when I should have done something differently.”) Participants indicate the frequency with which they engage in various self-talk using the following 5-point scale: 1 = *never*, 2 = *seldom*, 3 = *sometimes*, 4 = *often*, 5 = *very often*. The STS has been shown to have good test-retest reliability ( $r(99) = .66, p < .001$ ; Brinthaup et al., 2009).

**Demographic Questionnaire.** A demographic questionnaire was designed for this study and asked participants to provide their name, contact information (telephone number and email), age, and sex.

## **Procedure**

After obtaining informed consent, participants were asked to complete the STS, NIEQ, and Demographic questionnaire. Two other measures were also administered which are not

relevant here. Participation required approximately a half hour. Participants received .5 research subject-pool participation credit.

## Results

This study involved 260 participants who completed the NIEQ. The aim of study 1 was two-fold: 1) explore the NIEQ’s adequacy as a self-report questionnaire by examining the item correlations and its factor structure; and 2) investigate one portion of the NIEQ’s convergent validity.

### Reliability and construct validity of the NIEQ

The NIEQ was designed to measure five constructs (the 5FP) with two items each (the *Frequently* and the *Generally* items). Table 1 shows the NIEQ item means and (standard deviations) as percentages. On average, the NIEQ mean frequency for each *Frequently* and *Generally* item was high.

Table 1

*NIEQ item means, (standard deviations), percentages*

Item Type	Frequency				
	ISpeaking <sup>1</sup>	ISeeing	UnsTh	Feeling	SensAw
Frequently	71 (22) <sup>2</sup>	71 (24)	41 (30)	79 (19)	73 (21)
Generally	66 (20)	61 (24)	35 (26)	69 (23)	51 (24)

<sup>1</sup>ISpeaking = Inner speaking; ISeeing = Inner seeing; UnsTh = Unsymbolized thinking; SensAw = Sensory awareness

<sup>2</sup>All items ranged from 0 to 100% except Feeling/Frequently (range 9% - 100%) and Unsymbolized/Generally (range 0% - 98%)

To determine whether the five scales behaved as designed, we calculated the NIEQ item correlations, as shown in Table 2.

Table 2

*NIEQ item correlations*<sup>1</sup>

		Frequently				Generally				
		ISeeing <sup>2</sup>	UnsTh	Feeling	SensAw	ISpeaking	ISeeing	UnsTh	Feeling	SensAw
Frequently	ISpeaking	.37	-.05	.20	.13	.33	.26	-.08	.22	.14
	ISeeing		.01	.14	.33	.10	.49	-.01	.16	.18
	UnsTh			.00	.21	-.07	.01	.43	.05	.16
	Feeling				.20	.11	.22	-.03	.48	.22
	SensAw					-.14	.31	.14	.20	.21
Generally	ISpeaking						.08	-.17	.05	.06
	ISeeing							.07	.29	.34
	UnsTh								.10	.32
	Feeling									.31

<sup>1</sup>  $df = 258$

<sup>2</sup> ISpeaking = Inner speaking; ISeeing = Inner seeing; UnsTh = Unsymbolized thinking; SensAw = Sensory awareness

As designed, the *Frequently* and *Generally* item pairs for each distinct phenomenon of inner experience, shown on the main diagonal of Table 2, correlated more strongly with each other than with the items off the main diagonal. Sensory awareness was perhaps the exception, showing the weakest correlation on the main diagonal and the strongest correlations off the main diagonal.

Then we averaged results of the item pairs (*Frequently* and *Generally*) to create the NIEQ-ISpeaking, NIEQ-ISeeing, NIEQ-UnsTh, NIEQ-Feeling, and NIEQ-SensAw scales. We correlated those scales across the 260 participants, as shown in Table 3.

Table 3

*Intercorrelations<sup>1</sup> of NIEQ scales*

	ISeeing <sup>2</sup>	UnsTh	Feeling	SensAw
ISpeaking	.30	-.13	.21	.08
ISeeing		.02	.27	.43
UnsTh			.05	.31
Feeling				.35

<sup>1</sup>*df* = 258

<sup>2</sup>ISpeaking = Inner speaking; ISeeing = Inner seeing; UnsTh = Unsymbolized thinking; SensAw = Sensory awareness

As seen in Table 3, the NIEQ scale intercorrelations reflected the NIEQ item off-diagonal correlations of Table 2: the scales had relatively low intercorrelations, with the exception of sensory awareness, which had relatively high correlations with the inner seeing, unsymbolized thinking, and feeling scales.

Following the recommendations of Eisinga, Grotenhuis, and Pelzer (2013), we computed the standardized coefficient alpha (equivalent to the two-item Spearman-Brown coefficient) for each NIEQ scale across the 260 participants. Those values are shown in Table 4.

Table 4

*Coefficient alpha for NIEQ scales*

NIEQ Scale	Coefficient alpha
ISpeaking <sup>1</sup>	.50
ISeeing	.66
UnsTh	.60
Feeling	.65
SensAw	.34

<sup>1</sup>ISpeaking = Inner speaking; ISeeing = Inner seeing; UnsTh = Unsymbolized thinking; SensAw = Sensory awareness

To investigate construct validity, we conducted two confirmatory factor analyses of the ten items, first assuming one factor (to determine whether the NIEQ represented a general inner experience factor) and then five factors (to determine whether the NIEQ did in fact reflect the five factors as designed). Using EQS, the goodness of fit statistics for these analyses, specifically the Comparative Fit Index (CFI), Akaike’s Information Criterion (AIC), the Root Mean Square Error of Approximation (RMSEA), and the Satorra-Bentler scaled chi-square statistic (S-B  $\chi^2$ ; Satorra & Bentler, 1988), are shown in Table 5. Because Mardia’s coefficient for the analyses was 21.38 (that is, greater than 5.00; Bentler, 2005), the data violated assumptions of normality, so robust fit statistics are displayed. It can be seen that the five-factor model provided a much better fit than did the one-factor model (for example, the one-factor AIC is 99.332, whereas the five-factor AIC is –4.655). The five-factor goodness of fit statistics presented in the second row of the table were generally considered adequate (CFI  $\geq$  .90, Bentler, 1990; RMSEA  $\leq$  .08, Steiger & Lind, 1980); the RMSEA 90% confidence interval for the 5-factor robust solution was (.029 – .082). Therefore, we will further describe the five-factor model below.

Table 5

*Goodness of fit statistics for NIEQ confirmatory factor analysis (robust solutions for 1 and 5 factors)*

Model	CFI	RMSEA (90% CI)	AIC	S-B $\chi^2$
One factor	.596	.122 (.103 – .140)	99.332	169.332 <sup>1</sup>
Five factors	.939	.056 (.029 – .082)	–4.655	45.345 <sup>2</sup>

<sup>1</sup>df = 35

<sup>2</sup>df = 25

The factor loadings for the NIEQ items on the five factors produced by this model are shown in Table 6 and in Figure 1. It can be seen that the items typically loaded as expected: one factor was composed of the inner speaking *Frequently* and *Generally* items; another of the inner

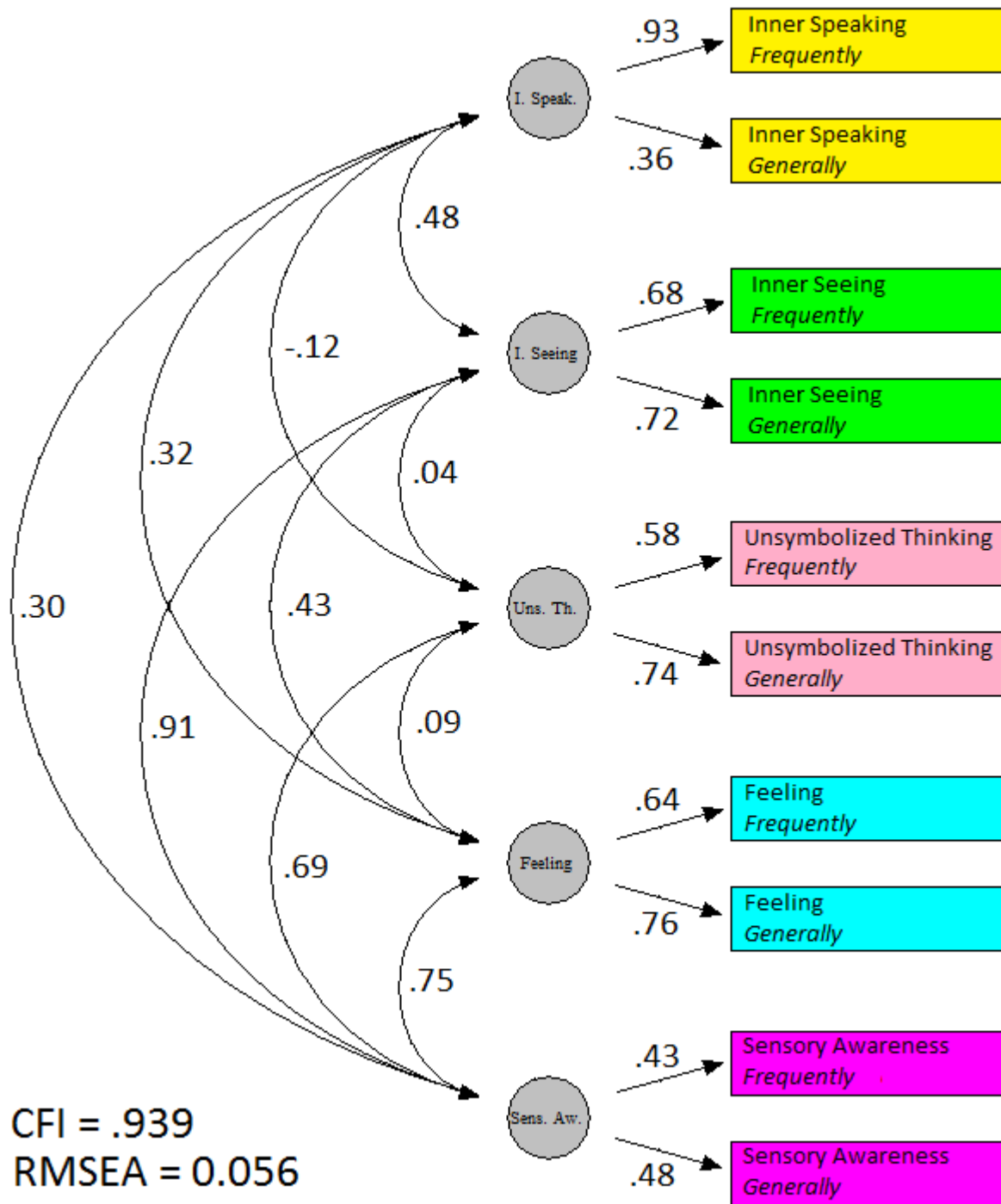
seeing *Frequently* and *Generally* items; and so on for each of the five factors. Here again, sensory awareness was perhaps the exception: the *Frequently* and *Generally* items showed the weakest correlation with the sensory awareness factor and that factor strongly correlated with the inner seeing, unsymbolized thinking, and feeling factors (.91, .69, and .75 *respectively*). This five-factor model supports the structural validity of the NIEQ.

Table 6

*Factor loadings for NIEQ scales*

Factor	Factor Loadings	
	Frequently item	Generally item
Inner speaking	.93	.36
Inner seeing	.68	.72
Unsymbolized thinking	.58	.74
Feelings	.64	.76
Sensory awareness	.43	.48

Figure 1: Confirmatory Factor Analysis of the NIEQ



### **Convergent Validity of NIEQ**

We investigated one portion—inner speaking—of the NIEQ’s convergent validity by averaging the two inner speaking items of the NIEQ to form the NIEQ-ISpeaking scale. Then we correlated the NIEQ-ISpeaking with the STS total scores across our 260 participants, finding that  $r = .52$  ( $df = 258, p < .001$ ). This correlation supports the convergent validity of the NIEQ.



## Chapter 3: Study 2—Criterion Validity of the NIEQ

Study 1 established that the NIEQ has the characteristics of an effective questionnaire: its factor structure is what was expected, and the correlation with another questionnaire with somewhat similar content was strong, as expected. Study 2 aimed to determine whether the NIEQ actually measures what it intends to measure—the 5FP of inner experience. To accomplish the aim of Study 2, we recruited 16 participants who, by questionnaire self report, were either frequent self-talkers or infrequent self-talkers. Then (blind to self-talk condition), we engaged each in four days of DES sampling in their natural environment and for each sample determined whether each of the five 5FP phenomena were present. Preliminarily, we (2a) asked whether our DES interviews were reliable measures of the 5FP (a conceptual replication of Hurlburt & Heavey, 2002). Once that was established, we (2b) asked to what extent the NIEQ questionnaires predicted DES sampling results.

### **Method**

#### **Participants**

The 260 undergraduates who participated in Study 1 (all of whom had completed the STS measure of self-talk frequency) served as the screening group for study 2. Participants qualified for Study 2 if they had scored within the upper or the lower quartile of the STS. We initially used Brinthaup et al.'s (2009) statistics to suggest quartile cutoffs of  $> 60$  for the upper quartile and  $< 45$  for the lower quartile. Approximately half way through our recruitment (after screening participants), we discovered that our own mean was somewhat higher than had been found by Brinthaup et al. (2009), so we revised the quartile cutoffs to  $> 66$  and  $< 52$ , and used those values for the entire Study 2. Thus 65 participants were in the upper quartile and 65 in the lower quartile. All participants and investigators were kept blind to quartile membership.

Participants from each quartile were randomly contacted and invited via telephone and/or email to participate in the sampling phase of the study. The sampling phase required a substantial time investment, more than was required by subject-pool participation. Participants were given 1 research subject-pool participation credit, as well as \$10 for each hour of participation. If an eligible participant declined the invitation, another participant from the same quartile was invited. We contacted 74 participants, 25 from the upper quartile and 49 from the lower quartile, which resulted in 16 participants in the sampling phase (ten from the upper STS quartile and six of the lower STS quartile).

### **Measures & Apparatus**

**Nevada Inner Experience Questionnaire (NIEQ).** As above.

**Descriptive Experience Sampling.** Descriptive Experience Sampling (DES) is a qualitative sampling method used to explore and describe pristine inner experience (Hurlburt, 2011b; Hurlburt & Akhter, 2006; Hurlburt, Alderson-Day, Kühn & Fernyhough, 2016). DES requires participants to wear a random-interval beeper developed by Hurlburt for 3-4 hours in their natural environment (Hurlburt & Heavey, 2002). The beeper randomly delivers a 700Hz tone via an earphone and cues participants immediately to jot down what was ongoing in their experience at the last undisturbed moment before the beep. Participants use a small spiral bound notebook given to them by DES investigator(s) at the start of the study for jotting notes about their inner experience. During this 3-4 hour sampling period, the participant is beeped at randomly selected intervals approximately six times. A collection of six moments is considered one day of sampling. Within 24 hours participants meet with the DES investigator(s) for an expositional interview. The interview is designed to help participants apprehend their naturally

occurring experience. Once the sampling process is complete, the investigators review the set of descriptions and identify salient characteristics that emerge.

## **Procedure**

After recruitment, each participant individually engaged on ten occasions (plus two or four later occasions as part of a study not reported here): (1) the introduction-to-DES meeting; (2) day 1 natural environment sampling; (3) day 1 expositional interview; (4) day 2 natural environment sampling; (5) day 2 expositional interview; . . . (9) day 4 expositional interview; (10) debrief. These were scheduled at the participant's convenience and typically spread over two to four weeks.

(1) Introduction-to-DES meeting. Participants were given instructions about the DES rationale and procedure and encouraged to ask questions regarding it.

(2) Day 1 sampling. The participant wore the beeper in natural environments at a self-selected time until six randomly selected moments of experience were collected. They had been instructed to jot down notes about the experience that was occurring at the moment of the beep. Participants are not expected to be skilled.

(3) Day 1 expositional interview. Within 24 hours of the Day 1 sampling, the participant met with two to four investigators for a 1-hour expositional interview conducted as described in Hurlburt (2011a), Hurlburt and Heavey (2006, 2015). The interview was unscripted and always aimed to explore the question: "What was in your experience at the moment of the beep?" DES participants are not skilled in this interview: they do not understand what is meant by "the moment of the beep"; do not understand what we mean by "experience"; do not distinguish among what was actually going on in experience at the moment of the beep, what occurred before the moment of the beep, and what occurred after the beep; and so on. The "What was in

your experience at the moment of the beep?” and its clarifying and follow-up questions are used to train participants to move towards a higher-fidelity apprehension of the experience present at the beep. All expositional interviews were video recorded. Each investigator individually had the responsibility of understanding the participant’s beeped experiences.

Within 24 hours (usually within a few hours) of the DES expositional interview, one investigator drafted a description of each sampled moment of experience from that day. These descriptions were then immediately circulated to the other interviewers who had been present. Using tracked changes or in face-to-face conversations, investigators discussed openly any disagreements or shades of difference in interpretation; this process might involve reviewing video of the interview. Disagreements were discussed until they were either resolved or left as an explicitly stated as tracked changes in the written description. We refer to this description as the messy contemporaneous description.

(4) Day 2 sampling. Like (2) except that participants are typically somewhat more skilled.

(5) Day 2 expositional interview. Like (3) except that participants are typically somewhat more skilled and the interviewers have somewhat more context for their understandings.

A Day 2 messy contemporaneous description is prepared as in (3). Occasionally, the Day 2 expositional interview will clarify something that had been left unclarified in the Day 1 contemporaneous description (“Oh! That’s what she meant!”), in which case the Day 1 contemporaneous description was amended (again using tracked changes).

(6) and (8) Day 3 and 4 sampling. Like (4) except somewhat more skilled.

(7) and (9). Day 3 and 4 expositional interview. Like (5) except participant and interviewers are somewhat more skilled. Messy contemporaneous descriptions are prepared as before.

(10) Debrief. Participant's questions are candidly and forthrightly addressed.

Once all ten steps for a participant had been completed, all interviewers met and reviewed all the samples for that participant, guided by the messy contemporaneous descriptions and using the videotapes if desirable. Immediately following the conclusion of that meeting, each interviewer wrote an independent draft of the salient characteristics. Investigators were not to view any independent brief description written by others until they had written and circulated their own. Then each investigator could comment, disagree, and so on with all other independent brief descriptions. Most often, those descriptions were similar—all had been written immediately after a meeting where characteristics were discussed—but that was not a requirement. One designated researcher then coalesced all the brief descriptions into one full descriptive account of the participant, which was again reviewed and edited by other members of the research team until a consensus was reached or disagreements explicitly exposed but not resolved.

Once the “Salient Characteristics” (aspirationally high fidelity) descriptions of a particular participant had been agreed upon, each investigator independently rated each sample as to the presence or absence of the five frequently occurring phenomena (dubbed the 5FP by Kühn et al, 2014) found in DES studies: inner speaking (Hurlburt et al., 2013), inner seeing (Hurlburt, 2011b), unsymbolized thinking (Hurlburt & Akhter, 2008), sensory awareness (Hurlburt et al., 2009), and feelings (Heavey et al., 2012). These independent codings were then “rectified”: any discrepancies were announced to all investigators and discussed either/both

through tracked changes and/or face-to-face meetings. On those few occasions when investigators in the group disagreed, or when the investigators agreed that the experience was inadequately apprehended (either by the participant at the moment of the beep or by the investigators in the interview), or when the investigators agreed that the experience was ambiguous or the 5FP or idiographic category seemed not easily to fit, the sample was coded .5.

Note that in all phases of the sampling, the object was to characterize or rate the experience that was ongoing at the moment of the beep, *not* to characterize or rate a *description* of that experience. That is, the descriptions at all levels of consideration were considered to be tools that pointed to the experience, not data points themselves. If there seemed something ambiguous about a description, even in the final stages, then the investigators returned to the videotape of the interviews to try to disambiguate. For example, the codings just described were performed after the “final” description of salient characteristics had been written. However, the act of coding might cause the investigators to view a description from a new perspective, and that occasionally resulted in the recognition that a word or phrase in the description was misleading or ambiguous, in which case the “Salient Characteristics” description was updated.

## **Results**

This study involved 16 participants of the 260 original participants in Study 1 who completed the NIEQ. 10 participants were from the upper quartile in the Self-Talk Scale (STS) and 6 in the STS lower quartile.

Each participant took part in DES for 4 sampling days, responding to approximately six beeps each day. The first day was considered a training day and was discarded. We therefore carefully described each of approximately 18 samples of experience and rated each experience for the presence of each of the five frequent phenomena. We gave a rating of 1 if a phenomenon

(sensory awareness, for instance) was present in experience at a sampled moment. If a phenomenon was not present, we rated it 0, and if it was undetermined whether the phenomenon was present, we rated it .5. More than one phenomenon could be in a sampled moment (sensory awareness and inner seeing, for example, could both be scored 1). Multiple simultaneous instances of the same phenomena (two sensory awarenesses identified in one sampled moment) resulted in a score of 1 (not 2).

After we calculated the frequencies of the 5FP found from DES sampling, we correlated these findings with the frequencies of the 5FP self reported by our participants on the NIEQ. We aimed to examine how well the results of the NEIQ predicted the DES findings across our 16 participants.

The NIEQ was designed to ask participants to estimate the frequency of their inner experience phenomena. DES was designed to apprehend participants' frequency of inner experience phenomena using the iterative sampling-interview process. Table 7 presents the means of the NIEQ-estimated frequencies along with the means of the DES-sampled frequencies.

Table 7

*Mean frequency and (standard deviations) of the 5FP as estimated by the NIEQ and STS (inner speaking) and as discovered during DES sampling, percentages*

	ISpeaking <sup>1</sup>	ISeeing	UnsTh	Feeling	SensAw
NIEQ	67 (26)	69 (27)	39 (25)	79 (20)	69 (19)
STS	69 <sup>2</sup> (24)	--	--	--	--
DES	15 (15)	20 (16)	12 (11)	17 (16)	32 (20)
Heavey & Hurlburt <sup>3</sup>	31	32	21	24	22

<sup>1</sup>ISpeaking = Inner speaking; ISeeing = Inner seeing; UnsTh = Unsymbolized thinking; SensAw = Sensory awareness

<sup>2</sup> Converting the STS raw score average 60.38 to a percentage following the procedure used by Brinthaup et al. (2015)

<sup>3</sup> Means from Heavey & Hurlburt (2008) for comparison

On average, the NIEQ estimates, as seen in Table 7, were dramatically higher than the DES frequencies. Similarly, the STS estimates reflected the NIEQ inner speaking estimates and were dramatically higher in comparison to the inner speaking frequency found in DES sampling results.

Table 8 presents the intercorrelations of DES phenomena. We correlated the 5FP frequencies across the 16 participants, and as seen in Table 8, the DES phenomena were unrelated to each other.

Table 8

*Intercorrelations<sup>1</sup> of DES phenomena*

	ISeeing	UnsTh	Feeling	SensAw
ISpeaking <sup>1</sup>	-.31	-.15	-.12	.04
ISeeing		-.14	.27	.04
UnsTh			-.01	-.10
Feeling				.17

<sup>1</sup>df = 14

<sup>2</sup>ISpeaking = Inner speaking; ISeeing = Inner seeing; UnsTh = Unsymbolized thinking; SensAw = Sensory awareness



## Reliability of DES Results

DES was designed to provide idiographic descriptions of salient characteristics of inner experience. Across many studies and many participants, five characteristics were found frequently (the 5FP); we therefore quantified each sample by determining whether any of the 5FP was ongoing at that moment. First, we had to determine whether that quantification was reliable. Split-half reliabilities were determined for each of the 5FP by computing DES frequencies based on odd-numbered samples and on even-numbered samples and correlating those frequencies; those correlations are shown in Table 9, where it can be seen that the correlations were relatively high for all except unsymbolized thinking. The right-hand column of Table 9 shows the Spearman-Brown-corrected correlations, which estimated the reliability of the sampling quantification across the entire sampling.

Table 9

<i>Reliability (split-half frequency correlations) of DES sampling</i>					
	ISpeaking <sup>1</sup>	ISeeing	UnsTh	Feeling	SensAw
Odd-even correlations	.84	.58	.21	.67	.71
Spearman-Brown correlations	.91	.73	.35	.81	.83

<sup>1</sup>ISpeaking = Inner speaking; ISeeing = Inner seeing; UnsTh = Unsymbolized thinking; SensAw = Sensory awareness

We used an additional method to determine whether our own application of DES was adequate by comparing our DES frequencies of the 5FP to those reported by Heavey and Hurlburt (2008). We found, broadly speaking, similar results: inner speaking (our 15% compared to Heavey and Hurlburt's 26%), inner seeing (20% compared to 34%), unsymbolized thinking

(11% compared to 22%), and feelings (18% compared to 26%), and somewhat more sensory awareness (32% compared to 22%). We gained greater confidence that our own application of DES was adequate because our natural environment frequencies were not dramatically different from what Heavey and Hurlburt reported.

### **Criterion Validity of the NIEQ**

Prior to participation in the sampling task, we asked participants to complete the NIEQ by estimating the extent to which they experience each of the 5FP characteristics. Then we asked the same participants to engage in DES. We used DES to investigate (as directly as the state of the art allows) the extent to which the participants experience each of the 5FP characteristics as they naturally occur in their natural environments. Again, the principal aim of this study was to see how well do participants' NIEQ (retrospective questionnaire) ratings predict their own DES (natural environment sampling) results.

Similar to Study 1, we averaged the frequencies of the item pairs for each of the 5FP (*Frequently* and *Generally*) to create the NIEQ-ISpeaking, NIEQ-ISeeing, NIEQ-UnsTh, NIEQ-Feeling, and NIEQ-SensAw scales. We correlated those scales across the 16 participants with their DES sampling results as shown in the main diagonal of Table 10. These correlations were close to zero, with the exception of inner seeing (.29 with NIEQ-ISeeing). Scatterplots were created for all correlations between NIEQ and DES. An inspection of the scatterplots indicated that the correlations (on and off the main diagonal) were not due to a small number of outliers.

Table 10 also shows (off the main diagonal) the correlations between the frequencies of the NIEQ 5FP characteristics and the frequencies of the 5FP characteristics found in DES sampling. Those correlations were close to zero with the exception that inner speaking on the NIEQ was inversely related to unsymbolized thinking ( $r = -.60$ ) when sampled by DES; and

inner seeing on the NIEQ was inversely related to sensory awareness ( $r = .46$ ) when sampled by DES.

We also looked at how well the participants' STS ratings predicted their own inner speaking DES results. As shown in the bottom left corner of Table 10, we found this correlation was .21. Inspection of the scatterplot indicated that one participant was responsible for most of this correlation; removal of that one participant's data would drop the correlation from .21 to .05 (her STS percentage = 100% (converted from STS raw score of 80 following the procedure used by Brinthaupt et al., 2015) was tied for highest; her DES inner speaking = 44.4% was second highest).

Table 10

*Correlations between DES sampling and NIEQ estimates of inner experience*

		DES Sampled Frequency				
		ISpeaking <sup>1</sup>	ISeeing	UnsTh	Feeling	SensAw
NIEQ	ISpeaking	.06	.20	-.60*	.13	.08
	ISeeing	-.15	.29	-.19	.29	.46
	UnsTh	-.26	.37	.07	.16	-.24
	Feeling	-.03	.15	-.16	-.03	-.06
	SensAw	.09	.48	-.17	.29	-.11
STS		.21				

\*  $p < .05$ , uncorrected,  $df = 14$

<sup>1</sup>ISpeaking = Inner speaking; ISeeing = Inner seeing; UnsTh = Unsymbolized thinking; SensAw = Sensory awareness

## Chapter 4: Discussion

The current paper reports two studies that, together, take an important step into exploring the extent to which retrospective-self-report questionnaires that are designed to explore inner experience actually capture that inner experience. Prior construct-validation studies of inner experience generally have relied on concurrent-validation strategies, usually finding strong correlations between several questionnaires designed to measure the same inner experience construct. As is well known, the fact that two inner-experience questionnaires are highly correlated indicates only that they measure the same thing, not necessarily that they measure the inner-experience criterion of interest. However, criterion-validation studies of inner-experience questionnaires are essentially nonexistent, primarily due to the difficulty (some would say impossibility) of measuring the characteristics of inner experience, which is by definition private.

The lack of criterion-validation is problematic because Hurlburt (2011b) and Hurlburt and Heavey (2015) give reason to wonder whether individuals actually know the characteristics of their own inner experience. Furthermore, questionnaires that inquire about inner experience often include a mix of experiential and non-experiential questions, and/or do not focus on features that have been found to be frequent in inner experience (Heavey & Hurlburt, 2008).

### **Creation and Validation of the NIEQ**

The present studies seek to advance the science of inner experience by focusing on Descriptive Experience Sampling (DES, a method that seeks to explore inner experience in high fidelity) and the five frequent phenomena (dubbed the 5FP by Kühn et al, 2014) of inner experience that DES frequently finds: inner speaking, inner seeing, unsymbolized thinking, feeling and sensory awareness. Study 1 ( $n = 260$ ) created a questionnaire (the Nevada Inner Experience Questionnaire; NIEQ) designed to measure directly the retrospectively estimated

frequency of the 5FP, thus eliminating the possibility that the questionnaire items might be different from the phenomena DES finds. The NIEQ uses five pairs of items, each pair designed to estimate retrospectively the frequency of one of the five 5FP constructs. Within each pair, one item uses a *Frequently* stem (i.e., “How frequently do you...”) the other a *Generally* stem (i.e., “Generally speaking, what portion of your inner experience is...”). Study 1 explored the construct-validity of the NIEQ using standard psychometric procedures. We inspected the item correlation matrix (Table 2) and found, as expected, that the items within the pairs generally had higher correlations than did off-pair correlations. Study 1 also examined the intercorrelations of the NIEQ scales (Table 3) and found (as is desirable) that the NIEQ scales have relatively low intercorrelations.

The largest exception for both tables is sensory awareness. The NIEQ intercorrelation matrix (Table 2) showed that sensory awareness had the weakest within-pair correlations and had the strongest off-pair correlations, particularly with inner seeing. Table 3 showed that sensory awareness had high correlations with inner seeing, unsymbolized thinking, and feeling scales.

The straightforward questionnaire interpretation for these relatively high correlations between NIEQ items and scales is that participants whose inner experience actually has frequent sensory awareness also actually have high frequencies of other inner experience phenomena, especially inner seeing.

Furthermore, in Study 1 we performed a confirmatory factor analysis of the NIEQ and found that the five-factor model was a good fit and that the pairs of items generally loaded in the expected way. The confirmatory factor analysis also showed that the sensory awareness factor had the weakest item loadings and had the strongest between-factor correlations, particularly

with inner seeing. This further suggests the possibility of an overlap between sensory awareness experience and other forms of inner experience, especially inner seeing.

To investigate one aspect of the NIEQ's concurrent validity, Study 1 asked how well the NIEQ inner speaking items correlated with a widely used self-talk questionnaire, the Self-Talk Scale (STS; Brinthaupt et al., 2009). We focused particularly on inner speaking because (a) inner speaking is a fairly widely investigated phenomenon; (b) because inner speaking is comparatively easy to define; and (c) because the literature has widely discrepant views on the frequency of inner speaking. We found, as expected, a relatively high correlation between the NIEQ-IS scale and the STS. We had not expected a higher correlation because (a) the NIEQ-IS and STS are not designed to measure exactly the same thing: the NIEQ-IS is aimed exclusively at inner speaking whereas the STS is aimed at self-talk which includes both inner and aloud speech; and (b) because there are only two NIEQ inner speaking items.

Taken together, this creation and validation of the NIEQ was a straightforward example of test construction and concurrent validation, suggesting that the NIEQ is a reliable and psychometrically valid measure of the frequency of inner experience.

### **The Adequacy of DES**

However, psychology's main interest in inner experience is (or should be) not primarily about questionnaires and how they correlate but about the criterion validity of those questionnaires—how they correlate with actual phenomena of inner experience as they occurs in everyday people in everyday situations—that is, in correlations between questionnaires and pristine inner experience (Hurlburt, 2011b). Study 2 ( $n = 16$ ) evaluated the criterion validity of the NIEQ by comparing NIEQ results to the criterion of direct apprehensions of inner experience as found by DES.

Our first task was to establish the adequacy of DES as a criterion. Study 2 analyzed the split-half reliability of the DES sampling by computing DES frequencies for the 5FP for each participant based on odd-numbered samples and on even-numbered samples separately. We correlated those frequencies, finding (Table 9) relatively strong Spearman-Brown-corrected reliabilities for all the 5FP except unsymbolized thinking, suggesting that DES descriptions in general measure *something* with consistency. Furthermore, our Study 2 DES 5FP results were broadly similar to those of Heavey and Hurlburt (2008) as shown in the last row of Table 7. The low intercorrelations of the DES 5FP (Table 8) indicate that our DES ratings were measuring *five different somethings* with specificity.

Were those five different somethings actually the phenomena of interest? Inner experience phenomena are private, so in a fundamental sense we must rely on descriptions by the participants. However, as described in the Method section, we went to extraordinary lengths to help participants describe with fidelity (Hurlburt, 2011; Hurlburt & Heavey, 2006). We trained participants iteratively (Hurlburt, 2009, 2011) to help build their skills using on-the-job training. We focused on one moment at a time, typically two to three interviewers spending 10 to 15 minutes obtaining the details of each single sampled moment of experience. We assured ecological validity by using samples obtained in natural environments. We attempted to bracket presuppositions by using random samples and encouraging disagreement among multiple interviewers. We reduced memory distortions by asking the participant to take notes immediately following the sampled experience, conducting the expositional interview within 24 hours, writing sample descriptions within 24 hours; and so on. DES is open to criticism and responses thereto (Hurlburt & Schwitzgebel, 2007; the special issue of *Journal of Consciousness Studies*, 2011; Caracciolo & Hurlburt, 2016; Price & Barrell, 2012), but for the time being, it is

the state of the art. It seems very unlikely to us that a procedure that was designed to be very careful sample by sample would produce five independent and reliable kinds of characterizations, that purported to be of the 5FP, but which were actually of a different set of five experiential characteristics. Taking all that into account, it seems reasonable to hold (until a better procedure comes along) that the 5FP as discovered by DES are adequate criteria for the present study.

### **Questionnaires as Measures of Inner Experience**

Recall the intercorrelations between the NIEQ-scale sensory awareness and other frequent inner experience phenomena, and that the straightforward questionnaire interpretation of those intercorrelations was an actual overlap between the phenomena. However, the parallel intercorrelations between the DES sensory awareness and other frequent inner experience phenomena are low (Table 8). That suggests an alternative explanation: participants when filling out questionnaires do not know their own inner experience. Thus, there is a great possibility that questionnaire correlations are characterizations of participant's presuppositions about their inner experience and *not* real characterizations of their actual inner experience.

Now (finally) we can turn to the main result of this paper, Study 2's consideration of the criterion validity of the NIEQ, using the DES sampling 5FP results as the criterion. Despite the fact that the NIEQ was designed to measure as directly as possible by retrospective questionnaire the frequency of the same five inner-experience phenomena discovered by DES studies (the 5FP), the correlations between the NIEQ 5FP scales and the corresponding DES sampling results were, with the possible exception of inner seeing, remarkably close to zero (Table 10). Because we have concluded that the DES 5FP are adequate criteria, we conclude that the NIEQ is inadequate as a measure of the characteristics of inner experience.



Study 2 also used the STS as a measure of inner speaking frequency; the correlation between the STS and DES inner speaking was modest ( $r = .21$ ,  $df = 14$ ) and far from statistically significant. Furthermore, the magnitude of this correlation was dominated by one participant, who was tied for the highest STS score and had the second highest DES inner speaking percentage. Removal of her data would lower the correlation from .21 to .05. Such potential fluctuations reflect, of course, a limitation of small-sample-size studies. However, even this participant dramatically overestimated, on the STS, her percentage of inner speaking as measured by DES: STS inner speech 100 percent (converted from her STS score of 80 following Brinthaup et al., 2015) vs. DES inner speaking 44.4 percent. Therefore, we see reason to believe that questionnaire measures of inner experience (not limited to the NIEQ) may be of low criterion validity.

Thus we brought together psychometrically adequate questionnaires (the NIEQ, and also the STS) and an ecologically adequate sampling method of inner speaking, and found very near zero correlation between them, and it seems unlikely this near zero correlation is due to inadequacy of the measures. A more likely reason for this near-zero correlation is that participants' questionnaire estimates of their inner speaking are substantial overestimates of their actual inner experience: the average discrepancy between the NIEQ estimate and DES frequency was a factor of more than 4 (Table 7).

Whereas in general the NIEQ was not a good predictor of the DES results, we did find one moderate good predictor: the correlation for inner seeing between the NIEQ and DES was  $r = .29$  (Table 10). However, even though the correlation was moderately high, the ability of the respondents on the NIEQ to estimate their own frequency of inner seeing was not good: the NIEQ mean frequency estimate was 69 percent compared with the DES mean frequency of 20

percent. Furthermore, the NIEQ sensory awareness estimate was a better predictor of DES inner seeing ( $r = .48$ ) than was the NIEQ inner seeing estimate itself ( $r = .29$ ). Likewise, the NIEQ inner seeing estimate was a better predictor of DES sensory awareness ( $r = .46$ ) than was the NIEQ sensory awareness estimate itself ( $r = -.11$ ). That is, our results suggest that the correlation between NIEQ and DES inner seeing may arise not from a person's accurate recollection of inner seeing events but from some sort of confusion between sensory awareness and visual imagery. Clearly more research is needed here.

### **Inner Speaking**

As we have seen, Study 2 was interested in all five aspects of inner experience (the 5FP) with, as described above, an emphasis on inner speaking. We might have enlisted participants by random sampling from the general subject-pool population, but that procedure might, by chance, have produced participants with little variability on self-reported inner speaking frequency; such a low variability would lead to low correlations of self-reported inner speaking with all else. We avoided such a potentiality by using a stratified-random-sampling procedure, enlisting participants as random samples from the upper and lower quartiles of the STS, thus ensuring large variability of self-reported inner speaking. Such a procedure would be expected to inflate the correlations of the NIEQ-ISpeaking scale with other measures, including especially DES inner speaking. Even so, the correlation between NIEQ-ISpeaking and DES inner speaking was very small ( $r = .06$ ).

It might be expected that the stratified sampling procedure would suppress correlations among non-inner-speaking variables, and that might indeed be the case. An argument against that interpretation is that with the exception of unsymbolized thinking, the correlations between

the NIEQ-ISpeaking and all other variables were very small (Table 10). This observation would lead to the interpretation that self-reported inner speaking had no effect on anything, so the remaining correlations would have been small if the sample had not been stratified. Certainly replication is necessary on this point.

The strong negative correlation between NIEQ-ISpeaking and DES unsymbolized thinking ( $r = -.60$ ) suggests that participants who believed themselves to have much inner speech, in fact, had little unsymbolized thinking in DES. This is perhaps not surprising, because the definition of unsymbolized thinking includes the denial of the experience of inner speaking at the moment, and participants who believed themselves to have high frequency of inner speaking might indeed have some insight into the not-unsymbolized nature of their inner experience. Another possibility is that DES has shown that, because of presuppositions, sometimes, unsymbolized thinking is not described by participants until fairly late in sampling (Hurlburt & Akhter, 2008). The NIEQ-ISpeaking scale might be interpreted as a measure of presuppositions about inner speech (if not inner speech itself), and those individuals may have resisted the description of unsymbolized thinking across the four sampling days. Replication, perhaps with a longer sampling period, is required.

### **Summary**

We used a questionnaire (the NIEQ) designed to measure directly frequently found characteristics of inner experience (the 5FP). We showed in Study 1 that the NIEQ had good psychometric properties, and that it correlated strongly with another inner experience questionnaire (STS). However, we showed in Study 2 that the correlations of the NIEQ questionnaire with the results of a careful method designed to capture inner experience in high fidelity (DES) were remarkably close to zero. These results suggest that investigators using self-

report questionnaires to investigate inner experience should be cautious when interpreting their results. These findings may have relevance within the clinical psychology field as well, particularly regarding diagnosis. There are numerous questionnaires designed to measure the frequency and severity of symptoms of clinical disorders. Often clinicians accept the types of symptoms patients endorse as characterizations of their inner experience. We think it reasonable to suppose, at least tentatively, that participants are likely giving their presuppositions about their experience, rather than a faithful representation.

For example, a scale widely used in the diagnosis of obsessive-compulsive disorder is the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS; Goodman et al., 1989), which has been repeatedly shown to be valid and useful. The Y-BOCS asks questions such as: “How much of your time is occupied by obsessive thoughts?”; the interviewer scores the answer using this scale: 0 = *None*; 1 = *Less than 1hr/day or occasional occurrence*; 2 = *1 to 3 hrs/day or frequent*; 3 = *Greater than 3 and up to 8 hrs/day or very frequent occurrence*; and 4 = *Greater than 8 hrs/day or nearly constant occurrence*. However, the Y-BOCS’s validity and utility depends on the correlation of items with diagnoses; such correlations do not necessarily imply that patients’ endorsement of such categories are accurate self-characterizations of ongoing inner experience. Our results suggest that such answers may be substantial mischaracterizations, but that should not be taken as undermining the utility of questionnaires such as the Y-BOCS; our results do suggest that one should be skeptical about the presumption that item endorsements reflect the actual nature of experience.

### **Limitations and Suggestions for Future Research**

One notable limitation of our studies was that our research was based on a convenience sample of undergraduate students. Furthermore, in Study 2, our sample was restricted according

to participants who fell within the upper and lower quartiles of self-talk as measured by the STS. We aimed to explore how well college students self-reported the frequency of inner experience using a questionnaire in comparison to their frequencies of inner experience as measured by DES. Yet we were unable to determine how generalizable our findings might be to broader samples, including students who fell within the middle quartiles of the STS, non-college participants, older adults, adolescents, or participants from varying cultures. More research is needed using different populations. Additionally, future research may want to use sampling methods other than convenience sampling to gain a more representative sample of the general population.

Another significant limitation was that our sample size for both studies was small (Study 1, N = 260 ; Study 2, N = 16), which was due to the time and labor intensive nature of DES and its emphasis on the iterative process. For instance, data collection for both of these studies involved seven DES researchers and took approximately two years to complete. Had our sample size for both studies been larger, we would likely have had higher statistical power for detecting more significant relationships and differences (i.e., Table 10, NIEQ inner seeing with DES sensory awareness and NIEQ sensory awareness with DES inner seeing). One way to counter our small sample sizes is by replicating these studies and administering the NIEQ in all subsequent DES studies. Thus, we could continue to compare participants' inner experience frequencies as self-reported on questionnaires with participants' inner experience frequencies as measured by DES. Future research may also want to administer the NIEQ before *and after* DES to see if participants' results change in any way.

Additionally, a main limitation was the NIEQ's 2-item structure to measure each of the 5FP. Although the *Frequently* and *Generally* item pairs for each distinct phenomenon of inner

experience correlated more strongly with each other than with non-paired items (Table 2), these correlations were surprisingly low (ranging from .49 to .21). Further research is required to explain this result.

## Appendix A: Descriptive Experience Sampling (DES)

The purpose of this appendix is to provide the reader with further background regarding the specific methodological characteristics of DES, the method's validity, the method's utility in characterizing the experience of individuals and various populations, and clarification of the five frequent phenomena of inner experience. Please refer to the main document for an overview of the DES method procedures.

### **The Iterative Process, Bracketing Presuppositions, and the Use of Open-Beginninged Prompts**

Hurlburt and Heavey (2004) point out that two perils of observing consciousness is the belief that it is an easy task to complete and the belief that said task generates accurate descriptions of inner experience. They argued that to gather high fidelity accounts of consciousness scientists must employ a careful and systematic method for observing inner experience. A prominent and exhaustive methodological characteristic of the DES method is the iterative process. A series of sampling days and expositional interviews, each successively becoming more and more skilled, allows participants to build expertise in apprehending and describing their inner experience. Most participants at the start of sampling have misconceptions about the task and their own inner experience. Participants on their first sampling day cannot (or at least usually do not) discriminate among their naturally occurring (pristine) inner experience, what they believe should be in their experience, what they believe the investigator wants to hear, and their assumptions of the typical characteristics of their experience (Hurlburt, 2011b). These beliefs, assumptions and judgments about inner experience (e.g., 'I usually say to myself...', 'while I'm doing \_\_\_\_, I tend to feel...') reflect presuppositions. Interviewers have their own presuppositions as well, including expectations about what the participant might say, among

other things. Hurlburt (2009, 2011b) argues that the iterative process of DES sampling days and interviews may lead to higher fidelity apprehensions of inner experience because each successive DES interview trains participants (and interviewers) to become more skilled at setting aside, or “bracketing” their presuppositions. Although other experience sampling methods may also have a repetitive aspect, they do not bracket presuppositions and therefore accomplish the same goal as DES, which is apprehending pristine inner experience (Hurlburt 2011b; Hurlburt & Akhter, 2006; Hurlburt & Heavey, 2015). When comparing DES to Petitmengin’s interview method (PIM), Hurlburt and Akhter (2006) emphasize that the PIM method reifies presuppositions of experience by asking participants to recreate their experiences, assuming recreated experience is the same as pristine experience (Hurlburt & Akhter, 2006). By contrast, DES uses techniques that aim at bracketing assumptions about the nature of inner experience.

One effective way to bracket presuppositions is to use open-beginninged questions when examining inner experience (Hurlburt, 2011a, b, 2009; Hurlburt & Heavey, 2006; Hurlburt & Schwitzgebel, 2007). Hurlburt (2009) describes an open-beginninged probe as “one that leaves *both* the beginning and the end of the response spontaneous and unguided” (Hurlburt, 2009, p.169). For instance, “What, if anything, was in your experience at the moment?” is an example of an open-beginninged question. An example of a closed-beginning question is “What did you innerly say to yourself when you experienced...?”. The beginning of the response is specified—the response will be about innerly speaking. Open-beginninged questions convey that the interviewer is genuinely interested in the participant’s experience (or lack thereof) at the moment of the beep (Hurlburt, 2009). They do not contain any assumptions of what might or should be in one’s inner experience and in so doing they refrain from reifying the participant’s (and interviewer’s) presuppositions. Thus, after participants are exposed to open-beginninged probes



during the first (and second, third, fourth) interview, participants approach the second (third, fourth, fifth) sampling day with more skill of setting aside their assumptions of inner experience and more expertise in apprehending their inner experience. Hurlburt (2009, 2011b) argues that the iterative process works hand-in-hand with open-beginninged examination. One is not possible without the other. Open-beginninged examination allows for clarification and new understanding about one's presuppositions, the genuine aim of the interviewers, the sampling method itself, the apprehension of inner experience, and the language used to describe those apprehensions. In turn, participants use the clarification and new understanding from the previous interview to inform their future action during the next sampling day and subsequent interview. As their skill in bracketing presuppositions and observing inner experience increases with each iterative interview, so, too, does their ability to apprehend and describe inner experience in high fidelity.

### **The Validity of The DES Method**

The open-beginninged format of the DES interview encourages the participant to describe any and all types of inner experience. Unique and/or idiographic descriptions of a participant's experience result from each interview (Hurlburt & Akhter, 2006). However, one may question the validity of whether these idiographic descriptions are valid characterizations of a participant's experience. A common limitation of introspective methods is language. Language used to report inner experience is extremely undifferentiated by comparison to language used to describe external events (Hurlburt & Heavey, 2001, Skinner, 1953). Skinner argued, and Hurlburt and Heavey (2001) emphasized, that we, as a verbal community, establish distinct and differentiated verbal responses when describing an external event. For instance, if the external event is "eating" and an individual uses "biting" and "chewing," to describe eating, those words

will likely be reinforced as high fidelity descriptive wording of eating because both the individual and community have access experiencing the external aspects, “biting and chewing”. Because all can directly see biting and chewing, they can refine the word usage to describe the event. By contrast, when we verbalize private events, such as “I was thinking about the pain in my right foot,” the individual and community do not have shared access to the experience of the private event. Thus the use of “thinking” as a verbal response to describe private events is not generally reinforced and shaped by the community into a high fidelity descriptive language.

A way DES researchers aim to collect high fidelity accounts of experience is by identifying occurrences of “subjunctifications” during the interviews. As the interview occurs, researchers are sensitive to the use of any subjunctifiers—movements, expressions or vocalizations that suggest the participant has deviated from describing experience at the moment of the beep (Hurlburt, 2011b). For example, a participant may use general statements that seem to describe experience (e.g., “I usually...”) or use verbs in the subjunctive mood (e.g., “I would think) that suggest that participant is describing a belief about experience and not fact. Additional examples of subjunctifiers are approximations (e.g., “like, pretty much”), intentional expressions (e.g., “I was trying to...”), casual inferences (e.g., “because”), and behavioral markers such as long pauses, absence of eye contact with interviewers, or facial expressions suggesting the participant is confused, stressed or unsure (Hurlburt, 2011b). Participants learn through the iterative procedure of DES that high fidelity descriptions of their inner experience require specific details and bracketing presuppositions (Hurlburt, 2009).

A case study conducted in 2014 examined the validity of DES descriptions using an fMRI scanner (Kühn, Fernyhough, Alderson-Day, & Hurlburt, 2014). The study was divided into four phases. During the first phase the participant, Lara, was introduced to the study and the

procedures of fMRI scanning process. 10-minute baseline brain structural scans and 5-minute resting state scans were taken. Lara was then asked to complete an imagination task while in the scanner that required her to imagine saying, seeing, hearing, feeling and sensing something. During the second phase the participant was trained in the DES method. She sampled for four natural-environment periods, each followed by an expositional interview. Phase three of the study required Lara to complete a DES sampling session while in the fMRI scanner for a 25-minute period. In the scanner, Lara collected four samples, jotting down notes after each sample. Immediately after the 25-minute period, she participated in a DES expositional interview. Lara completed this in-scanner-sampling/expositional interview procedure nine times in phase three, collecting 36 random samples of experience. In phase four, Lara underwent another 10-minute structural scan and a 5-minute resting-state scan. Results showed that fMRI activations within the brain associated with speech processing correlated with DES identified moments of inner speaking in Lara's experience. Although this study examined a single case, it does suggest that the DES method may apprehend valid and high fidelity accounts of an individual's inner experience.

DES is also an ecologically valid method; it has participants apprehend their experience in their natural environment instead of laboratory settings in an attempt to have a participant's DES sampled experiences be characteristic of their everyday inner experience. Ultimately, a major aim of DES is to create high fidelity accounts that are characteristic of an individual's everyday inner experience (Hurlburt, 1997; Hurlburt & Heavey, 2006). An extension of the fMRI case study described above (Kühn et al., 2014) investigated the degree to which participants' experiential frequencies in their natural environment correlated with their experiential frequencies at resting state in the fMRI scanner (Hurlburt, Alderson-Day,

Fernyhough, & Kühn, 2015). This study included five participants who completed the same four phases of the Kühn et al. (2014) study. Each participant was iteratively trained in DES (phase two) before completing the 25-minute in-scanner-DES sampling/ 1-hour expositional interview procedure (phase three). Participants were told to relax and keep their eyes open while in the scanner. Each participant completed the procedure nine times, collecting 36 random samples of inner experience and spending a total of 225 minutes in the fMRI scanner. Findings showed that in-scanner resting state experiences were highly correlated with natural environment experiences, with the exception of inner seeing, which was less frequent in the scanner. Participants who had a high frequency of a specific characteristic in the natural environment also had a high frequency of the same characteristic in the scanner while at resting state. This suggests that people's characteristically spontaneous inner experience in their natural environment also occurs while in resting state in the scanner.

Hurlburt et al.'s (2015) results suggest that whether resting or not, an individual innerly experiences in his own usual way, whatever that may be. However, does inner experience in the resting state strongly relate to instructed inner experience? Hurlburt, Alderson-Day, Kühn, & Fernyhough (2016) used the same five participants from Hurlburt et al. (2015) and compared brain activation during spontaneous inner speech at resting state (i.e., random experiences apprehended by the DES method) to brain activation during task-elicited inner speech (i.e., participants were instructed to innerly say "elephant"). Hurlburt et al. (2016) found significant differences between brain activation, suggesting that, at least for some people, elicited inner speaking is not neurally or phenomenologically the same as spontaneous inner speaking. These findings also support DES as an ecologically valid method.

Hurlburt et al. (2015) not only conducted a within-subject analysis of natural environment DES results with resting state DES results, but also examined the inter-individual differences of inner experience while in resting state and in their natural environment as measured by the five frequent phenomena (5FP; Heavey & Hurlburt, 2008; Hurlburt & Heavey, 2002). Participants' in-scanner DES results varied greatly, indicating that participants' salient characteristics of inner experience during resting states might differ considerably. For instance, the resting state frequency of inner speaking ranged from 14 to 53%. Similar individual differences regarding the wide 5FP frequency ranges were found in the natural environment.

### **Common Inner Experience Characteristics of Various Populations as Identified by DES**

Hurlburt et al.'s (2015) across-subject differences support Heavey and Hurlburt's (2008) findings such that there are large differences between individuals regarding the frequency of each of the five frequent phenomena. DES has repeatedly shown that individuals' inner experience can vary greatly. Likewise, DES has shown that there are some salient features of inner experience that emerge across groups of individuals who share the same traits or characteristics. DES is an idiographic procedure that identifies and describes salient features of an individual's natural inner experience. However, this idiographic procedure can be used towards examining nomothetic characterizations of the inner experience of various populations. The procedure is a bottom-up process, beginning with the faithful apprehension of each individual's inner experience (Hurlburt & Akhter, 2006). Then researchers characterize each individual's salient features of inner experience, and subsequently compare across individuals to identify any shared features of inner experience.

Several DES studies have examined groups of individuals who share the same traits, such as rapid speaking (Hurlburt, Koch, & Heavey, 2002) and left-handedness (Mizrachi, 2014).

Other studies have investigated clinical populations, such as individuals with schizophrenia (Hurlburt, 1990), major depressive disorder (Hurlburt, 1993; Lefforge, 2011; Mihelic, 2013), anxiety (Hebert & Hurlburt, 1993), Asperger's syndrome (Hurlburt, Happé, & Frith, 1994), bulimia nervosa (Jones-Forrester, 2006, 2010; Hurlburt, 2011b), and Posttraumatic Stress Disorder (Reger, 2016).

DES has demonstrated on multiple occasions that individuals of various groups, particularly clinical populations, share experiential commonalities. For instance, DES found that participants diagnosed with schizophrenia tend to experience clear (or hyperclear), distinguishable emotions and distorted or inaccurate visual images (Hurlburt, 1990; Hurlburt & Melancon, 1987). Studies investigating depression found that depressed individuals had a tendency of experiencing a higher frequency of unsymbolized thinking (thinking that is not characterized by images, words or any other symbol) than do non-depressed individuals (Hurlburt, 1993). Also, DES showed evidence that depressed individuals had a higher frequency of inner speaking and feelings, as well as experienced a greater ratio of negative to positive feelings than those who were not depressed (Lefforge, 2011). DES also studied individuals with anxiety (Hebert & Hurlburt, 1993), finding that anxious individuals experience higher proportions of self-criticism as well as other-directed criticism. Another study examined inner experience of individuals diagnosed with Asperger's syndrome (Hurlburt, Happé, & Frith 1994), finding almost exclusively inner seeing, with no inner speaking, feelings or bodily sensations. Participants also had a higher than normal frequency of having no inner experience at all, and the few accounts. These results are consistent with other experiential findings of individuals with Asperger's syndrome (Grandin, 1992; Schoper, Reichler, & Lansing, 1980). Furthermore, these participants were not interested in learning whether their experience was similar to others'; most

DES participants are curious how their experience compares to others' (Hurlburt, Happé, & Frith 1994). DES also found that women diagnosed with bulimia nervosa often experienced multiple inner experience phenomena simultaneously in one moment, called "fragmented multiplicity of experience" (Hurlburt, 2011b; Jones-Forrester, 2006, 2010). Participants' frequency ranged from 44 percent to 92 percent of multiple phenomena experiences. The median frequency of fragmented multiplicity of experience for non-bulimic participants was 0 percent.

DES has also shown that non-clinical individuals who share an external characteristic share experiential commonalities. Hurlburt, Koch, and Heavey (2002) examined the relationship between inner experience and rapid external speech (measured in words per minute). Participants with high external speech rate experienced multiple awarenesses three-times more than did controls (25.9% and 7.1%, respectively). Participants also experienced a higher frequency than controls of "just doing," which is an experiential phenomenon pertaining to the participant engaging in an activity with no ongoing inner experience.

### **The Emergence of the Five Frequent Phenomena (5FP)**

In 2002, Hurlburt and Heavey investigated the inter-rater reliability of DES and its coding system of inner experience descriptions, and in so doing identified five frequent features of inner experience. The names for these five characteristics have evolved since the original study, and are now called inner speaking, inner seeing, unsymbolized thinking, feeling, and sensory awareness.

In 2008, Heavey and Hurlburt conducted a follow-up study to quantify the relative frequency of those five phenomena. The researchers randomly selected 30 participants from a stratified sample of undergraduate students. Participants sampled their inner experiences using the DES method and, each day, took part in an expositional interview. This process was iterated

for three days, collecting 6 samples per day. The first day of sampling/interviewing was considered as training and the samples were discarded. Each participant was expected to contribute 12 samples, but the researchers used only 5 samples from each day to allow for the possibility that samples might be unusable (for example some participants did not jot down notes about a sample immediately after a beep sounded). Overall there were 295 samples included in the final data set. The researchers used the codebook developed by Hurlburt and Heavey (1999) to determine for each sample if one or more of the 16 common forms of inner experience were present. Because the nature of DES is exploratory, Hurlburt and Heavey did not want to limit the coding to the five most common phenomena identified in their 2002 inter-rater reliability study. The researchers were also open to the possibility of new forms of experience emerging in samples that did not fit within the codebook.

After calculating the frequencies, there was a clear split with the five phenomena (i.e., inner speaking (called there “inner speech”), inner seeing (called there “images”), unsymbolized thinking, feelings, and sensory awareness) occurring frequently—approximately one quarter of sampled moments (22% or more)—and the other 11 phenomena occurring infrequently (3% or less). Heavey and Hurlburt (2008) also calculated the intercorrelations of the five phenomena, which were generally modest and negative, suggesting these features of inner experience are independent. Furthermore, they found that the frequency of the five phenomena varied greatly across participants. For instance, while five participants experienced 0 percent inner speaking in their experience samples, one participant experienced the same phenomena in 75 percent of his samples. Kühn et al (2014) referred to the five frequent phenomena as the “5FP.”



## Appendix B: Other Modern Experience Sampling Methods

A variety of methods have been developed to examine inner experience. The most common forms of these methods are discussed below and include collecting experience samples through interviews, self-rating forms, verbally produced “think aloud” methods, and diaries. Questionnaires have also been used to investigate inner experience, which is discussed in Appendix C.

### **Experience Sampling Method (ESM) and Ecological Momentary Assessment (EMA)**

The Experience Sampling Method (ESM), developed by Csikszentmihalyi, Larson and Prescott (1977), is used to explore an individual’s natural environment, behavior and inner experience (Csikszentmihalyi & Larson, 1987). This method samples individuals’ daily cognitive states and activities using self-report forms and signaling devices (such as pagers, palm pilots, or programmable wristwatches) that sound on quasi-randomized signals throughout the day (Csikszentmihalyi & Larson, 1987; Larson & Csikszentmihalyi, 1983; Trull & Ebner-Priemer, 2009). Participants are also given a pad of paper, questionnaires, or are instructed to use their sampling device (i.e., palm pilot) to report on their current experience immediately after the beeper signals by completing an electronic self-report questionnaire; these questionnaires, whether paper or electronic, are typically called the Experience Sampling Form (ESF). The ESF is composed of both open-ended free response questions as well as closed-ended Likert scale questions (Larson & Csikszentmihalyi, 1983), and it generally inquires about the participants’ current location, activity, thought and mood. Essentially, the ESF is used to help direct participants’ focus at inner experience and guide descriptions of their experience (Csikszentmihalyi & Larson, 1987). The collection and compilation of ESF samples is believed to capture accurate information about a participant’s external state and inner experience. Overall,

ESM is said to have good ecological validity (Trull & Ebner-Priemer, 2009), and its use of the ESF minimizes retrospective errors. In addition, the items on the ESF can vary depending on the research focus. Furthermore, the method's immediate recall format and randomly timed samples in one's natural environment (Klinger & Kroll-Mensing, 1995) allows it to be cost-effective as well as an easy way to collect a large number of samples. Also, researchers have the advantage of examining how experience is impacted by situational factors because the ESF collects both experiential and contextual data (Hormuth, 1986; Stone & Shiffman, 1994).

ESM has been used to investigate the inner experience of participants' affect and cognitions. In terms of clinical populations, ESM has been used to examine the inner experience of individuals diagnosed with schizophrenia (Kimhy et al., 2007), as well as to compare positive and negative affect patterns between depressed and non-depressed individuals (Peeters, Berkhof, Delespaul, Rottenberg, & Nicolson, 2006). Another study measured emotional reactivity to daily frustrations in individuals diagnosed with bipolar disorder in comparison to a control group (Myin-Germeys et al., 2003). Findings suggested that participants with bipolar disorder experienced a decrease in positive affect in response to daily hassles. ESM has also been used to examine individuals' emotional and motivational states. For instance, ESM researchers have looked at variations across cultures regarding pleasant and unpleasant affect (Scollon, Diener, Oishi & Biswas-Diner, 2004) as well as the relationship between intrinsic motivation and the experience of time passing (Conti, 2001), among other variables.

Ecological Momentary Assessment (EMA) is a variation of ESM that was originally used as a medical assessment measure to collect ecologically valid data on patients. Particularly, researchers using EMA are interested in obtaining information about how people experience medical illnesses. Similar to ESM, EMA uses electronic devices to signal the participant to fill

out an experience questionnaire as well as a physiological measure (e.g., pain rating) (Shiffman, 2000). Signals are typically delivered several times over the course of a day, sometimes for extended periods of time. Unlike the usually random reporting schedules of ESM, EMA often uses a non-random signal schedule to focus on specific time periods, and researchers can select the reporting schedule based on their particular assessment interests (Stone & Shiffman, 1994). Investigators have increased flexibility in choosing to signal subjects in three different types of schedules: time contingent (e.g., every few hours), event contingent (e.g., after a target event, such as after exercise, or an anxiety attack), and signal contingent (e.g., at the prescribed signal). EMA has been used to study a variety of topics within the psychological and behavioral-medical fields, particularly because of its use of physiological measures, including stress and coping (Bolger & Zuckerman, 1995), chronic pain (Bruehl, Liu, Burns, Chont, & Jamison, 2012), insomnia (Miller, Kyle, Marshall, & Espie, 2013), and behavioral patterns surrounding diet and exercise (Spook, Paulussen, Kok, & van Empelen, 2013).

Before participants engage in the ESM or EMA process, they undergo one initial training session in which they learn about the method, are given the opportunity to ask questions about the procedure, and may practice filling out the ESF (Csikszentmihalyi & Larson, 1987). According to Hurlburt and Heavey (2015), however, a one-day training is not adequate to capture inner experience in high fidelity. Although the ESM training and the ESF instructions emphasize the importance of reporting on the moment right before the beeper sounds, Hurlburt and Heavey (2015) argue that participants' ability to focus and report on a specific, clearly identified moment requires more than one-occasion instructions. ESM's minimal training makes it challenging to be confident that participants are using the instructed time period to report their experience (Trull & Ebner-Priemer, 2009).

A similar limitation is that the specific ESF questions cue participants to focus and reflect on the particular features of experience inquired about. Although the ESF asks questions about experience, it is uncertain if these inquiries capture important features of experience. For instance, if Sally is asked always to report about her feelings at the time she was signaled, Sally will likely be inclined to report an emotion, even if there were no feelings in her awareness at the moment she was signaled. Sally also is likely to try to recall an instance around the signaled moment when she did experience an emotion, and so her report may not be anchored to the moment of the beep. ESF questions are likely to bias participants into reporting on experiences that may not have occurred at the signaled moment.

Another primary limitation of ESM and EMA is language. Both methods assume that everyone has the same understanding of words, particularly words like “thought” and “feeling.” However, Skinner (1953) and Hurlburt and Heavey (2001; cf. Heavey, Hurlburt, & Lefforge, 2010) showed that the language used to report inner experience is often poorly differentiated compared to language used to describe external events (Skinner, 1953 (see appendix A.2.). The referent when a person says (either in interview or in responding to an ESF question) “I was thinking” varies widely from one person to another (Hurlburt, 2011b; Hurlburt & Heavey, 2015; Hurlburt & Schwitzgebel, 2007). For instance, suppose Celia and Roy each fill out the ESF by writing “I was thinking about what I want for dinner.” Carefully examined (which is not possible with ESM or EMA) “thinking” for Celia means that she is experiencing the jaggedness of her tooth against the tip of her tongue. By contrast, for Roy, “thinking” means that he is feeling annoyance associated with having to decide what to eat for dinner. Both Celia and Roy report their “thoughts”; however Celia's inner experience greatly differs from Roy's when “thinking” about what they want for dinner. When one applies “thinking” to describe his or her inner

experience, it refers to what is occurring inside the individual that is not visible to anyone else, including a cognitive experience, an emotion, or a bodily sensation. Individuals' use of "thinking" to describe inner experience does not aim primarily at cognition (Hurlburt & Schwitzgebel, 2007). Thus, participants may vary greatly based on their notions of "thought" and the ESF does not capture this variability. These limitations of ESM and EMA indicate these methods may not be able to investigate inner experience and apprehend it in high fidelity; this is particularly clear due to the lack of iterative training and the opportunity to clarify meaning of inner-experience related words and phrases like "thought" and "the moment before the alarm sounds."

#### **Think-Aloud (TA) Method & Articulated Thoughts in Simulated Situations (ATSS).**

Another technique designed to examine the characteristics of inner experience is Think-Aloud (TA). This method is used to investigate cognitions through the participants' verbal expression of thoughts (Aanstoos, 1983, Ericsson & Simon, 1984). One underlying principle of TA methods is that most people experience thoughts in a stream-of-consciousness format as they engage in their daily routines, and that these thoughts can be readily accessed and voiced. TA research primarily explores cognitions that transpire while participants complete a task (Bloom & Broder, 1950), and they are instructed to complete a task while tuning into their present thoughts and verbalizing them. For instance, some studies have participants verbalize their thought processes while interpreting items of a self-report questionnaire and responding to it (Darker & French, 2009; French, Cooke, McLean, Williams, & Sutton, 2007). Participants' verbalized experiences are recorded, transcribed, coded and interpreted (Davison, Navarre, & Vogel, 1995).

TA data are coded and categorized based on the focus of research and its relevant themes of content. Two main coding strategies are used to categorize and describe TA data: context-free and context-specific approaches. The context free approach, proposed by Ericsson and Simon (1984), divides recordings of TA data into segments and randomizes these segments. This is so raters can decide how to categorize data as discrete segments, free from contextual biasing effects. Yang (2003) on the other hand has argued that segmented experiences are context-specific and cannot easily be categorized. The context-appreciative coding method differs from the context-free approach by keeping segments of experience in normal sequence. Each data segment is then cross-referenced with its previous and subsequent segment. Cross-referencing segments helps researchers recognize specific thought patterns that may otherwise be overlooked when categorizing and encoding segments independently of their context (Yang, 2003).

TA methods were used starting in the 1950's and 1960's, when researchers explored problem-solving skills in college students (Bloom & Broder, 1950) and the thought processes of average and superior chess players (de Groot, 1965). Since then, the use of TA methods in research has expanded, including studies in consumer psychology as well as social, educational and clinical psychology. For instance, TA has been used to investigate purchasing behaviors and cognitions of African-American mothers while shopping for fruits and vegetables (Reicks et al., 2003). Likewise, another study looked at cognitive strategies used while individuals recalled at-risk sexual behaviors and counts of sexual partners (Bogart et al., 2007). TA has also been used to examine the ease of navigating Internet-based learning tools (Cotton & Gresty, 2006), as well as to assess memory differences between depressed and non-depressed individuals (Barnhofer, Jong-Meyer, Kleinpaß, & Nikesch, 2002).

Articulated Thoughts in Simulated Situations (ATSS) is an alternative method to the TA method. ATSS uses an imaginal approach in which participants are asked to imagine themselves in a hypothetical scenario that is presented to them via an audio or video recording (Davison, Robins, & Johnson, 1983). Like TA, ATSS assesses its participants' cognitions as they verbalize them, and thus, participants are asked to articulate their ongoing thoughts as they complete the imaginal exercise (Eckhardt, Barbour, & Davison, 1998).

ATSS has been used in multiple areas of research, including studies investigating cognitive distortions (Eckhardt & Kassino, 1998), cognitive change before and after psychotherapy (Szentagotai, Lupu, & Cosman 2008), anti-gay bias (Rayburn & Davison, 2002), smoking relapse (Haaga, 1989), and smoking cessation (Pearlman, Wernicke, Thorndike, & Haaga, 2004). With regard to studies of psychopathology, ATSS has been used to explore cognitions of social anxiety (Bates, Campbell, & Burgess, 1990), phobia of flying (Moller, Nortje, & Helders, 1998), and binge eating (Clyne & Blampied, 2004). This method has also been used to compare cognitive biases of participants with and without depression when presented with negative, neutral and positive hypothetical situations (White, Davison, Haaga & White, 1992). There, the environmental input of each hypothetical situation was manipulated to detect changes in cognitive bias across groups. The negative situation consisted of participants imagining partaking in a conversation regarding an acquaintance being disappointed with the participant, whereas the positive scenario involved the acquaintance being grateful for the participant and expressing praise. The neutral situation involved the acquaintance discussing innocuous topics unrelated to the participant. Findings showed that depressed individuals experienced significantly more cognitive bias than do non-depressed participants in negative situations, but not in the neutral or positive scenarios (White et al., 1992). This indicates that

situational-specificity may influence differences in cognitive bias between depressed and non-depressed individuals.

ATSS is particularly useful for investigating emotions because the hypothetical scenarios can be manipulated to elicit specific types of emotional responses from participants (Eckhardt et al., 1998; Zanon & Davison, 2009). In particular, ATSS has been used to examine cognitions related to anger and aggression. Eckhardt and Kassirer (1998) compared cognitive distortions and cognitive deficiencies of married men who were or were not violent towards their spouses. Results suggested that married non-violent men showed more anger control and less negative affect than did violent men during simulated situations meant to evoke anger. Additionally, married violent men reported a significant increase in irrational beliefs and automatic thoughts when responding to the anger-inducing hypothetical scenarios (Eckhardt & Kassirer, 1998).

The fact that researchers have the ability to control and alter emotional content of the imaginary situations is a significant advantage of ATSS. Emotions and their relation to cognitive processes are challenging to elicit and investigate naturalistically. Moreover, ATSS occurs in a laboratory setting, giving researchers an easier time to capture, record and examine participants' verbalized experiences. Also, because of the use of imaginary research, ATSS can accommodate the exploration of a wide range of subject matter (Zanon & Davison, 2009).

The TA method, like ATSS, is a flexible approach that can be used to explore cognitions in various tasks or situations, and also occurs in a laboratory setting. Both methods minimize retrospective errors because participants' verbalizations of thoughts are generated in the moment (Davison et al., 1995; Ericsson & Simon, 1984). Moreover, participants are less likely to analyze their own experiences and change their verbalizations because of the immediacy of the reporting



(Davison et al., 1995). Lastly, both methods are relatively unstructured regarding participant reporting, which allows variability in the content and structure of the thoughts reported.

Whereas TA and ATSS share certain advantages, they share disadvantages as well. Both methods lack ecological validity. Participants' reports might be impacted by the laboratory setting or by the presence of the experimenter (Genest & Turk, 1981). Thus, thought processes observed in a laboratory setting cannot be generalized to mental processes that might arise in the natural environment. In addition, Davison et al. (1995) as well as Cotton and Gresty (2006) criticize the assumption upon which the TA and ATSS method function: that it is possible for participants to simultaneously attend to their cognitions and verbalize them with ease and without omitting (consciously or unconsciously) important parts of their experience. Klinger (1975) indicated that the TA task itself might impede the participants' ability to experience their cognitions naturalistically. Likewise, participants may censor what they report due to social desirability bias or because they believe some content is not relevant (Davison et al., 1995).

Lastly, and perhaps most importantly, both methods rely on the assumptions that inner experience is easily described, that inner experience is mostly, if not all, composed of cognitions, and that most if not all cognitions are in words. However, some research indicates that features of inner experience are highly idiosyncratic, are not solely cognitions, and may (but not always) include phenomena such as inner seeing, inner speaking, feelings, sensory awareness and unsymbolized thinking that are difficult to verbalize (Hurlburt, 2011b; Hurlburt & Heavey, 2006). These drawbacks suggest TA and ATSS may not be effective methods for examining the wide range of naturally occurring features of inner experience.

### **Diary Methods**

Diary methods are another category of experience sampling methods used to investigate individuals' inner experiences. These methods require participants to keep a diary or some type of written narrative about their experiences (Bolger, Davis, & Rafaeli, 2003). The aim of these methods is two-fold: 1) to explore inner experience phenomena as it unfolds across a designated time span (hours, days, weeks or months); and 2) to investigate specific phenomena (Bolger et al., 2003; Breakwell & Woods, 1995). Participants are informed of the research target prior to recording and are often provided scales related to that target in an effort to direct participants' focus to certain features of their experience (Hedges, Krantz, Contrada, & Rozanski (1990); Wutich, 2009). Participants are instructed to record their thoughts, emotions and behaviors in a written narrative regarding a specific topic or scenario within a certain period of time.

Diary methods have been used in a variety of studies within psychological research, including those examining the inner experience of eating behaviors (Conner, Fitter, & Fletcher, 1999), adolescents' transitioning self-identity (Becht et al., 2016), sexually risky behaviors (Morrison-Beedy, Carey, Feng, & Tu, 2008), work motivation (Navarro, Arrieta, & Ballen, 2007), alcohol consumption (Web, Redman, Sanson-Fisher, & Gibberd, 1991), mood and anxiety (Ollendick, 1995; Stone & Neale, 1982), and perfectionistic self-presentation and social anxiety (Mackinnon, Battista, Sherry, & Stewart, 2014), among others.

The various structures of diary methods can be categorized into three different designs: event-contingent, interval-contingent, and signal-contingent (Bolger et al., 2003). These three contingencies direct participants when and how to record their inner experiences. Event-contingent designs require participants to document their experience each time a specific event occurs (e.g., every time they consumed alcohol, or each time they were involved in interpersonal conflict). It is very important for researchers who use this design to create clearly defined

triggering events (Bolger et al., 2003); otherwise ambiguity increases the risk of participant confusion concerning whether an event is deemed reportable. Interval-contingent designs involve participants following regular fixed time schedules (such as every evening) to attend to and record their experience. Signal-contingent designs prompt participants to report on their experience when signaled by a signaling device at random intervals, fixed intervals, or a combination of both intervals.

The two main methods for collecting data from diary methods are electronic devices (e.g., palmtop computers or personal digital assistants (PDAs)) and paper-and-pencil diaries (Bolger et al., 2003). While paper-and-pencil diaries are cost effective and are more commonly used than electronic methods, the latter are advantageous such that they provide researchers more control over the study, including when to remind participants to complete their diaries, as well as allowing researchers to ascertain when participants reported their experience (Bolger et al., 2003; Taylor, Fried, & Kenardy, 1989; Thiele, Laireiter, Baumann, 2002). Research findings also suggest that the use of electronic devices when compared to paper-and-pencil diaries for data collection increases compliance (Stone, Shiffman, Schwarz, Broderick & Hufford, 2002). Stone et al. (2002) sampled 80 participants to investigate method compliance, with half the participants filling out paper-and-pencil diaries and the other half completing electronic diaries. The investigators used photosensors to detect when participants opened and closed their paper diaries, while the electronic devices automatically time-stamped when participants activated their diaries. Participant self-reports showed 90% compliance yet results based on the photosensors showed that compliance for the paper diary method was as low as 11%. Compliance rates for electronic diaries were markedly higher at 94%. Likewise, another study found 88% compliance when using the electronic diary method with an interval-contingent design (Taylor et al., 1989). On the

contrary, Green, Rafaeli, Bolger, ShROUT, and Reis (2006) found that both methods had very similar compliance rates of approximately 86%. However, results showed that participants completing paper-and-pencil diaries were less inclined to complete all required fields for their daily entries than participants using electronic diaries.

One advantage in using diary methods is that they are ecologically valid and use an open-ended format to collect comprehensive narratives of experience as they occur in the participant's life. Such in-depth accounts of experience would be challenging or impossible to acquire with closed-ended format methods such as questionnaires (Hektner & Csikszentmihalyi, 2002). Another significant advantage is that diary methods request immediate recall and reporting (Bolger et al., 2003; Breakwell & Woods, 1995; Thiele et al., 2002). Thus, when participants adhere to the method, errors are reduced because there is shorter retrospection and a shorter reference period (e.g., the moment of the signal vs. the past 30 days). Diary methods also allow for investigating within-subject and between-subject differences (Bolger et al., 2003). Overall, diary methods have shown to be a relatively convenient way to collect in-depth narratives of experiential data.

On the other hand, there are disadvantages to diary methods. Although diary methods can reduce reporting errors, the length of retrospection and reference period are still too long in comparison to the other experience sampling methods described above. Moreover, attrition rates are typically high and participant motivation tends to decline because participants are often required to complete diary entries multiple times day over a span of weeks or months (Bolger et al., 2003). Diary methods may also be prone to social desirability effects. For instance, participants may be less likely truthfully to report experiences that are against social norms and cause the participant to feel ashamed. Researchers have minimal interaction with participants

during data collection and thus they have little control in verifying that participants are adhering to protocol or in encouraging honest reporting (Thiele & Baumann, 2002). The disadvantages of diary methods make it difficult to ensure participant compliance and accurate reporting, which can be a challenge when exploring specific features of inner experience.

## Appendix C: Self-Report Inner Experience Questionnaires

During the early 20<sup>th</sup> century, psychologists began to change their methods to explore inner experience using self-report questionnaires, which Costall (2006) indicates were deemed “sensitive indicator[s] of what is going on inside the subject” (as cited in Hebb, 1966, p.6). While initial self-report measures consisted largely of open-ended questions and were descriptive in nature, by the mid 1900’s, they became increasingly structured and quantitative. The present review will focus most directly on questionnaires that seek to measure inner speech, and will use those examples to highlight issues in questionnaires in general.

### **Questionnaires Measuring Inner Speaking**

Whereas most inner-experience questionnaires focus on one or a few aspects of consciousness, there is one questionnaire that has a broad focus: One known self-report measure developed to study inner experience is the Phenomenology of Consciousness Inventory (PCI). This 53-item questionnaire was designed by Pekala and Levine (1981) to assess twelve major subsystems of inner experience, including state of awareness, altered experience, volitional control, self-awareness, rationality, internal dialogue, positive affect, negative affect, imagery, attention, memory, and arousal (Pekala, 1982). Participants are asked to retrospectively rate the questionnaire’s 53-items on 7-point likert scales in reference to a preceding event. Studies using the PCI have mostly examined how these twelve major dimensions differ between alternative consciousness states. For instance, Woodside, Kumar and Pekala (1997) used the PCI to investigate how monotonous percussion drumming as well as yogic sitting and standing “trance” postures are associated with states of consciousness. In particular, this study found that participants having sat in trance postures while listening to monotonous percussion drumming retrospectively reported on the PCI more internal, absorbed attention, less self-awareness and

less internal dialogue than participants who stood in trance postures while listening to monotonous percussion drumming. These results suggest that participants who sat in trance postures while listening to drumming experienced meditative-hypnotic-like states.

The PCI defines its internal dialogue dimension as “silent talking” (e.g., “I was silently talking to myself a great deal”, or “I did not engage in any silent talking to myself.”) Although the PCI was designed to map consciousness in general (Pekala, 1982), there are several self-report measures that have been developed simply to examine inner speech. In 1996, Burnett designed the Self-Talk Inventory (STI) to measure children’s positive, negative and neutral self-talk. Many of the questionnaire’s items originated from a study conducted by Burnett (1994) in which 105 elementary school children were interviewed about their self-talk in response to nine various imagined situations (e.g., “you are coloring in an important drawing, you slip and draw outside the line, ruining the drawing. What kinds of things do you say to yourself?” “Your teacher praises you in front of the whole class for doing really good work. What kinds of things do you say to yourself?”) The children’s responses were then analyzed and categorized into positive, negative or neutral self-talk responses. Items of the STI were formed based on the three most commonly used positive and negative self-talk responses given for each of the nine imagined situations. Burnett included a tenth situation with three positive and three negative self-talk statements, making the STI a 60-item questionnaire. The original STI has been used in four studies, all of which investigate self-talk in adolescent samples in academic settings. Notably, the STI does not differentiate between inner and external self-talk as evidenced by its use of vague instruction (i.e., “How would you say this to yourself?” or, “What kinds of things would you say to yourself?”).

In Burnett's (1996) first study using the STI, a sample of 675 elementary school children ranging from the 3<sup>rd</sup> to 7<sup>th</sup> grade completed the measure by endorsing whether they would say each of the 60 items to themselves using a 'Yes', 'Sometimes', or 'No' format in response to each imagined situations. One of Burnett's aims in this study was to examine developmental and gender differences in positive and negative self-talk. Results suggested that the frequency of negative self-talk increased for girls between the 3<sup>rd</sup> and 5<sup>th</sup> grade and then plateaued, whereas for boys, negative self-talk gradually increased over time. The study's results also indicated that positive self- talk for girls declined between grades 2 and 6, whereas positive self-talk for boys remained stable across grades.

Calvete and Cardenoso (2002) translated the STI to Spanish and increased the maturity of the imaginary situations so that they would be more applicable to a sample of 13-17 year old adolescents. They also reduced the item count from 60 to 52, so that the scale was evenly sub-divided into the negative self-talk scale and the positive self-talk scale, with each scale composed of 26 items. Uttl, Morin and Hamper (2011) examined the internal reliability for each of the subscales, and both had high reliabilities (STI Negative Self-Talk Scale, .90; STI Positive Self-Talk Scale, .81).

In 2005, Calvete and Cardenoso used their adapted version of the STI to examine gender differences among adolescents regarding cognitive vulnerability to mood disorders and behavioral problems. Unlike the other studies where the STI was used to evaluate specifically the frequency of self-talk, this study used the STI to measure the frequency of positive cognitions and negative cognitions. Participants who scored higher on positive self-statement responses were considered to be using positive cognitions to control thoughts, emotions and behaviors. Participants who scored higher on negative self-statement responses were further analyzed and



categorized as either having negative cognitions about others (other-focused; e.g., believing others will evaluate one's performance critically) or about themselves (self-focused; e.g., engaging in negative self-assessment). Adolescents aged 14-17 completed the questionnaire ( $N = 856$ ). Findings indicated that whereas females reported significantly more negative self and other-focused cognitions than did males, males reported higher frequency of positive cognitions.

Another questionnaire designed to measure self-talk is the Self-Talk Use Questionnaire (STUQ; Hardy, Hall, & Hardy, 2004). This questionnaire is primarily used to quantify the use of sport-related self-talk in athletes and is composed of 59-items (Hardy et al., 2004). The items are subdivided into four sections assessing: 1) general use of athlete self-talk, 2) the content of athlete self-talk, 3) the function of athletic self-talk and when it was used (e.g., practice vs. competition), and 4) how athletes experience self-talk (e.g., alone or in combination with imagery) (Hardy et al., 2004). Athletes respond to items using 9-point Likert scales (1 = *never*, 9 = *all the time*). Similar to the STI, the STUQ measures both internal and external self-talk. Findings from Hardy et al.'s (2004) study suggest that athlete self-talk generally occurs internally.

In 2005, Hardy and Hall investigated the STUQ's internal consistency and test-retest reliability using an abbreviated, 24-item version of the questionnaire. Hardy and Hall (2005) found that the STUQ has good internal consistency (Cronbach's  $\alpha = .94$ ). However, the STUQ's test-retest reliability was marginal with intra-class correlations (ICC) ranging from .54 to .80, and only six of the 24 items showed ICC values greater than .70 (Hardy & Hall, 2005).

Whereas the STUQ has been used to assess internal and external self-talk, critics of the measure suggest it has not clearly differentiated between overt/external self-talk and covert/internal speech (Alderson-Day & Fernyhough, 2015; Hurlburt & Heavey, 2015).

Furthermore, many questionnaires used to measure inner speech primarily focus on the functions and circumstances related to self-talk instead of the specific characteristics of inner speech itself (Alderson-Day & Fernyhough, 2015). The Varieties of Inner Speech Questionnaire (VISQ; McCarthy-Jones & Fernyhough, 2011) is the only self-report scale that assesses the quality of inner speech in terms of four phenomenological properties. The VISQ is an 18-item questionnaire based upon Vygotsky's (1987) four characteristics of inner speech: dialogicality (or tendency to engage in inner speech with a conversational quality), evaluative/motivational content, the abbreviation or expansion of words, and the inclusion of others' voices in one's inner speech (Alderson-Day & Fernyhough, 2014, 2015). Items include statements such as: "I talk back and forward to myself in my mind about things", and "I think to myself in words using full sentences." Participants retrospectively rate their level of agreement with each item using 6-point Likert scales with categories ranging from 1 = *certainly does not apply to me* to 6 = *certainly applies to me*. McCarthy-Jones and Fernyhough (2011) sampled 235 undergraduate students and found that approximately 77% of participants reported experiencing dialogicality regarding their inner speech and approximately 26% reported the presence of other people's voices in their inner speech. Additionally, a four-factor structure was shown to be a good fit for the VISQ and the four dimensions showed satisfactory internal reliability, with Cronbach's alpha ranging from .80 - .88, and adequate test-retest reliability ranging from .61-.80 (McCarthy-Jones and Fernyhough, 2011).

Furthermore, in 1995, Siegrist designed a 19-item questionnaire, the Inner Speech Scale (ISS), in an attempt to measure the frequency "to which one talks to oneself about oneself". Items include statements such as: "When I have an important decision to make, I discuss with myself in my head the pros and cons"; or "In difficult situations I sometimes say to myself, 'You

can handle this; you'll do alright." The ISS defines inner speech as "talk to oneself about oneself" (Siegrist, 1995), and *not* solely internal dialogue or silent talking. Participants are asked to rate their degree of agreement or disagreement with each inner speech item using a 6-point Likert scale. Despite its attempt to measure the overall frequency of inner speech, it seems as though this questionnaire is actually measuring participants' level of agreement to *what* they might say to themselves (e.g., the positive or negative content) about themselves in particular situations).

In 2011, Uttl et al. conducted a study examining the reliability and validity of the ISS among several other self-report measures of inner speech, including the STI and the Self-Talk Scale (STS; Brinthaup, Hein & Kramer, 2009). Uttl et al. (2011) found that the ISS had good internal reliability measured by Cronbach's alpha ( $=.85$ ). Yet the correlations among the inner speech measures showed to be highly variable, ranging from  $-.04$  to  $.65$ . The ISS particularly had weak correlations with most of the other self-talk scales, including the STI, suggesting the measure has weak convergent validity. However, Uttl et al. (2011) found one exception: there was a moderate positive correlation between the ISS and the STS ( $r=.65$ ). The researchers suggested that this exception is due to the fact that the ISS and STS measure (to some degree) similar constructs while the other inner speech measures lack convergent validity because they are non-comprehensive and focus too narrowly on specific aspects of inner speech (Uttl et al., 2011).

Like the ISS, the Self-Talk Scale (STS; Brinthaup et al., 2009) is designed to measure both inner speech as well as audible, private speech. However, unlike the ISS, the STS is a 16-item questionnaire that assesses the frequency of when and why individuals might talk to themselves (Brinthaup et al., 2009). The questionnaire is divided into four subscales: Self-

Reinforcement, Self-Criticism, Self-Management, and Social-Assessment. Participants rate their frequency of engagement in self-talk during certain situations (e.g., “I talk to myself when I should have done something differently”) using 5-point scales that range from 1 = *never* to 5 = *very often*.

Brinthaup et al. (2009) examined the measure’s internal consistency, test-retest reliability and its construct validity. Results showed that the STS has satisfactory internal consistency ranging from .36 to .60, and has acceptable test-retest stability for its subscales. Additionally, in an effort to evaluate the STS’s construct validity, researchers originally sampled 195 participants and calculated the upper and lower quartiles of the distribution. The mean cut-off for the low self-talk group was an STS total score of 44.05, and the mean cut-off for the high self-talk group was an STS total score of 75.79 (Brinthaup et al., 2009). Then, Brithaupt et al. administered the Padua Inventory of Obsessive Compulsive Tendencies (Sanavio, 1988) and the Need for Cognition Scale (Cacioppo & Petty, 1982) to those participants who fell in the upper and lower quartiles. The researchers hypothesized those with high levels of self-talk frequency would also self report higher levels of cognitive tendencies (including higher frequency levels of intrusive/obsessive thoughts and higher frequency levels of engagement in thinking and other cognitive-related tasks) than would infrequent self-talkers. Results showed that frequent self-talkers scored significantly higher than infrequent self-talkers on the Padua Inventory total score (high group mean=51.21, low group mean = 32.14, Cohen’s  $d = .80$ ) and on the Need for Cognition Scale (high group mean = 23.67, low group mean = 10.55, Cohen’s  $d = .64$ ). Additionally, each of the STS subscales significantly correlated with the Padua Inventory total score, and scores on the Need for Cognition Scale significantly correlated with two of the STS subscales. These findings indicate good construct validity of the STS.

The STS has been used in a variety of psychological studies, including those examining the relationship between self-talk and public speaking anxiety (Shi, Brinthaup, & McCree, 2015), the relationship among self-talk, loneliness, and the need to belong (Reichl, Schneider, & Spinath, 2013), and the relationship between self-talk and emotional intelligence (Depape, Hakim-Larson, Voelker, Page, & Jackson, 2006). Additionally, Brinthaup, Benson, Kang and Moore (2015) conducted a study to assess the accuracy of participants' STS self-reports, investigating whether participants who generally report high frequency of self-talk on the STS are more likely than low self-talking participants to report high frequency self-talk in response to relevant situations that had recently occurred. The researchers theorized that people with typically high frequency self-talk as measured by the STS would also report high levels of self-talk during recent situations that had actually occurred, thus indicating that people's reported self-talk frequency in a variety of situations is an accurate portrayal of their self-talk frequency when those situations actually occur. A total of 83 undergraduate students completed the original STS; 6 weeks later, they completed a revised version of the STS (reSTS), modified so that all items were presented in the past tense. Participants were required to rate the items in terms of whether the situation had occurred (yes/no) and if so, they were required to indicate if they talked to themselves (yes/no). Findings showed that frequent self-talkers reported using self-talk more than did infrequent self-talkers when reSTS situations recently occurred. According to Brinthaup et al. (2015) these results indicate that general assessments of self-talk frequency during hypothetical situations are accurate depictions of actual self-talk frequencies when those situations have occurred.

### **Advantages and Disadvantages to Inner Experience Questionnaires**

There is no argument that when it comes to ease and time efficiency, questionnaires are the most advantageous compared to other methods of inner experience. Questionnaires also require less of the participants' time and effort, and they yield quantitative data, allowing easier interpretation of results as opposed to qualitative data yielded by open-ended measures.

However, regardless of the advantages, questionnaires can also be flawed. Inner experience is naturally transient (Heavey, 2013). Those administering questionnaires act under the assumptions that: 1) people notice their ongoing inner experience, 2) people are skillful at apprehending that inner experience, and 3) people are skillful at self-reporting or describing that inner experience to others with high fidelity. However, most people do not necessarily notice their inner experience in the first place, let alone know how to apprehend and describe it (Hurlburt & Heavey, 2015).

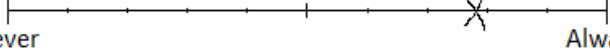
Additionally, inner experience questionnaires are based on retrospective reporting that usually focus on long reference periods. Any high-fidelity retrospective reporting on inner experience may be almost unachievable because it requires participants not only to stabilize their inner experience long enough so they can apprehend it, but also requires them to retain the memory of it for more than a brief instant (Heavey, 2013). In particular, participants are likely to make retrospective errors. Memory decays rapidly (Atkinson & Shiffrin, 1968). An individual's ability to recall an event is significantly influenced by any time lapse that occurs between the event and the time the individual retrospectively reports on the event (Ericsson & Simon, 1980; Kahneman & Tversky, 1982; Schwarz, 1990). This limitation is particularly crucial for inner experience reporting. Memory inaccuracies often occur every time past experiences are discussed due to the fact that an individual must reconstruct the memory, and thus the memory is altered slightly with each reconstruction (Sara, 2000). Similarly, memories and the ability to

retrieve them can be largely influenced by life events (Robinson, 1976), as well as weaknesses such as suggestibility, which is also a limitation discussed regarding ESM's use of its questionnaire. Like the disadvantages addressed for ESM, inner experience questionnaires generally cue participants to focus on specific features of inner experience and lack clearly defined language to refer to and describe inner experience. These limitations of inner experience questionnaires indicate this method may not be able to apprehend inner experience in high fidelity.

## Appendix D: Nevada Inner Experience Questionnaire

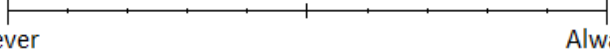
### *About Your Own Experience*

Please place marks on lines below to indicate the characteristics of your own inner experience. Here's a sample mark:

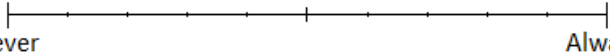
Sample: 

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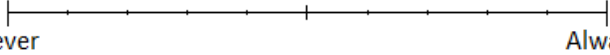
1. How frequently do you talk to yourself in your inner voice?



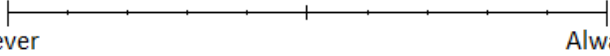
2. How frequently do you mentally see or visualize something?



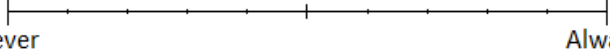
3. How frequently do you feel any emotion such as sadness or happiness or fear?



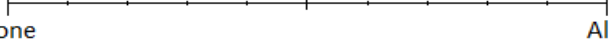
4. How frequently do you pay attention to the colors, smells, or sounds or your environment?



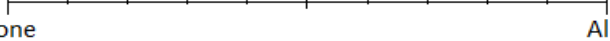
5. How frequently do you experience thoughts without words, images, or feelings?



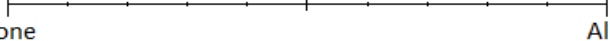
6. Generally speaking, what portion of your inner experience is in inner speech (thinking in words)?



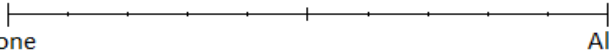
7. Generally speaking, what portion of your inner experience is in images (seeing things in your imagination)?



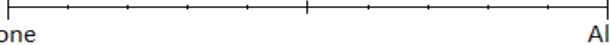
8. Generally speaking, what portion of your inner experience consists of feelings (the experience of emotions like happiness, sadness, excitement, dread, etc.)?



9. Generally speaking, what portion of your inner experience consists of focusing on internal or external sensory experiences, like a tickle or pain, or the color or shape of something you are seeing?



10. Generally speaking, what portion of your inner experience consists of thinking about something specific but without using any words or mental images?





## Appendix E: Natural Day DES Samples

Descriptions from sampled moments are labeled with the participant's name, the sampling day, and the order in which the samples occurred. For instance, a sampled moment labeled **Lance 2.1** indicates that Lance is the participant, the sample occurred on the second sampling day, and it is the first sampled moment. All natural environment samples were collected on days 2-4 (day 1 excluded for training purposes).

### **Lance**

Lance 2.1: [Lance had been on his computer going through the process of changing the address on his driver's license. He was at home with people speaking in the next room and music playing.] Lance is not experiencing anything at the moment of the beep. He is "spaced out."

Lance 2.2: [Lance was driving, and had gotten a ticket a week or so ago and was now being extra careful to avoid doing anything which might get him another ticket. As part of this attending to his driving,] Lance is especially attending to the physical distance between himself and a car in front of him, which seems about right or somehow comfortable. This is primarily visual, though it is difficult to fully understand how this is in his experience. [During the description, Lance described various other things that may have been in experience at some point – awareness of his speed on the speedometer, awareness of his position in the lanes, etc. When asked to further refine the moment of the beep, Lance said his experience was about attending to the distance between himself and the car in front of him.]

Lance 2.3: [Lance was visually scanning a restaurant for his waitress.] At the moment of the beep, his eyes are aimed at a group of people in another part of the restaurant, but the waitress isn't there. There is nothing in particular that he is attending to about what

he is seeing other than that the waitress isn't there. [During his description, Lance described various things that occurred before (waiting for the waitress to appear) and after the beep (seeing other people, looking at various parts of the restaurant, etc.). When asked to refine the moment of the beep, he said his experience was of scanning for the waitress.]

Lance 2.4: Lance is tasting pizza [that he happened to be chewing] and feeling physical warmth from the pizza all around his mouth. The taste is cheesy, saucy, and of pepperoni. [The rest of the world around him was not present – he was merely attending to the pizza taste and temperature].

Lance 2.5: Lance is seeing and hearing his girlfriend ask her little brother if he wanted their leftover pizza. [Lance had just posed the same question to his girlfriend's uncle as part of a coordinated effort to give away the pizza, but this moment was of passively observing his girlfriend's interaction with her brother. Of note, Lance used several unusual locutions during his description: that this sample was more like his "girlfriend's experience"; that "I notice myself asking"; that "the beep wasn't for me". It was unclear what Lance was conveying about his experience by these locutions.]

Lance 2.6: [Lance was working on an essay.] At the moment of the beep, Lance is trying to figure out how to write/organize the essay to make the essay five paragraphs long. It is not clear how this is present to him, but he is confident that the content of what he might write [or of the article the essay was going to be about] is not present. [RTH agrees with that, but emphasizes that it was somewhat surprising that the content was

not present—that something about the structure of the essay was present without the about-what of the essay. RTH doesn't know what, if anything, to make of this.]

Lance 3.1: [Lance was reviewing his notes on his laptop in class before an exam started.] At the moment of the beep, Lance is reading/scanning his notes for main points. At this particular moment, he is not focused on any particular points; he is simply scanning his eyes over the material. Although this occupied all of Lance's experience, there is little if anything actually present in experience.

Lance 3.2: [Lance was taking a test that asked about an experiment he had seen earlier in a video shown in the class.] At the moment of the beep, Lance is innerly seeing the video displayed on the screen in his classroom. On the screen he sees an experimenter and a subject. He also innerly hears the narrator saying something about the experiment, [and while the narrator was saying specific words in his experience, at the moment of the beep, Lance could not remember those words at the time of the interview]. In the foreground he also innerly sees himself from behind, shoulders to head, watching the video, although the video itself is the main focus of his inner seeing.

Lance 3.3: [Lance had gotten into his car and was putting on his seatbelt.] At the moment of the beep, Lance is perhaps dimly seeing other cars and the parking lot outside his window. This seeing is either only faintly present in experience, or he might have had nothing in experience at all. [RTH thought Lance convincingly said he was faintly seeing the cars.]

Lance 3.4: [Lance had been looking in the fridge, trying to decide if Gatorade or milk would go better with his chicken.] At the moment of the beep, Lance is innerly tasting Gatorade on his tongue. [It is possible that he was imagining drinking Gatorade rather than

innerly tasting Gatorade. Lance had a difficult time pinning down his experience, and his description wandered around, beginning with thinking, then becoming tasting, then becoming cold/wet, then becoming tasting again. The most likely experience seemed to be tasting, but we were not confident about this.]

Lance 3.5: [Lance was in a hurry to leave for work and he was putting his shoes on.] At the moment of the beep, Lance is wondering if he is going to be late. The wondering is clearly present to him, but did not involve words or images. He is also worrying, which he feels moving through his arms and upper body though he could not describe the sensation [and was less than convincing about the arms-and-upper-body portion of the experience. There was something about a wave through the body, and it made more sense to say that it was arms and upper body than elsewhere, but Lance did not compellingly say that he felt it in his arms and upper body.] The wondering is more central in his experience than the worry.

Lance 3.6: [Lance was playing a game on his cell phone called Candy Crush.] At the moment of the beep, Lance is innerly seeing different move possibilities, one after another, overlaid on his actual seeing of his phone [what he was actually looking at was not in experience]. This entailed innerly seeing the moving pieces of candy, which then link together and disappear, and the candies above it fall into place. [This inner seeing was his process of trying to figure out what move to play next. The figuring out process seemed similar to the milk/Gatorade figuring out of 3.4, with an important difference being that in 3.4, he was actively creating the alternative imaginations but in 3.6 he experienced himself as merely watching the different possibilities appear on the screen.]

Lance 4.1: [Lance was changing his oil on his vehicle]. At the moment of the beep, Lance is wondering if the jack and the car are lined up properly for the car to balance on it, and this wondering does not involve any words, images, etc. (about 65% of his experience). He is also seeing the top of the jack and it's alignment under the car (about 35% of his experience).

Lance 4.2: [Lance was watching his father pour oil into the car.] At the moment of the beep, Lance is seeing the clearness/cleanness of the new oil as it is poured into the vehicle.

Lance 4.3: Lance is innerly seeing the light-brown football in his hand, the grass, and another player on his right as he runs while playing football. [He was seeing what he had seen a week earlier when he played football. He knew the people he played with, but in his inner seeing he couldn't identify the person]. This seeing is from his first-person point of view and in motion. Lance is particularly drawn to the light-brownness of the football.

Lance 4.4: Lance is looking at his sister's boyfriend's truck (about 60% of his experience), particularly at the right corner of the hood that is pushed in due to a car accident. He is also thinking that the boyfriend doesn't have a car to drive because of the accident. This thinking occurs without words, images, etc. (40%).

Lance 4.5: [Lance was talking to his sister's boyfriend.] At the moment of the beep, Lance is hearing his sister's boyfriend say that he is happy he has cleats because he was slipping last time they played football and that he won't slip now because of his new cleats. Nothing in particular stood out to Lance, as he is simply listening to the boyfriend's voice [although he said in the interview that the boyfriend said it in a happy tone, noticing that was not present to Lance at the moment of the beep. CH

thought Lance was noticing the happiness in his boyfriend's sister's voice as he was speaking.]

Lance 4.6: Lance is visually scanning the park to see if he could recognize any of his friends among the people that were there. [At this particular moment, Lance had just started scanning and had not yet ruled anybody in or out]. Nothing in particular is standing out to Lance among what he is seeing. [In a previous day's sample (2.3), Lance visually scanned a restaurant for his waitress. He said this beep was the same kind of experience, although in the restaurant he was further along in the process and he had ruled some people out.]

### **Jenni**

Note: Jenni collected four beeps total on day 2. Two beeps (2.3 & 2.4) on the day of the interview, and two beeps (2.1 & 2.2 three days prior to the interview.

Jenni 2.1: (Collected 3 days before the interview) [Jenni was writing flashcards to study for a test.] At the moment of the beep, Jenni is writing flashcards and thinking about the meaning of what she is writing. She might have been thinking about the function of exo-skeletons and focused on the words that she is writing. [She was unable to remember exactly what words she was writing or give details about how the thinking was present. It seemed that she was not sufficiently aimed at / able to recall the experience at moment of the beep.]

Jenni 2.2: (Collected 3 days before the interview) [Jenni was walking to wash her hands.] At the moment of the beep, Jenni might have been feeling mentally stressed and drained. This is experienced as a slow, sluggishness primarily in the trunk of her body. [It

seemed that she was not sufficiently aimed at/able to recall the experience at moment of the beep.]

Jenni 2.3: [Jenni was sitting at her desk and looking at study material on her computer screen, but that was not in her experience.] At the moment of the beep, Jenni is feeling mentally drained and guilty; these are two highly related but distinct experiences [but it is possible that the interview talked her into that distinction.] Jenni was unable to give any further details about how the mentally drained experience was present to her, except that it did not include bodily sensations. Feeling guilty was a prolonged feeling that had been ongoing for some time and was still present in experience at the moment of the beep; she was feeling guilty about not studying enough. [Her father and brother were in town visiting; for the first part of the interview it was not clear whether she felt guilty about the studying interfering with their visit or the visit interfering with her studying. Later in the interview she was confident that it was the latter.] [The lack of clarity of description was striking.]

Jenni 2.4: [Jenni was getting ready for her brother and dad to arrive.] At the moment of the beep, Jenni is feeling happy. Her happiness involves a mental and bodily excited/awake/energetic state but we were not convinced that the excited/awake/energetic state was actually experienced, either bodily or mentally]. She feels this in her entire body as well as mentally. [There were some details about being jumpy, faster, and more awake than usual, but it is unclear if any of these details were present in experience.]

Jenni 3.1: [Jenni was reading an article on the benefits of drinking lemon water.] At the moment of the beep, Jenni is understanding the general idea of warm lemon water being good

for you as she is reading. There is no specific benefit in experience and no experience of the reading. [It seemed that she must have been reading about some specific advantage of warm lemon water, but she did not or could not say what that was. The interview may not (or could not) separate out the general from the specific, even though we tried. It is possible that this experience was more vague and passive than a usual unsymbolized thought, more in the realm of reading with comprehension, though the lack of specificity was concerning in terms of the believability of her report.]

Jenni 3.2: [Jenni was lying in bed and absorbed in the things around her.] At the moment of the beep, Jenni is feeling the softness of the blanket on her skin. [The interview proceeded as if this softness was on her body, but it is possible that the softness was felt by her hand and the interview did not nail down this issue]. This is not localized to a specific part of her body but is a tactile sensation. She is also seeing the brightness of the light. She is slightly more into the softness (60%) than the brightness (40%). There also seems to be a sense of understanding what is in the room around her in addition to these sensory components, but Jenni is unable to give us any details about what this understanding is like. [Like 3.1, Jenni began by saying she was absorbed with everything that was around her. Only after considerable probing did it seem that she was particularly feeling the softness of the blanket. She brightened considerably when the interview focused on the blanket, and it seemed that that had been her focus at the moment of the beep.]

Jenni 3.3: [Jenni was planning out what days she would take shifts at work over the coming week.] At the moment of the beep, Jenni is innerly seeing the next week of her



calendar and is particularly noticing that Tuesday is blank. She sees black and white squares in a row, with the days of the week written in the top of the squares (Monday-Friday). The Monday, Wednesday, Thursday, and Friday squares all have writing in them detailing her schedule; Jenni is not aware of the specifics of what is written in these squares, but is mostly noticing the emptiness of Tuesday, meaning that she is free that day. The writing is neater than her handwriting and might have looked typed. The overall sense of planning her week might also have been present.

Jenni 3.4: [Jenni was watching the TV show Merlin on her computer.] At the moment of the beep, Jenni is being carried along by the story line and the action of the TV show she is watching. [It was unclear to what extent she is absorbed in the show as opposed to watching what was happening with little in experience.]

Jenni 3.5: [Jenni was Skyping with her boyfriend and smiling a lot.] At the moment of the beep, Jenni is feeling secure/happy in her relationship with her boyfriend. This is a single, mental feeling and does not include any bodily sensations. [Her eyes are aimed at her boyfriend on the Skype screen, but she is not focused on him; instead] she is focused on the secure/happy feeling.

Jenni 3.6: At the moment of the beep, Jenni wants to go to sleep. This desire seems to be present as feeling tired in her upper body and feeling her eyes closing. [Jenni was unable to provide any further details of the desire or bodily sensations.]

Jenni 4.1: [Jenni was watching faces be presented on her computer screen for a psychology experiment simulation, where she was required to judge whether the expression was warm or cold.] At the moment of the beep, Jenni is trying to figure out whether the face is warm or cold. [She was attending to the face, but seeing it was not in

experience at the moment.] She has not yet decided whether the face is warm or cold, and the trying to decide is somehow present to her.

Jenni 4.2: [Jenni was talking with her mom on the phone.] At the moment of the beep, Jenni is trying to think about what to say next. She is trying to think of an idea, but has not yet formed one. There is some kind of sense of gathering thoughts, the expression gathering itself together like a cloud forming, but there is no specific content present. There are no pictures, words, or bodily sensations present. [To underscore: even though this was the trying to think of what to say, there were no words present at the moment of the beep.]

Jenni 4.3: [Jenni found this sample interesting.] [Jenni was putting papers into a folder.] At the moment of the beep, Jenni is feeling the motion of the papers going into the folder. She is experiencing this sensation where her fingers are holding the papers, but, to reiterate, the sensation is of the motion of the papers going into the folder rather than the feel of touching the papers. This sensory experience is about 80% of her experience. Also at the moment, Jenni is thinking about which papers would be easiest to revise. This is not a clearly articulated thought, but a general sense of which papers would be easiest to revise, and is about 20% of her experience.

Jenni 4.4: [Jenni was watching the TV show Merlin.] At the moment of the beep, Jenni is caught up in the story/plot of the TV show. [Nothing else was in her experience.]

Jenni 4.5: [Jenni was talking with her boyfriend about the homework she needed to do.] At the moment of the beep, Jenni is thinking about what homework she needs to do. This is partially, but not completely, experienced as innerly seeing her whiteboard with the word “Homework” written in pink; underneath the word “Homework” are three

assignments written in pink. The words of the assignments are not clear (not able to be read) and there is a blank space between them [as they were on her actual whiteboard because other things had been written between them had been erased because they were already completed]. The borders of the whiteboard are not seen. The thinking about what homework she needs to do and innerly seeing the whiteboard is a single experience, but there is something about the thinking aspect that is not fully captured by the inner seeing. [Jenni was unable to give any further details about what is not captured by the inner seeing.]

Jenni 4.6: [Jenni was scratching her leg.] At the moment of the beep, Jenni is feeling a tingling itch on her left calf, just below the back of her knee. The itch is about 90% of her experience. She also is battling with herself about how good scratching the itch would feel but that she should not scratch the itch [she explained that her mother told her that scratching itches would leave scars, but it is likely that that part was not directly present in experience at the moment of the beep]. This battle is a mental/cognitive experience and is about 10% of her experience.

### **Pamela**

Pamela 2.1: In experience, Pamela is mentally choosing which pants to wear from among 5 pant options. The choosing experience is of having a mental “sense” of the pants, without words or visual features present, that involves eliminating some of the 5 pants which were dirty, narrowing down to two, and then choosing between those two which she wanted to wear. Simultaneously, or perhaps part of the same experience, Pamela has a spatial experience of sensing where each pair of pants might be located in her room.

Her spatial experience is oriented in relation to the doorway of her room. There are no visual features present.

Pamela 2.2: In experience, Pamela is seeing the pinkness of a piece of paper [in reality, she could only see a triangle of the top right corner of the pink paper, but her experience was of seeing pink paper]. Also in experience, in order of diminishing presence, Pamela is seeing the white notebook paper that is blocking most of the pink paper, she is seeing the doorway ahead of her as she walks toward it, she is seeing her car keys inside her bag, and she is seeing the bathroom door open with a light on inside. Also in experience is some kind of sense that it is weird that the bathroom light is on, but the hall light is off, and that that is unusual. At the same time, Pamela is experiencing an unsymbolized notion that she needs to calculate her study-abroad costs. She experiences this notion as being located behind her head just outside the skull, in the shape of a layer about an inch or less thick wrapped around or just outside the back half of her brain. Also, part of the notion about study abroad costs includes the feeling of being overwhelmed. [This was a highly complexly multiple experience, with simultaneous strands of several simultaneous observations, analysis, and meta-awareness. RTH understood this as being Pamela's apprehension—that is, that she really did at the moment of the beep have this complexity of experience. She contrasted the complexity of this experience with the simplicity of later experiences (e.g. sample 2.3) in a believable way.]

Pamela 2.3: In experience, Pamela is innerly seeing a Starbucks iced vanilla latte with a green straw being handed to her through a drive-thru window. She is particularly drawn to the greenness of the straw, and then to the color of the latte and the size of the cup.

The window and a possible person handing her the drink are very low in experience, if they are present at all. At the same time, Pamela is in the midst of opening her wallet, and her experience is of seeing the wallet, performing the action, and being aware that she is opening her wallet. Also, Pamela might have experienced innerly seeing how much money she believes to be in the wallet, although she is not certain if this occurred before or during the beep.

Pamela 2.4: Pamela is hungry. The hunger is a mild, dull pain in her torso, primarily on the right side. She is also bored, which might have involved the presence of the feeling of annoyance and the absence of focus. The hunger is more prominent than the boredom, maybe about 70% to 25%. Pamela's is sealing envelopes [at work], which might have been a very minor feature of her experience or possibly not present at all.

Pamela 2.5: Pamela is trying to recall some instructions her supervisor had given her. This experience involves a sense of him giving Pamela instructions, although this sense is not represented in words or pictures. Her experience is mainly of trying to recall, and this effort is experienced as localized to the left, front area of her brain. She is seeing the computer screen in front of her, which was much less salient, perhaps about 10%.

Pamela 2.6: Pamela is innerly speaking the words "number1-0-4." While it is not visually present to her, Pamela knows that the words represented "#104" [which is something she was considering typing onto a computer screen at work]. She is innerly speaking, which was in her own voice, in monotone, and at normal volume. At the same time, her experience might have included seeing what was on the computer screen, which is on the right side of her visual field, and possibly the notion that "#104" relates to her

task of determining how to fit a long message into a text box that allows limited characters.

Pamela 3.1: Pamela is seeing “green blurriness” or “blurry greenness” as her eyes are unfocusedly aimed at the television. The green and the blurry stand out to her equally. She is experiencing a mental feeling of happiness. She is aware that she is happy, but could not report any other details about that feeling.

Pamela 3.2: Pamela is having a visual experience of the Polar Express train. While she is not actually seeing anything literally or in imagination, somehow the front of the train is experienced visually, with particular focus on the circular components at the front of the train and the boxy part beneath it, as well as steam coming out of the train’s chimney. Pamela herself is part of the experience, as if she is standing to the right of the train as it moved in her direction, but that is less visual and more “knowing” than the train aspects. Her emphasis is more on the train than herself, and no characteristics of herself are present in experience.

Pamela 3.3: Pamela is experiencing a happy/excited feeling. She describes experiencing the feeling in her body and in her mind. The bodily feeling is of being “jittery” and “bouncy” [although she was not actually bouncing]. The jittery bounciness is felt primarily inside her back towards her shoulders in the area around her spine, and it seems to pulse out from there to affect her entire body, head to toe. She is also feeling the happiness in her mind, like a mental experience of being happy.

Pamela 3.4: Pamela is feeling a pain (70% of experience) on the inside of her left ankle that feels like someone is stabbing her on her anklebone [After the fact, she rated the pain to be a 6 out of 10]. The pain feels deep inside her ankle and is the size of a quarter.

Pamela is also anxious about being restless (30% of experience). She feels a little bit of physical tension in the center of her chest, at the core of her torso. She also feels the anxious/restlessness mentally. There might have been a physical sensation to her mental experience, which is like a pulsing/throbbing sensation [which, she noted, was not painful].

Pamela 3.5: Pamela is asking herself if she had taken out the trash. There are no actual words to the question. [This experience occurred after she heard the sound of the garbage truck]. The asking becomes present to her like a “flash” of the question appearing to her and moving forward in her head. She experiences the asking to occur on the right side of her brain, towards the top, and inside the skull. It occurs more towards the back than the front.

Pamela 3.6: Pamela is singing a song by Arctic Monkeys to herself in her head (80% of experience). The singing is in the voice of the male singer in the band, although Pamela experiences it as having been produced herself [“singing” as opposed to “hearing herself sing” or “hearing the Arctic Monkeys sing.” She was unable to recall what lyrics were present at the moment of the beep.] At the same time, Pamela is threading a belt through the first loop on the right side of her pants. She is seeing herself perform the action in the mirror (15% of experience) and performing the action of threading the belt (5% of experience).

Pamela 4.1: At the moment of the beep, Pamela is innerly saying “diatom” in her own voice with no inflection. [She had been repeating the word “diatom” over and over in her head, and the beep caught her on one of the repetitions.] At the same time, she is trying to innerly see a diatom. [While she was not yet successfully seeing], her experience is of

putting mental effort into trying to see the mental picture. The inner speaking is about 90% of her experience, while the mental effort to see a diatom is about 10% of her experience.

Pamela 4.2: At the moment of the beep, Pamela is engaged in a conversation with a coworker, and is in the middle of saying “Does Corona Del Mar have volleyball nets?”; the beep caught her in the midst of saying “Corona Del Mar”. Her experience is of just being in the conversation with her coworker; [no particular aspects of the conversation, such as forming or saying the words, visually experiencing her coworker, thinking about volleyball nets, etc. were in experience.] She does not have a sense of forming or driving the words—that is, the words just flow out of her. [See 4.4]. [CH thought that she was experiencing what she was saying, though the words were flowing out without explicit focus or effort, and that she was seeing her coworker.]

Pamela 4.3: [Pamela was trying to decide what size paper clip she needed to buy.] At the moment of the beep, Pamela is innerly seeing a large-sized paperclip. She sees it with a horizontal orientation. [While her goal was to mentally measure the paperclip, she had not yet gotten to that step, and the measuring or the intention was not in her experience at the beeped moment – just the inner seeing of the paperclip.]

Pamela 4.4: [Pamela was giving directions to a friend.] At the moment of the beep, Pamela is simultaneously innerly and outerly speaking the words “To the left.” [She was unsure of how these words presented themselves chronologically; that is, whether the inner/outer proceeded word by word: *To* “To” *the* “the” *left* “left,” of phrase by phrase *To the left* “To the left.” ] The inner speaking precedes the outer speaking by a very brief time. At the same time, she is imagelessly seeing experience of the redness



and roundness of the mascot of the Jollibee restaurant; that is, she is experiencing the redness and roundness as a visual experience, although nothing is innerly out outwardly seen. The inner/outer speaking and the imageless seeing experiences are each about 50% of her overall experience.

Pamela 4.5: [A coworker had asked Pamela to do something that was against company policy, which she didn't want to do. Pamela was trying to write a text message.] At the moment of the beep, Pamela is trying to think of a polite way to refuse a former coworker's request. She experiences the trying to think of a way to refuse as a small, pulsing tension in the entire inside of her head. At the same time, Pamela is experiencing an awkward/bad feeling that did not have any physical features or location.

Pamela 4.6: [Pamela was trying to decide what kind of White Out to buy on an office supply website.] At the moment of the beep, Pamela's experience is of seeing photos of types of White Out tape and White Out liquid pens, which are displayed on a computer screen. The experience is of just seeing the two White Out. She sees both of them equally; that is, she isn't focused on one or the other but is looking at/taking in both simultaneously. She might have also been attending to the prettiness or relative prettiness of these objects [though she had not yet decided which was more appealing, which was eventually where her experience led.]

### **Isobel**

Isobel 2.1: At the moment of the beep, Isobel is looking at her sister while dropping a piece of cereal to her sister's dog. She is mostly looking at her sister and focusing in on her eyes to see if her sister would turn and then notice Isobel feeding the dog. There is no

active, experienced thinking about this, but there is explicit intentionality; Isobel is looking at her sister's eyes with the explicit, but unarticulated, intention to see if her sister would turn toward her. The remainder of her experience, perhaps 30% or so, is occupied with dropping the cereal. She is paying attention to what she is doing (dropping the cereal), but not focused on any particular aspect of it. [RTH was not sure the dropping was at all in her experience—that the 30% report followed from the presupposition that it *must be* experienced.]

Isobel 2.2: [Isobel was looking at the numbers 4, 0, 4, 1, and 5, which she had to add. She was saying the sum out loud as she added them.] At the moment of the beep, she is saying “4, 8” (as she adds the first and second 4). Her experience is seeing the numbers and saying the running total out loud.

Isobel 2.3: [Isobel was typing, transferring a definition from her textbook to her computer.] At the moment of the beep, she is typing/transferring the word “deviation,” which she says aloud as she types, but she is not at all experiencing the meaning of the word or the definition of which the word was a part. That is, this is *not* a semantic experience, not a saying experience. She is simply engaged in the task of transferring something (which happens to be a definition) from one place to another. Most, perhaps 80% of her experience, is on the transferring, but she has a little awareness of the typing, which is the feeling of the keys on her fingers as she types. [RTH was somewhat skeptical of this last.]

Isobel 2.4: [Isobel was entering a number into her calculator while saying it out loud.] She is saying the numbers 7, 4, 3 as she is punching them in. She also has a little [she said maybe 20% or so, but she described the experience with energy and focus, leading

RTH to wonder whether this was a larger (perhaps much larger) part of her experience than she claimed] experience of the click sound of the buttons as she punches them in. She hears the sound of the click for its aural qualities (which she likes), rather than as a sign indication that she has pressed the button.

Isobel 2.5: [Isobel was watching Alisha Johnson, a comedian on TV say something in a faux accent.] She is paying close attention to the faux accent (listening intently because it is funny and also hard to understand). The paying close attention involves both watching her face intently and listening closely to her words. [She is laughing at the time, but this is not in her experience.]

Isobel 2.6: At the moment of the beep, Isobel is looking at two words she has typed into her computer and is trying to remember a third word. [This was part of a homework exercise she was doing for one of her classes; the exercise had asked for three words, of which she had typed two but was not yet recalling the third.] She is looking intently and expectantly at the two already-typed words, waiting for the missing word to come. [Her understanding was that this looking was a way of trying to figure out the missing word, that somehow the looking at the existing words would cause the missing word to come.]

Isobel 3.1: [Isobel was at work organizing shoes.] She is going through a bag of shoes looking for shoes of the brand ABEO. When she discovers an ABEO shoe she pulls it out; simultaneously the word “abeo” is present, but it is not voiced in any way. There is also a recognition that she has to do this fast, but this is not represented in any way either, she “just knew”. She describes the experience as split 90/10 between the word “ABEO“ and the hurry.

Isobel 3.2: [Isobel was speaking to her co-worker explaining to her how to sell orthotics.] At the moment of the beep, she is paying attention to her co-worker's face, particularly her forehead; the wrinkles or furrows would reveal whether the co-worker understood what she is saying. Simultaneously, she is paying attention to how the co-worker is saying it. In particular, she is paying attention to the content of what her co-worker is saying to see if she has described the features of the orthotics correctly.

Isobel 3.3: [Isobel was trying to read a book in the same room as somebody who was listening to music and typing on the computer.] In her experience, at the moment of the beep, Isobel is simultaneously hearing the music escaping around the person's headphones and the keyboard clicks of the person's typing. These are described as not being separate, but the same hearing experience. At the same time, Isobel innerly hears her voice speaking several phrases at the same time. [She could not say precisely what she heard these voices to be saying or how many there were, but] she heard things like "what the hell", "doesn't he know" "music is loud" etc. The sentences were distinct, simultaneously innerly heard, and they did not jumble together or stop and start.

Isobel 3.4: At the moment of the beep, Isobel is reading a textbook, reading aloud although she is by herself. Her experience is *not* on the material, but on her aloud reading of the material—that is, she is listening to herself read. [At least part of the intention behind this listening to herself was to ascertain whether she understood what she was reading—that this would somehow be made evident to her by the act of listening to her aloud reading. That understanding was more the context of the reading than a direct experience.]

Isobel 3.5: [Isobel had her eyes closed and was thinking about what she was going to do the next morning.] She is thinking about waking up at 7:00, and at the moment of the beep, she is counting on her fingers as she is innerly hearing her own voice speak the words “8, 9, 10”. These words are in her own natural voice.

Isobel 3.6: At the moment of the beep, Isobel is reading a post on Facebook. The post said “I will find you and kill you”. At the same time as seeing the post, Isobel is innerly hearing the actor from the movie *Taken* say “I will find you and kill you” into a telephone. She is more focused on the hearing of the words than the visual scene of the movie, but she is innerly seeing it as well. [She described the experience as being 60% the hearing and seeing of the actor, and 50% the post on Facebook.]

Isobel 4.1: [Before the beep, Isobel had greeted a few foreign customers that had come into the store. The customers did not reply to her greeting.] At the moment of the beep, Isobel is innerly saying “Isn’t ‘hi’ universal?” This inner saying is in Isobel’s own voice. Isobel is also straightening the shoes and tags in front of them. She is visually inspecting the tags and adjusting them to make sure they are straight.

Isobel 4.2: Isobel is innerly saying “2, 4” in her own voice as she counts to make sure that there are 4 boxes in each bundle of orthotics. Although she is looking at the boxes, she is not paying particular attention to what the boxes are. Instead, she is making sure that there are four of them. [She is also holding the boxes, but her experience lacks the tactile sensation of touching the boxes.]

Isobel 4.3: Isobel is on the phone with her sister. Isobel is unsure of the exact words her sister is saying, but she believes that it was something like, “my leg still hurts.” Isobel [is not paying attention to the sound of the words, but she] is hearing these words as

meaningful utterances. Isobel is innerly seeing the cut on her sister's knee. Isobel sees her sister's knee as if her sister is sitting down in a chair with her knee bent and Isobel is standing over her. Only the knee is visible and there is no clearly defined border to the image. On the knee, Isobel innerly sees her sister's brown skin, some black marks and three large black scrapes. [The scrapes are black in her inner seeing but are red in the reality of the sister's knee. The innerly seen black marks existed as black marks on the sister's real knee. That is, there is some accuracy (skin tone, black mark), but some inaccuracy (scrape color black instead of red) of color in this inner seeing.] Isobel experiences the image as being present in a section of the middle top part of her head. The radio is playing in the background, but it is not clear if or how this is present in Isobel's experience. [RTH understood her to be saying that the radio was slightly in her experience, perhaps 15%.]

Isobel 4.4: Isobel is looking in the mirror and watching herself put her hair into a ponytail. There are two sensations present in her experience. One is of her fingers (primarily the back of her fingers) feeling her hair as it slides through her fingers. The second is of her head feeling her fingers against it.

Isobel 4.5: Isobel is watching cars crash on television. She is innerly saying the words "he could have died." The words are said in her voice and with a surprised tone. [RTH is concerned that we led Isobel into the words aspect of this experience. She began saying that she was thinking this, with a very tentative mention of saying. The interviewers accented the saying, and she ended by holding that she was saying that.]

Isobel 4.6: Isobel is cleaning her retainer with a toothbrush. She is seeing the water running over the retainer, and is closely attending to where the water and brush is hitting the

retainer and the act of cleaning her retainer. Her sensation of the water running over the brush is minimally present, if at all.

### **Bailey**

Bailey 2.1: [Bailey had been doing her biology homework, but she had momentarily left her homework to wonder about her sister.] Bailey innerly says “I wonder how my sister’s doing,” in her own voice, at a normal rate of speech, and with a questioning tone.

Bailey 2.2: [Bailey had been working on her homework, but she had paused.] Bailey is worried about how she is going to pass her classes. She feels this worry throughout her body. This is a feeling, not a mental or cognitive experience.

Bailey 2.3: [A woman is speaking to Bailey, but this is not in her experience.] Bailey experiences an *annoyed*, wanting-the-woman-to-stop-talking. She experiences this cognitively, but it is not clear if this is a feeling experience. Simultaneously, Bailey is seeing her computer with a blank screen. [In reality the screen was not blank, but either she saw it as blank or saw the screen but didn’t really notice what was on it.] The seeing is about 10% of her experience and the annoyed wanting the woman to stop taking is about 90%.

Bailey 2.4: Bailey is innerly saying to herself “I’m ready to go home,” in her own voice and a normal rate of speech. She is simultaneously tired, which is experienced as heaviness in her eyes. The inner saying is about 50% of her experience and the eye-heaviness is 50%.

Bailey 2.5: [Bailey had interviewed for a job earlier in the day.] She is wondering about her job interview. Part of this wondering is about whether or not she did well in the interview. None of her wondering is symbolized in words, sounds, or images.

Bailey 2.6: [Bailey is about to leave home and is thinking about the wind when she leaves.]

Bailey is innerly seeing herself (from behind) walking towards the library with the wind blowing towards her. The wind is blowing the trees, and about 5-10 students are walking in the opposite direction from her. This scene is in motion, about an arm's length away from and directly in front of her, and rectangular shaped with clearly defined edges.

Bailey 3.1: Bailey is thinking *that's so funny*. This thought could be expressed in other phrases as well. This thought is not present in words, sounds, or images. Simultaneously, she is feeling a sensation in her cheeks which she understands to be of smiling.

Bailey 3.2: Bailey is innerly saying "I'm ready to go back inside," in her normal voice and tone. Simultaneously she is feeling the cold air brush against the skin on her face, upper chest, and arms.

Bailey 3.3: Bailey is innerly seeing a piece of pizza sitting on the top rack in the refrigerator. [The racks of the refrigerator are white, but she could not recall if she saw the color and shape of the pizza or if it lacked color and/or shape. What she sees it about a foot away and directly in front of her.]

Bailey 3.4: Bailey is innerly sing-talking "summertime," in her own voice and at a regular volume. [The inflection matches that of the original Will Smith "Summertime" song.]

Bailey 3.5: Bailey is innerly saying "huh?" in her own voice and with a slightly rising, questioning tone. Simultaneously, she is confused [and her eyes are rolled-upwards. She does not feel the confusion or her eyes as a physical sensation, she just knows that she is confused and her eyes are rolled.]



Bailey 3.6: Bailey is innerly seeing the game Tetris and mentally moving the block that is falling.

She innerly sees the score is on the left, the blocks on the bottom, the block that is falling, a background that is black at the top and fades to blue near the bottom, and white speckles on the background, which are concentrated more strongly in the middle of the background than the periphery. Everything she is innerly seeing seems more vivid and more real than anything she has outerly seen before, especially the background. She could not recall the color of that block or the other blocks, but they were in color.

Bailey 4.1: Bailey is innerly saying “that’s funny.” She says this in her normal tone and inflection. [Bailey could not recall what it was that she found funny, but there was something that she found funny.]

Bailey 4.2: [Bailey was leaning the top left portion of her forehead into her hand.] Bailey is innerly saying, “this is hard.” She is also feeling her head press against her hand, a sensation more in her head than in her hand.

Bailey 4.3: [Bailey was using her computer, but this was not in her experience.] Bailey is innerly hearing about 4 different voices speaking about the homework she had recently completed. Although the voices are speaking in complete sentences, she could not recall exactly what is said, but one of the voices might have said something along the lines of “did I remember to put a comma before this word?” The voices are simultaneous and overlapping, all wondering whether Bailey had done the homework correctly. [The whole experience was in some way worrisome, but Bailey did not, as best she could recall, feel worried.]

Bailey 4.4: [Bailey is happy and excited, but] nothing is in her experience at the moment of the beep.

Bailey 4.5: [Bailey is listening to music by Drake, which is playing over speakers in the room. However, instead of hearing the real recording,] Bailey is innerly hearing Drake singing directly to her. [Bailey was confident that this was an inner hearing, *not* a hearing of the external music. She could not say whether the innerly heard Drake was in sync with the externally playing Drake—she did not hear the externally playing Drake. She could not identify any experiential distinction between an externally heard Drake and an internally heard Drake, although she was confident that the experience was of inner hearing. She could not identify how the singing-to-me aspect presented itself, although she was confident that she heard Drake as singing directly to her.]

Bailey 4.6: [Bailey was in line at Einstein’s Bagels, and her stomach had just growled.] Now at the moment of the beep, she is innerly saying, as if addressing the people around her, “Can anyone hear my stomach?” This inner speaking has apparently all the characteristics of external speaking except no words coming out of her mouth. [Her eyes darted about, checking out the people in line, but this was a fact of the universe known only on retrospection after the onset of the beep.]

### **Harrison**

Harrison 2.1: [Harrison had just scratched an itch.] At the moment of the beep, he is experiencing a burning, lasting pain [on the area he had just scratched, which is on the left side of his body between his left shoulder and his chest]. 100% of his experience in this moment is the sensing of this pain.

Harrison 2.2: Harrison experiences movement in his shoulder blades, the back of his neck, and his head as he jerks his head backwards. At the end of this movement, he also experiences the movement of his hair on his face. The sensation in his shoulders, neck and head is about 60% of his experience, while the hair movement is about 40%. The movement is sequential, and he is experiencing the entire sequence at the moment of the beep.

Harrison 2.3: Harrison experiences a delight/relaxation. This experience lacks a bodily localization. Harrison also experiences a knowing that he is engaged in the act of chewing. He does not experience the physical sensation of chewing.

Harrison 2.4: [Harrison was watching a basketball game. A little before the beeper went off, and in response to something that had happened in the game, he had felt a “jolt of relief”.] At the moment of the beep, the jolt-of-relief feeling is going away. This is experienced as chills moving from his chest downward to his midsection. The chills are experienced as being an indeterminate number of individual “chills”, (but between 5 and 20) and moving downward in a disorganized or sporadic fashion. The chills keep to the surface of the body in the front, but do not have a determinate shape.

Harrison 2.5: [The Beatles song Long Tall Sally was playing on the CD.] Harrison is innerly hearing Paul McCartney squeal/scream as well as the background music of the imagined song. This inner hearing is of a portion of this song somewhat before it actually occurs on the CD. There is a small (5%) sense of anticipation—like *c'mon already, let's get to this part*. By far (90%), most of his experience is the inner hearing; a small part is on hearing the actual song.

Harrison 2.6: [Harrison is yawning at the moment of the beep.] In his experience, there might have been a slight awareness that he is yawning, but nothing about the yawning stood out to him. In fact, there might have been no experience at all in this moment.

Harrison 3.1: [Harrison was studying and reading his psychology book about conditioning.] At the moment of the beep, he is innerly speaking the sentence he is reading; the beep occurs at the word “conditioning.” The sentence is innerly spoken in a normally declarative tone in his own voice. This may have been experienced as being slightly softer than he speaks normally. He is reading with understanding.

Harrison 3.2: Harrison is typing and about 70% of his experience is focused on the physical act of typing. 30% of his experience is on the innerly saying “success” (the word he was typing) in his own voice, without accent or emphasis. The physical sense of typing involves both feeling the skin between the fingers of both hands as the skin stretched in the act of typing. This is primarily between his index finger and middle finger, between his middle finger and ring finger on both hands. He feels all these stretching simultaneously—that is, they are not separable sensations associated with particular stretchings when particular fingers are used in typing. Somewhat less a part of the physical typing experience is feeling the keyboard keys—feeling the keys themselves, not his fingers on the keys. The skin stretching is roughly 55% and the key feeling 45% of the physical typing experience.

Harrison 3.3: Harrison is experiencing warmth on the surface of his skin from the top of his forehead down to just below his eyes. It feels quite warm, but not painfully so. He does not feel it in his eyes. Harrison is also annoyed, which [currently] is separate from the warmth. His annoyance does not have any other characteristics, and is

perhaps 30% of his experience, compared with about 70% for the warmth. [The warmth was understood to be an ingredient of annoyance, or at one time was a part of annoyance, or at some future time would have been a part of annoyance, but at the moment of the beep it was experienced as warmth per se.]

Harrison 3.4: Harrison is experiencing warmth in his chest, a bothersome something on his cheek, and the muscles around his mouth and cheek move. [Harrison describes these sensations as meaning he is happy, but he is not actually experiencing any happiness at the moment of the beep.]

The warmth in his chest is experienced as just under the skin, approximately six inches wide right around the sternum and extending up to the base of his neck. The center of the area is the warmest, just a little bit warmer than body temperature, and the further from the center the cooler the sensation is, with no warmth being experienced above the base of his neck.

The sensation on his cheek is a tear, although it is not experienced as a tear at the moment of the beep. At the moment of the beep it is simply a bothersomeness on the surface of his skin, on his upper right cheek just below on to the right of his eye.

The muscles-around-the-mouth experience is the physical result of a smile, but Harrison does not experience himself as smiling, but rather feels the musculature of his face forming the smile.

Harrison 3.5: Harrison is innerly seeing a burger joint. 85% of his experience is focused on seeing the burger joint, which includes a building with a green sign above the doors as well as an empty parking lot with parking spaces demarcated by white lines. The green sign has “Create” (the name of the burger joint) written in white letters.

Harrison's seeing is focused at the whole scene as opposed to any particular part of it. He sees the scene as if he is 20 steps away from the building, and as if he is seeing it through his own eyes. He describes the feeling as a "longing" for this burger joint. [At the moment of the beep, the feeling of nostalgia is less strong than just a few moments prior, as by this point in time it has been "fading."]

Harrison 3.6: [Harrison is studying psychology and trying to innerly say the name of the researcher who ran the Bobo doll experiments (the name is Bandura, but Harrison couldn't recall it then).] He feels a weight on the surface of his tongue, the distal half inch or so, mostly on the top but also wrapping around to the sides and the bottom of the very tip. The sensation is definitely right on the surface of his tongue, as if something slightly weighty is sitting on it, but he doesn't feel the imaginary thing, just the weightiness it engenders. At the same time, Harrison is innerly saying "Sacks," [as in Oliver Sacks] a name that he is [incorrectly] uttering in response to the effort to recall the Bobo researcher. Much more of his experience (85:15) is occupied by the tip of the tongue phenomenon than the innerly speaking "Sacks."

Harrison 4.1: Harrison feels warmth on the surface of his skin and in a region that surrounds the front of his head and seems to extend about 2 inches beyond his head. He experiences this warmth on his face and outside of his face. He feels a slight shake of his head from left to right and right to left. He experiences the warmth on his face and around it as being slightly cooler as his head moves. His experience is split about equally between his experience of warmth and of his head shaking. The warmth in the region around his face is to some degree a feature of the space, not his body. That is, as his head shakes from side to side it moves through the warm space, slightly warming his

face. That is, the surrounding region is slightly warmer than the face itself. The surrounding region also moves somewhat with his head, but it does not seem to be attached to his head.

Harrison 4.2: Harrison feels pain in the tip of his tongue where he had just bit it. [He describes the pain as 7 out of 10 in terms of painfulness], and it is occupying 80% of his experience. The other 20% of his experience is innerly saying to himself “Who bites their tongue?” in his own voice, in an exasperated tone. This inner speaking is of normal speed, is louder than his normal inner speaking volume, and just a little softer than his normal speaking aloud voice.

Harrison 4.3: Harrison feels his body (primarily his torso and head ) cooling down. This is a noticing of the cooling, not merely a noticing of temperature that is later judged to be cooler than previously. [The warmth had been part of a frustration, and the cooling down was understood retrospectively to reflect a lessening of the frustration, but the experience at the moment of the beep was \*not\* of frustration. At the moment of the beep the experience is the bodily cooling down.]

Harrison 4.4: Harrison’s arm feels itchy multiple (2 or 3) simultaneous pricks on the surface of his skin on the underside of his left forearm. The itchy area is oval-shaped, starting a couple of inches up from his wrist. The long side of the oval is about 4 inches long and extends lengthwise on his arm, and it is a couple of inches wide. [At that moment, Harrison’s right fingertips have just made contact with the arm, in an effort to scratch the itch (although scratching had not yet commenced). While it is the state of the universe that apparently, exactly, simultaneously, with the touch his arm felt less itchy (and therefore, “nice” relative to what he’d felt before), this change was not

present in experience. What was present was the itchy sensation in his left forearm, which happened to be less itchy than it had been in the previous moment before he touched his own skin. Also, while Harrison described the sensation as “bothersome,” nothing about bothersome-ness was in his experience at that moment.]

Harrison 4.5: [Harrison was reading the sentence “an Asian culture of success”]. At the moment of the beep, Harrison is reading the word “culture” simultaneously innerly speaking the word “culture” in a voice that he describes as his own, but at 75% of his natural volume. The process that the beep interrupts is of his reading and innerly speaking the sentence as a unit. He is not going from word to word to word. [Harrison described this reading as “see/say”: that he was reading a sentence without experientially processing the meaning of the sentence. That is, his understanding was that he was experiencing something like the *input* into the reading process, rather than experiencing a reading with understanding. The words and sentence structure were understood to be familiar—that is, he was reading an English sentence and English was his native tongue, and the words had a familiarity to them. But his sense was that the meaning would come later; the meaning was not inherently a part of the saying of the words.]

Harrison 4.6: [Harrison is taking a sip of Pepsi.] About 50% of his experience is a painful, burning sensation in his throat, just below his chin, [which he describes as 5 out of 10 in terms of painfulness]. The pain is of about 15 separate carbonation bubbles popping in his throat at approximately the same time, but not simultaneously. The bubbles are in a wave shape in his throat, and the pain is a constant sensation. About 30% of Harrison’s experience is the sweetness of the Pepsi. He tastes the sweetness



on the back half of his tongue. About 20% of Harrison's experience is hearing himself say "ahhh" and feeling his mouth open to produce the sound after taking the sip. [This is an experienced hearing, not saying.]

### **Caitlin**

Caitlin 2.1: [Caitlin was reading her developmental psychology book.] At the moment of the beep, she is innerly hearing or perhaps innerly speaking and hearing "Babies do not attend closely". This is experienced as being in her own voice [but she was not sure if the voice that she heard/(spoke) was the same as her external voice]. The hearing/(speaking) is experienced as being a whole phrase rather than a sequential one-word-after-another reading. [Note: Caitlin used the onboard speaker, not the earphone, during this sampling day.]

Caitlin 2.2: [Caitlin was in an "attentional break" while reading—that is, she had broken off reading but had not noticed that she had broken off.] At the moment of the beep, she innerly hears [perhaps the third repetition of] the word "momentous" in her own voice. There might be some experience of this happening separately from herself, as if her brain is doing the repetition, not her whole being. As she hears "momentous," her eyes flit aimlessly around the page—[that is, *not* in the organized eye movements while reading—but this was likely not in awareness at the moment of the beep.] [Note: Caitlin used the onboard speaker, not the earphone, during this sampling day.]

Caitlin 2.3: [Caitlin was hanging up a towel]. At the moment of the beep, the music that is playing in the room is somehow passing through her experience, but she is not focused on it. The acting of hanging up the towel is also slightly in her experience, also not occupying much of her attention. [She describes her experience as 20% the

music, 10% the towel; the remaining 70% is not occupied.] [Note: Caitlin used the onboard speaker, not the earphone, during this sampling day.]

Caitlin 2.4: [Caitlin was grabbing her phone to check the time.] At the moment of the beep, she is wondering whether she has enough time to call her friend as well as thinking about calling her friend. This is present without words, images or any other symbols.  
[Note: Caitlin used the onboard speaker, not the earphone, during this sampling day.]

Caitlin 2.5: [Caitlin was reading the phrase “simple floating objects” in her psychology book.] At the moment of the beep, she is innerly hearing the words “simple floating objects”. This is experienced in her own voice (although there she was not sure if this actually matched her outer audible voice), but the voice is somewhat delayed after the visual reading. Also, she innerly sees a yellow rubber duck floating in a bathtub. (The duck’s head is pointed to the left.) The whole bathtub is seen but mostly the portion on the left end of the tub, near where the seen duck is floating.  
Also directly in experience [that is, not merely surmised] is some sense of connection—that is, the reading and the visualizing are directly experienced as being connected—as if this is her way of understanding what “simple floating objects” meant [but she could give no specific details]. [Note: Caitlin used the onboard speaker, not the earphone, during this sampling day.]

Caitlin 2.6: [Caitlin was watching TV and eating a burrito.] At the moment of the beep, the eating action is her experience; possibly she is also innerly seeing the texture of the avocado. She is more strongly centered on the eating action than the texture of the avocado. At the same time, she is attending to the TV show she is watching and laughing along with it. The eating portion of experience is 65% and the television

show is 35%. [Note: Caitlin used the onboard speaker, not the earphone, during this sampling day.]

Caitlin 3.1: [Caitlin was eating and watching television.] At the moment of the beep, most of her experience is taken up by the show that she is watching. Also, there is an internal sense of her laughing, in response to the TV show. She is also noticing the texture of the food in her mouth, specifically the feeling of the food on her back teeth. She describes her experience as 75% watching the TV show, 15% laughing, and 10% chewing her food. [Note: Caitlin used the onboard speaker, not the earphone, during this sampling day.]

Caitlin 3.2: [Caitlin was watching TV, seeing a bridge on the television, where the content was about suicide by jumping off of the bridge.] At the moment of the beep, she is innerly experiencing or innerly seeing someone jump off the bridge. There are no particular seen features of this scene, but there is definitely something visual about the experience, somehow seeing an up-and-over trajectory of the person going over the railing of the bridge [there is not any motion present in the visual qualities of the experience]. [Note: Caitlin used the onboard speaker, not the earphone, during this sampling day. Because she did not use an earphone, and for other reasons, it is perhaps likely that Caitlin was not adequately discerning what was experience at the moment of the beep.]

Caitlin 3.3: [Caitlin was eating cereal out of a box, with her arm raised dropping Honey Bunches of Oats directly into her mouth.] At the moment of the beep, there is not much experience present. 10% of her experience is on keeping the food in her fingertips—the tactile sensation of so doing, and another 10% is on the television show that she is

watching. Both of these things are experienced at a low level. Aside from this, there is no experience. [Note: Caitlin used the onboard speaker, not the earphone, during this sampling day. Because she did not use an earphone, and for other reasons, it is perhaps likely that Caitlin was not adequately discerning what was experience at the moment of the beep.]

Caitlin 3.4: [Caitlin was lying down and was thinking about a conversation that she had from last night.] At the moment of the beep, Caitlin is feeling calm and happy. This is an experiencing of a feeling similar to last night's, but not identical—as if some processing of the event had taken place, and not a memory of what had happened. These feelings are mental experiences, not bodily sensations. [Note: Caitlin used the onboard speaker, not the earphone, during this sampling day. Because she did not use an earphone, and for other reasons, it is perhaps likely that Caitlin was not adequately discerning what was experience at the moment of the beep.]

Caitlin 3.5: [Caitlin was straightening her hair.] At the moment of the beep, she is wondering *what is experience?* This thinking is immediately ongoing in experience, but not present in words or other symbols. Also, at the moment of the beep, there might have been an aspect of “taking stock” or noticing what she is doing in anticipation of the beep. [Note: Caitlin used the onboard speaker, not the earphone, during this sampling day. Because she did not use an earphone, and for other reasons, it is perhaps likely that Caitlin was not adequately discerning what was experience at the moment of the beep.]

Caitlin 4.1: Caitlin is typing the word “more” and simultaneously was thinking “more about looking into poverty”. [Caitlin referred to this “more about looking into poverty”

experience as “on my head was the strain of words,” where “strain” apparently was a combination of train and stream; “strain” was not an accidental locution—she said it twice a minute or so apart] This strain rather trails off—that is, it does not have a clear ending demarcation—and is an auditory experience that is more spoken (experienced premotorically) than heard. This is experienced as being her own voice, but a voice that is not the voice that she normally uses when she speaks aloud. At the same time, there is a less prominent but simultaneous part of her experience, which is her trying to adjust, rearrange, or otherwise better construct the sentence she is typing. This is less concrete than the first part and is experienced as shifting and fumbly, but apparently in the same kind of spoken voice as the main inner experience.

Caitlin 4.2: [Caitlin was singing out loud to the music that was playing.] At the moment of the beep, her experience is mostly on the heard music and secondarily on the physical act of singing [without hearing herself singing].

Caitlin 4.3: [Caitlin was listening to music and doing laundry.] At the moment of the beep, she is (60%) listening to the music [more hearing the rhythm and the beat of it than the lyrics; the heard song had a vocal line but she was not attending to it.] At the same time, she is moving to the rhythm of the music as she is in the act of looking in places where clothes might be; she is 40% attending to the physicality of this search for the laundry. [That is, she is not directly experiencing the looking-for-the laundry—she experiences the action that underlies that looking.]

Caitlin 4.4: [Caitlin was pouring fabric softener.] At the moment of the beep, she is smelling the fabric softener and simultaneously enjoying the smell. Her experience is 70% smelling the fabric softener and 30% enjoying the smell. She describes this

experience as not very vivid and that there is not much in immediate experience, [but RTH thought there was reason to be skeptical—she had a lot of power in her description of the smell—so it might be a reticence to describe sensory awareness.]

Caitlin 4.5: [Caitlin was about to take off her flip flops.] At the moment of the beep, Caitlin experiences a premotor intention of where she is going to put her body so that the flip flops would go where she wants them to. This is an experience of the physicality of the motion she is about to perform. [She describes this experience as not very vivid (10-15%) and that there is not a lot in her experience at this moment.]

Caitlin 4.6: [Caitlin was in class listening to her professor talk about some personal projects that were an assignment in class.] At the moment of the beep, Caitlin is experiencing something like *It is ok if I get a couple of B's*. This is experienced as words, [but Caitlin could not recall the words at the time of the interview. It is unclear if this was experienced as an inner speaking.] There is not a voice present, but the experience of words is present. At the same time, Caitlin has a feeling of calm, a mental absence or a lack of an overriding concern with getting a B.

### **Adele**

Adele 2.1: [Adele was moving the beeper to make sure it felt comfortable on her belt.] Her experience is of just performing that action. [It is likely that she accidentally moved the thumbwheel and caused the onset of the beep.] [It is questionable whether Adele had an adequate concept of the moment of the beep, and therefore there is reason to be somewhat skeptical about the fidelity of this description.]

Adele 2.2: [Adele was rereading a passage in an anthropology reading with the intent to highlight part of it; she was looking for a passage that she had decided was worth highlighting.]

In her experience at the moment of the beep, Adele is just rereading with the expectation that she will recognize the passage to highlight when she comes to it [that is, she did not have any direct experience of the target passage, not in inner or outer words, not in gist, not in any way—she would recognize it when she got to it]. It is unclear whether she is reading with comprehension at the moment of the beep. [It is questionable whether Adele had an adequate concept of the moment of the beep, and therefore there is reason to be somewhat skeptical about the fidelity of this description.]

Adele 2.3: [Adele was on the bus, and describes the experience of wondering whether people are watching her wear the beeper and write down notes about it. This led her and us to conclude that she was describing thinking that took place during the sounding of the beep rather than cleaving to the moment of the beep. This moment is thus disregarded for our data collection purposes but provided a clear opportunity to discuss the concept of the moment of the beep.]

Adele 2.4: [Adele had been thinking that her paycheck would be less this week, and that that would make it impossible to buy a desired item.] Adele is innerly seeing a generic paycheck stub. [She was seeing it as if she were looking at it on a website that she uses to view her own stub.] The paycheck stub occupies her whole seeing [as if it filled the computer monitor], and she can see a white background with black writing on it. [She said in response to questioning that she was drawn by the whiteness of the background, but RTH sees reason to be skeptical about this]. The black writing is not clear to her. [It is questionable whether Adele had an adequate concept of the

moment of the beep, and therefore there is reason to be somewhat skeptical about the fidelity of this description.]

Adele 2.5: Adele is seeing the lid of her coffee cup. [She was about to get off the bus, and had been in the process of checking to see that the lid was closed, but the notion of checking was not in her experience at this moment; neither was the action of checking, which came after the beep.] [It is questionable whether Adele had an adequate concept of the moment of the beep, and therefore there is reason to be somewhat skeptical about the fidelity of this description.]

Adele 2.6: [Adele was “thinking about thinking about” (and she meant that literally) whether/how to tell her brother where she was in the library. She was considering whether to send a text message to her brother, what to say in it, and when to send it.] Adele is innerly seeing a text message, but she does not actually innerly see any aspects of it. [RTH sees reason to be skeptical about the imageless seeing account.] The words “Fifth Floor” are, she says, present to her, and it might be that she is innerly speaking them to herself [as she was deciding how to describe her location to her brother via text.] [It is questionable whether Adele had an adequate concept of the moment of the beep, and therefore there is reason to be somewhat skeptical about the fidelity of this description.]

Adele 2.7: [Adele had registered for a GRE test and was concentrating on the code (a string of letters and numbers that were presented on the computer screen.)] She might have been particularly focused on seeing the letter “F”, as if the “F” stood out to her or grabbed her attention in some way, [although she is not sure that she was seeing particularly the F at the moment of the beep or just remembering the particularized F



during the interview with us.] [It is questionable whether Adele had an adequate concept of the moment of the beep, and therefore there is reason to be somewhat skeptical about the fidelity of this description.]

Adele 3.1: [Adele had just finished cleaning under her nails and had not yet moved on to another activity or experience.] At the moment of the beep, nothing is in experience.

Adele 3.2: [Adele was about to watch a video about a comedian on her cell phone.] Adele is wondering what the main character in the video is about to do, and to a lesser extent, about what he might say—how he would portray the scene. This wondering does not involve words or images. [It is also not a feeling.]

Adele 3.3: [Adele was having a “flashback” of something that happened a few days earlier.] At the moment of the beep, Adele is innerly seeing the white [Student Services] building to her right as she walks toward it to heat up her and her brother’s lunch. She also innerly sees people walking around her, who are clear [and not fuzzy], although she cannot make out their faces or clothing. The whiteness of the building is particularly salient in this inner seeing.

Adele 3.4: Adele is wondering what her sister was thinking, which might have presented itself to her as her innerly saying something like “I wonder what she’s thinking” [although Adele did not seem confident when she first reported it in this interview, and she was not certain about the precise words or even if words were present. If these words were present, they were innerly spoken (not just heard) in her own voice, softly and slowly, in the right side of her head.] Adele is also seeing (in reality) her sister, who is lying in bed, awake, propped up on her arms. The inner words are about 80% of Adele’s experience and the seeing is 20%.

Adele 3.5: Adele is innerly saying something like “Is this bottle filled with cream?” or “Is this filled with cream?” or “is this a bottle of cream?” and simultaneously innerly saying “Is this hidden from me?” or “Did they hide the cream from me?” [That is, she understood herself to be saying two different things simultaneously, but was not confident about the words in either.] [Whereas she was confident that the words were present, she was not sure what they were verbatim. RTH sees such indeterminacy of words as a possible indication that the experience is not in words.] At the same time, she is seeing the top of a bottle with a drop of [what looked like] cream on top, and she is primarily seeing the drop of cream more than the top of the bottle.

Adele 3.6: [Adele was reading an anthropology book with comprehension, although she was unable to recall what she was reading about]. At the moment of the beep, Adele’s experience is of making a mental effort to grasp the concepts and being absorbed in the text. She described this effort as mental [and also not a feeling, and it did not have any physical aspects.]

Adele 4.1: At the moment of the beep, Adele is seeing a bus stop that she is approaching. She is seeing the bench and the shelter portion of the bus stop. She may also be thinking that she may have missed the bus or that the bus may have been on the way. However, it is unclear if this is part of the seeing experience or is its own separate thinking experience.

Adele 4.2: Nothing is in experience at the moment of the beep.

Adele 4.3: [Adele was reading from an anthropology book. She had just read about a culture that described women’s sexual behavior that involved lying down, motionless, with their clothes on while having sex.] At the moment of the beep, Adele is somehow mentally

experiencing herself in the motionless, lying down posture, with her arms limp to her sides. However, this experience is not visual and is not about her imagining the physical sensations/posture. [It is unclear how exactly this is experienced. Adele describes that she is mentally placing herself in the story.]

Adele 4.4: Adele is hearing her phone ring, loudly, in her left ear. She is also flustered. She may also be seeing her pocket in experience as she looks down to take out her phone. Her experience is 90% about hearing the loud ringing, 8% about feeling flustered, and maybe 2% about seeing her pocket.

Adele 4.5: [Adele had just read the word “anrongbunting” in her anthropology book.] At the moment of the beep, Adele is trying to recall what “anrongbunting” means and is also seeing the word printed in her book. [We were unable to determine how she experienced trying to recall what the word meant except that it somehow involved a mental effort of trying to match the word to meaning.] She might also be aware of her inability to match the word to meaning at this time. Her experience is 75% about trying to match the word to meaning and 25% about just seeing the word on the page.

Adele 4.6: [Adele had just received an email from Turbo Tax and was about to open the message on her phone.] At the moment of the beep, Adele is innerly seeing the message that might be about to come up. She innerly sees a white message with black text on it. The beginning of the text is her first name followed by a comma: “Adele,”. The rest of the text is a 3-4 sentence paragraph that is not seen in sufficient detail to be read. [There was no border to the message she was seeing, just a white screen with black text.] Also present is mentally hoping that Turbo Tax would have money for her.

[This “hoping” was mental, and not an emotion, and was not represented by words or images.]

### **Eden**

Eden 2.1: [Eden was reading and highlighting it. Neither the mechanics of reading nor the highlighting was experienced.] At the moment of the beep, Eden is innerly seeing a nighttime scene with three Native Americans: a woman with her child beside her and, a few feet over, a man in a headdress. In the background is a teepee style tent. They are dressed in beige clothing, and the scene is experienced in dark nighttime colors.

Eden 2.2: [Eden was outside seeing her grandmother through the window of the car before it drove away.] At the moment of the beep, Eden feels a sense of relief and alleviation, a feeling that is aimed at Eden’s relationship with her grandmother. This is not experienced as being in her body, but may be a feeling in her head or a cognitive experience that is difficult for her to describe. The scene and background behind her grandmother is also present.

Eden 2.3: [Eden was looking at her notes for a class and was having difficulty answering a question.] At the moment of the beep, Eden is feeling inadequate--a bodily exhaustion that is also (although less so) a mental experience. The inadequacy is a specific reaction to the difficulty of the problem—that it is taking a long time[, *not* a general feeling of inadequacy]. At the same time, she is trying to find the answer to the question, a mental trying that is in her experience. She describes her experience as 60% trying to find the answer, 40% feeling inadequate.

Eden 2.4: Eden was laughing at something that was on TV.] At the moment of the beep, she is enjoying the feeling of laughing and is focused on the sound of it and the up and

down movement in her chest as she laughs. That is, her focus is on her own laughter phenomenon (almost a meta-awareness), not on the TV show.

Eden 2.5: [This beep was skipped because it went off as she was adjusting the beeper.]

Eden 2.6: [Eden was watching a TV show and was laughing.] At the moment of the beep, she is innerly seeing the scene in the show that had just occurred, which was of two couples, each a man and a woman. She is keeping the scene alive or occurring in her experience as she laughs. The innerly seen scene has less detail than the actual scene in the television show. At the moment of the beep, laughing at the scene is also somewhat in her experience, [but not nearly so present or central as the laughing in 2.4.]

Eden 3.1: [Eden was typing.] At the moment of the beep, she is drawn to the black against white color (of the words on the computer screen). She is also drawn to the clicking sound of typing. At the same time, she is drawn to the shape of pattern (of the words on the page), black white black white, and how the stream of words is growing as she typed. The meaning of what she is typing is not present.

Eden 3.2: [Eden was walking out of her front door.] At the moment of the beep, she is feeling the cold wind on her entire body [even though the wind is coming only from the front]. This experience is more of the coldness than the wind. At the same time, she is drawn to the black color and the other features (fabric, shape) (of the backpack of the girl in front of her); she is simultaneously drawn to the brownness (of the girl's jacket). She also sees a gloomy grey-blue tone of the scenery around her—she experiences both the color and the gloominess it conveys.

Eden 3.3: [Eden was in class. Someone had said something that Eden had found funny, and Eden had laughed.] Now she is smiling and feeling both the physicalness of her smile (the

stretching feeling at both corners of her mouth) and feeling joy at her own laughter. [That is, at the moment of the beep was a self-referential experience, joy/smiling at her own laughing.] The original thing that she is laughing at is not present. Simultaneously she is drawn to the bright blue of the Windows screen on her computer.

Eden 3.4: [Eden was in class listening to her professor speaking.] At the moment of the beep, she is mostly drawn to the deepness—the bass timbre— of the professor’s voice. [The professor was talking about colleges and graduate programs, and was saying “within those domains it doesn’t matter,” referring to the details of the program.] At the same time, Eden innerly sees four or five small boxes, seen as small squares that are evenly spaced and seen straight on, so that even though she cannot see depth to the boxes, she knows them to be boxes. (These boxes are understood to be a seeing of what the professor was saying, that is, the boxes are some kind of abstract representation of “within those domains it doesn’t matter.”) Simultaneously, she is seeing [in reality] the professor standing in the classroom. [The professor’s voice may have been the most salient feature of this experience, or the boxes may have been the most salient feature; Eden was not sure whether she was in some way lying to herself about whether the boxes were important.]

Eden 3.5: [Eden was slouching in her chair, leaning her head on her outstretched finger.] At the moment of the beep, she experiences the pressure of her finger on her head (not in her finger), a comfortable feeling. She also feels comfortable in her whole body. At the same time, she has an unsymbolized thought that she is comfortable, that she is not

very often this comfortable. That is, this is both a sensory awareness of the comfortable pressure and a self-referential thinking about that comfort.

Eden 3.6: [Eden was in fact frustrated with something her mother had just said, and in expressing that frustration had just said “Why?” in a drawn-out way that reflected frustration; however, she did *not* feel frustrated.] At the moment of the beep, she is continuing to feel, to be consumed by, the vibration in her neck and throat of the word “why”. She also is thinking about how she said it and how it felt to say it in that way. This thinking about saying “why” may be experienced in an unsymbolized way. [That is, she both had a sensory experience of vibration and also a cognitive self-referential or self-analytic experience.]

Eden 4.1: [Eden was opening her notebook.] At the moment of the beep, the weighty sound of flipping the notebook open is in her experience as well as the whiteness of the paper. She is focused on the sound and the whiteness of the paper, [and not any other particular detail of the paper. That is, she doesn’t see the lines or the writing that is on the paper].

Eden 4.2: [Eden was texting.] At the moment of the beep, she is making sure that what she is texting is correct/has the right tone/ is not mean. This has an aspect of imagining forward to compare the written text to what she wants it to say. How this comparing is in her experience is not clear, but it is *not* a spoken (innerly or outerly) comparison, and does *not* involve in experience the meaning of the text, but on the way it would compare to what she wants to say. Also in her experience is the blueness of the screen of her phone.

Eden 4.3: [Eden was at In-N-Out looking at a girl putting away sauces, wondering if she was organizing them.] At the moment of the beep, Eden is innerly seeing her own hand from a first person perspective, that is, as if it were hers (although this is the girl's hand, *not* her own hand). This hand is in motion putting a red sauce packet in a box. At the same time, Eden is watching the girl's hand move, and is also being drawn to the whiteness, the redness, and brightness of the scene. She describes her experience as split 30/70 between the inner seeing and seeing the whiteness/redness/brightness of the scene.

Eden 4.4: [Eden was typing the word "but" into her laptop.] At the moment of the beep, the words "beauty of dance" are present. These are not experienced as having any vocal qualities (they are not experienced as innerly spoken or innerly heard), but they are sequentially experienced. At the same time, the color pink is present [this is understood as being the same pink as she had seen a bit earlier in the pink dress and roses of the ballerinas (although ballerinas, dresses, and roses are not present in experience at the moment of the beep.)] This pink is experienced as connected to the words, but it is unclear how.

Eden 4.5: [Eden had reloaded a webpage and a commercial that she had just seen opened again.] At the moment of the beep, she is experiencing a feeling of shock, confusion and surprise. This is experienced being fast, and as one single feeling [not three]. At the same time and separately Eden is experiencing the sensation of her eyebrows knitting together. [It makes sense to say that the eyebrows reflected the shock/confusion/surprise, or were part of the shock/confusion/surprise, but that



connection was not experienced. Instead, there was the shock/confusion/surprise, and there was the eyebrows knitting.]

Eden 4.6: [Eden was watching a movie where a scene was of a man who was drowning.] At the moment of the beep, she is experiencing the blue of the water and the form or shape of the person who is under the water. She is not attending to the content of the movie; she sees the color and the shape [but they have no meaningful connection to the movie. That is, she does *not* see the shape of a drowning man; she sees the shape (which was of the drowning man).]

### **Deana**

Deana 2.1: Deana is innerly hearing a song (“Atticus” by the band Noisettes). She innerly hears the singer (singing the lyrics “Constellations tonight, they’re so fearsomely bright, my love”) and the music. [She understood these to sound as she would hear them if she were hearing the actual song.]

Deana 2.2: At the moment of the beep, Deana is hungry, mentally imagining how good a Subway ham on Italian bread sandwich would taste, and feeling guilty about spending too much of her money at Subway. These three somewhat separate but connected experiences are all approximately equally salient in her experience. Her hunger involves an almost painful sensation of emptiness in her stomach. The ham on Italian bread sandwich is mental, something like imagining how good it would be, rather than being a sensory experience of taste. Her feeling of guilt is emotional rather than mental.

Deana 2.3: [Deana’s friend had hurt her feelings. She felt betrayed by him. She had trusted him. She had read a text from him and] She is now seeing the particularly hurtful words.

She sees the words “fragile,” “weak,” “crying” in large font directly on top of each other. She sees all of them at once, as separate words, but all straight ahead. It is not a collage. It is a seeing of the word “fragile” and a seeing of the word “weak” and a seeing of the word “crying” all seen in the same place but not overlapping or interacting. The words are black words and in the same font as she had read them on her phone, but in a much larger font than the original. Simultaneously, she feels betrayed. She feels (60%) crushed in her chest [as if stepped on from front to back, like being hit by a train hard and slowly, or like an elephant’s foot pressing on her chest]. She also feels (40%) lifeless in her limbs (arms and legs), drained and cold, as if she is not able to move them.

Deana 2.4: At the moment of the beep, Deana is feeling stressed/bad about disappointing a friend. Her feeling involves an inner side-to-side shaking of a region in her core that vibrates the contents of the area directly around it. The region in her core is a golf-ball sized area in the middle of her chest, slightly above where her heart would be, but it is not her heart. The shaking affects an area about the size of a grapefruit directly around the core region, as if organs are being moved by the vibrating of the core. [This shaking would not be a visible shaking or a physical reality, but a feeling that Deana experienced as inner shaking.] Also, at the moment of the beep, Deana has a thought/feeling in her head of feeling bad for disappointing her friend. If this thought/feeling could be put into words, it would be “aww, man,” but there are no words present and this thought/feeling is not present in any other way. [This part of Deana’s experience is difficult to describe; she cannot definitively say whether this is a thought or a feeling, or give any specific characteristics of the experience besides it

being located in her head.] Both the stressed/bad feeling and the thought/feeling are about Deana rather than about the friend. That is, this is an experience of Deana-the-disappointer rather than of the-friend-as-let-down.

Deana 3.1: [Deana was eating a chocolate cheese bar, which she loves.] At the moment of the beep, she feels happy/amazing. She innerly sees three scenes: (1) a picture of calla lilies, one particular lily against a background of a field of lilies. This is experienced as seeing a photo (wider than it is tall) of a lily rather than as a seeing of a lily. It is in color—the lily is white. (2) a picture of orange, a wider-than-tall luminous field of orange (the color of a ripe orange) fading to deep blue (like the sky after sunset but before dark) at the very top. Perhaps 7/8 of the field is orange, then morphing to a narrow stripe of blue. (3) She sees the stars of Orion's belt. This is a seeing of the night sky, \*not\* a photo of the night sky. The three stars of the belt are large—perhaps a foot in diameter—and spread out proportionally as if Deana has zoomed in on that portion of the night sky. The rest of the stars are normal (marble) sized. At the same time, she feels happy—a warmth being introduced into her body from about her nose to her thighs and to the upper portion of her arms.

Deana 3.2: [Deana was walking outside in the cold weather.] At the moment of the beep, she is feeling sad, which she experiences as moderate weight pushing downward on the top of her shoulders and pulling downward on her waist. She is also feeling the wind and cold air, which feels like it is cutting on her hands. She also feels the cold on her legs, face, and up her dress all the way up to her belly. The sadness is understood as arising from or being intimately connected to the coldness.

Deana 3.3: [Deana was in the bathroom putting the finishing touches on her lipstick, but that is happening on autopilot.] She sees her face in the mirror, but her lips have a different color lipstick: her seen lips are brownish/black/purplish [a color that she has never seen]. [She is trying out in her imagination different colors of lipstick]; at the moment of the beep she sees this color. Deana is attending to her face and hair and how they look with this color of lipstick—that is, she is not focused particularly on her lips.

Deana 3.4: [Deana was sitting on the second floor of the Student Union with her eyes pointed out the window.] There is nothing in her experience.

Deana 3.5: [Deana was just finishing talking to her friend Chris and had just said “I love you” to him.] She feels/sees her love for him. She feels many balls (as if made out of pipe cleaner material) moving/vibrating in her core—a region slightly smaller than a volleyball in her chest. At the same time, Deana sees a musical staff except that the lines are wavy in parallel, and Chris’s face (just his face, as if it had been carefully cut out of a picture) moving along the musical lines back and forth, up and down, somehow in sync with the pipe-cleaner ball movement in her core.

Deana 4.1: Deana is worried about the classes she signed up for next semester. This worry is a “mental” feeling of paranoia or potential dissatisfaction; that is, Deana understands it to be a feeling that has no bodily aspects. [Deana understood the feeling to be caused by a series of ideas such as *Are those the right classes? Will I like them? I’ve signed up for them, but...*, but these ideas were inferred to be present rather than directly experienced.]

Deana 4.2: Deana innerly sees two pieces of paper: one with a list of “pros” and the other with a list of “cons.” The size of the font reflects the importance of the pro or con listed. There are only two font sizes: one normal sized and the other half-again larger. The paper on the left [the “pro” list] is orange with green pastel lines and she experiences it as if it were a piece of paper. It has two columns. The column on the left lists the pros for studying abroad in the Czech Republic and the column on the right lists the pros for studying abroad in Australia. [Items that appeared in larger font are in larger font.] The pros for the Czech Republic include being away from Las Vegas and **having the opportunity to visit other places in Europe**. The pros for Australia include warm weather, getting to visit the coral reef, and **koalas**, [which are her favorite animal]. The paper on the right [the “con” list] is charcoal colored and dirty with frayed edges. It has a column on the left listing the cons for studying abroad in the Czech Republic and a column on the right listing the cons for doing the same in Australia. The cons for the Czech Republic are **cold** and that the country has too many castles. The cons for Australia are that weather can often get cold when near a coast.

Simultaneously, and of perhaps equal experiential importance, she feels bodily bad [which she took to be the result of her indecision]. She feels “unwell” in the core of her torso [as if she had eaten disgusting food and it was reacting badly in her stomach and intestines]. Her muscles ache [as if her bones had been pulled out of their sockets and then replaced—she did not experience bone’s being pulled, but intended that as a

description of the intensity and unpleasantness of the sensation]. She feels her heart pumping.

Deana 4.3: [Deana was studying, but had drifted off to reflect on her just-ending philosophy class and how she was going to miss it and the professor.] She feels (70% of her experience) a nostalgia/longing for the professor/class, which is a mental (that is, not bodily) feeling. At the same time, she feels sad, which is felt throughout her body. Also, at the moment of the beep, she innerly sees the professor at the whiteboard in the classroom. The seeing is from the perspective that she had as a student in the class [but she doesn't feel herself there. That is, it is a view from there rather than a being in the classroom.] The seeing is personalized in the sense that it is how she would see him, but it is also objectively accurate, as far as she knows, and is in color and motion.

Deana 4.4: Deana is innerly seeing pictures that represented things she might do this upcoming weekend. The pictures are still rectangular images, wider than they are tall, as if they are actually photographs. The pictures "flash" or "pop" into view one at a time, about one picture every few seconds, and then slowly fade into the black background before another picture appears suddenly. These appear in various positions in her visual space: now a bit high and to the left, now off to the right, now center and low, and so on. Deana is not sure which picture is present at the moment of the beep, but the pictures include seeing her friend Brandon's face, seeing herself and best friend Chris side-by-side and laughing, seeing her friend Fabby sitting down at a party, seeing a red Solo cup as if it were held in someone's hand [but no hand was present; the cup symbolized party drinking], and a first-person perspective of sitting in the passenger

seat of a car and seeing trailing street lights. At the same time, she is excited, experienced as a series of bodily sensations at the core of her torso. These sensations feel like sparkler fireworks, energetic, kinetic, electric, which grow larger when each picture appears, and then grow smaller as the picture fades out.

Deana 4.5: [Deana had noticed that her mother and two sisters were wearing Deana's boots, her shirt, and her nail polish. They had not asked for permission, which angered Deana.]

Deana feels an intense heat exploding in her torso, then spreading to the rest of her body. The heat explodes in pieces and each piece explodes into more pieces.

Simultaneously, she sees a vibrant, stoplight-red light flashing about 1-foot away from her head, at a 45-degree angle from the direction she is facing, and slightly above her head. The light is flashing about once per second. Simultaneously, she experiences a series of thoughts. [It was unclear to us if these thoughts were symbolized in words or sounds, however, the thoughts were clear to Deana.] With each flash of the light she experiences one of these thoughts. [Although it was not clear to us if these thoughts in words or sounds, the thoughts could be described in writing as follows: Is this a personal attack? Why are you doing this? Do you know how much those boots cost? Why? Are you serious? Why don't you buy your own stuff?]

Deana 4.6: [The anger of 4.5 had given Deana a headache, and she had drunk some Chai tea and was lying down trying to calm down.] She feels the stabbing of clusters of needles into her head, patches of needles moving from place to place around her skull (but not her face and eyes). [That's what Deana called a "headache" or a "migraine."] She feels the hotness in her core [see 4.5] less than it was previously—but she does not

feel the lessening of the heat. Instead, she innerly *sees* the heat dissipate: she sees grayish or whitish lines above her, moving out and away from her. These lines look sort of like steam from a coffee cup, but it is not that she sees vapor; she sees lines of heat moving away. There are thus three aspects of her experience: migraine is experientially more present than the hotness, which is experientially more present than the seeing.

### **Nina**

Nina 2.1: [Nina had just smelled her dog.] At the moment of the beep, she is having a cognitive experience that she needs to give her dog a bath. It is uncertain if there are words present [early in the interview the implication was that there was a thought without words--just the idea of needing to give the dog a bath. Later she stated with conviction that words were present, they seemed to be directed to the dog, and the words were "I need to give you a bath." She was not sure if she said this innerly or outerly. From the sequence of the interview, it seems possible that there were no words present at the moment of the beep.]

Nina 2.2: [Nina had just felt the heat of her coffee cup in her hand.] At the moment of the beep, Nina is thinking (cognitively) that the coffee cup is hot. This thought is not represented in words, images, feelings, etc.

Nina 2.3: [Nina was stopped at a red light and was watching the cross-traffic.] In her experience, Nina is seeing the traffic pass by to the rhythm of the clicking of her turn signal (blinker). A car passes by with every click of the blinker. The seeing is 60% of her experience, and hearing the click and rhythm of the blinker is 40% of her experience. [Nina was confident of the cross-modality synchrony of this experience, and was



bashful about reporting it, presumably because she recognized the physical impossibility.]

Nina 2.4: [Nina was walking up to the door of the library, seeing the handle of the door as she approached it.] At the moment of the beep, Nina is feeling mildly anxious/disgusted (50%), which is mild feeling that is not localized and does not have any bodily aspects to it. She is also thinking that there are a lot of germs on this door handle (25%); this thinking is not represented in words, pictures, etc. She is also seeing a door handle and the surrounding door that she is about to touch (25%). Nothing stands out to her about the seeing of the door and the handle; she is merely seeing it as she approaches to open the door.

Nina 2.5: [Nina is typing.] At the moment of the beep, Nina is experiencing mental effort of trying to find a word [to continue the sentence she was typing]. The trying is an active process, and it may involve Nina suggesting word candidates to herself that are being discarded, although she is not confident in this description. It is an active thought process, not merely a waiting for the word to appear.

Nina 2.6: [Nina had just felt the back of her hand with her other hand.] At the moment of the beep, Nina is thinking that she needs to put on lotion (90%). This thinking is not represented in words, images, etc. At the same time, Nina is innerly seeing a bottle of lotion (10%). The inner seeing appears a few feet in front of her, as if it were present in reality [although her eyes were aimed at a printer, she was not seeing it in her experience]. The thinking and the seeing of the bottle of lotion are distinct experiences.

Nina 3.1: [Nina was in her closet, staring at her closet, deciding what to wear like she does every morning.] At the moment of the beep, there is nothing present in her experience. [She may have had some minor trace of seeing her clothes or thinking about what to wear, but if so it was so minimal as to be indistinguishable from nothing being present in her experience. She attributed the blankness to her being tired—having just awakened.]

Nina 3.2: [Nina was a passenger in a car driving down the freeway. They had been behind a Toyota Forerunner for a few minutes, which she had been examining.] At the moment of the beep, she is seeing the rolled down back window and thinking that it is weird that the back window is rolled down [because she thought they couldn't be rolled down]. This thought does not involve words or images. [At the same time, she is saying out loud, “weird,” but that spoken word is just coming out of her and is not in her experience.]

Nina 3.3: [Nina was at Einstein's Bagels, ordering a bagel.] At the moment of the beep, Nina is staring at Diane, [who had taken her order,] and thinking “Diane.” The name Diane is present as a word, not voiced or otherwise represented. She is looking at Diane and thinking her name intentionally [so as to connect her face and name, but this intention is not directly present in her experience]. She is not noticing any particular feature of Diane.

Nina 3.4: At the moment of the beep, Nina is innerly saying, “I always get the same bagel” in her normal voice with a tone of mild wonderment. She is recalling the taste of, or perhaps actually tasting, the bagel she always gets, which may be the idea/recollection of what it tastes like or it may be the taste of the bagel she is eating.

[Although she could not confidently distinguish between the idea/recollection of the taste and the sensation of tasting it at that moment, it seemed to be more the idea of the taste than the actual taste.] Her focus is somewhat more on the inner speaking than the taste.

Nina 3.5: [Nina had been reading an article.] At the moment of the beep, she is hearing the word “Bay-ee-sian” internally in her own voice. [She had internally said the word a moment earlier as a way to figure out its pronunciation and then she had changed the sound of it so she heard it in her voice pronounced a few different ways: something like “Bay-ee-sian <spoken> Baysh-un <heard> Baz-in <heard> Bay-ee-sian <heard>”..] At the beep she is hearing herself saying “Bay-ee-sian.”

Nina 3.6: At the moment of the beep, Nina is seeing “9:08,” which is the time on her computer display, and mentally noting that it is 9:08. The mental noting of 9:08 may be without symbols or words, or it may be dimly innerly saying “9:08.” It seems more likely to be without symbols or words.

Nina 4.1: Nina is thinking about whether she wants iced coffee or hot coffee. This thinking is a mental experience, and is not experienced in words, images, feelings, etc.

Nina 4.2: [One of Nina’s favorite songs was playing in the background. Her boyfriend was singing along, making fun of the song.] Nina is innerly saying “He’s ruining my song.” It is in her own voice, spoken innerly as if she had spoken it out loud. There are no particular tones or inflections.

Nina 4.3: Nina is reading, with comprehension, an electronic sign over the highway that reads “Accident on Charleston Left Lane Blocked.” The reading is occurring without

particular effort or attention to specific details, and it is not innerly or outerly spoken or heard, nor does it have other symbols.

Nina 4.4: Nina is sensing the warmth of the sun on the skin of her legs (90%), and she is simultaneously thinking that the sun feels good on the skin of her legs (10%). The thinking is a cognitive, not feeling experience, and occurs without words or other symbols.

Nina 4.5: [Nina had been thinking about the weather—that it was nice out.] Nina is feeling a good/happy/content feeling. She experiences this feeling mentally [and not bodily]. [She understood this feeling to be the result of the good weather, but this was not part of the experience at the moment of the beep.]

Nina 4.6: Nina is having 3 experiences at the moment of the beep. She is (1) feeling anxious (by which she means eagerly anticipating); (2) she is excited (2); and (3) she is realizing that she has a test at 2:30. The anxious/eager/anticipating feeling (60%) is a positive feeling about wanting the test to happen soon/now. The excited feeling (20%) is about wanting to take the test in general. The realizing she has a test at 2:30 (20%) is a mental experience, separate but related to the feelings, that is not experienced in words, images, feelings, etc. [The initial realizing had happened just prior to the beep, but it was still in experience when the beep began.]

### **Maddi**

Maddi 2.1: At the moment of the beep, Maddi is reading a novel, reading a sentence that included the words “even though,” but most of her attention is aimed at the inner seeing of a crummy hotel room with the character Barbara standing in it holding her nose. Barbara is seen as a blond hefty lady, somewhat more illuminated than the

room, which is dark and run down. Maddi sees the bed (head to right), the walls, the window on the other side of the bed. [Somewhat surprisingly it seems that] she is seeing the dark hotel room more vividly than she is seeing the brighter Barbara.

Maddi 2.2: [Maddi was on Facebook looking at a friend's photo album.] At the moment of the beep, she experiences a "flash back" to a time when her sister told her that she was not going to be able to go to a concert with her. Maddi innerly sees her sister from the torso up, sitting on her bed, as if Maddi were looking at her from the doorway. At the same time, Maddi feels sadness in the pit of her stomach, at her core, but without a definite shape or form. The sadness and the inner seeing are equal parts of the experience.

Maddi 2.3: [Maddi was reading a novel (the same novel she was reading in Maddi 2.1). She was reading a sentence that ended with the word "articles."] At the moment of the beep, Maddi is innerly speaking/hearing the word "articles" [which was part of an ongoing innerly spoken/heard sentence; the beep happened to catch her on the word "articles" at the end of that sentence.] The word "articles" is spoken/heard in her own voice without any emphasis. [She was unsure if she was innerly speaking it or innerly hearing it.]

Maddi 2.4: Maddi is in the bathroom looking at herself in the mirror. She is holding her hair in her hands, and seeing it in the mirror, but also seeing the reflected room. She is not particularly feeling her hair, even though she is holding it attentively. Simultaneously, she innerly says "When did my hair get this long?" in her own voice. [It is possible that she was innerly hearing her voice, but it seems it was inner

speaking.] Her experience is pretty evenly divided between the seeing and the inner speaking.

Maddi 3.1: Maddi feels irritated, a “mental” [but not a cognitive] experience. This experience lacks a physical presence. She clearly understands her experience to be one of irritation. [She could not describe her experience further.]

Maddi 3.2: [Maddi was playing the computer game The Sims where you create a simulated life for your character.] At the moment of the beep, she is seeing her Sims living room (on the computer) and comparing the size of the TV to the rest of her furniture. What she is seeing and the comparison of the size of the TV to the rest of the furniture are both in her experience. The comparison is some type of mental process separable from what she is seeing, but it does not have any other experiential aspects (e.g., location, sensation, etc.) other than being an experienced mental comparing process of some type. [After the beep she had the thought that the TV was too big relative to the other furniture, but that thought had not yet occurred at the moment of the beep.]

Maddi 3.3: [Maddi had been playing the Sims game, but it had died and is now displaying a message that says it had died. That message is falling on her retina, but it is not directly in her experience. Instead,] her entire experience is of feeling wastefulness, in the pit of her stomach. There is nothing cognitive about this experience; there is nothing physically differentiated about this experience other than that it is in the pit of her stomach.

Maddi 3.4: [Maddi is reading her math textbook.] At the moment of the beep, Maddi is innerly hearing “find X and Y intercept” in her own voice, slightly slower than usual, and without accent or emphasis. This is a hearing experience rather than a speaking

experience. Furthermore, at the same time, she is reading the line on the page, but her experience is not of the reading, it is of the hearing. She does not know exactly when the beep occurred during her inner hearing.

Maddi 3.5: [Maddi was reading the novel *Looking for Alaska*.] At the moment of the beep, she is innerly seeing the character Pudge from the book. He is in profile facing Maddi's right, holding a lunch tray. He is seen from the waist up, with no background. Pudge is (perhaps) not in motion but looks as if he were walking. [In retrospect, Maddi noticed that the seen Pudge was a visual recreation of the character Henry from the TV show *Once Upon A Time*, although neither this knowledge nor any other aspect of the *Once upon A Time* show is in her experience at the moment of the beep; at the moment of the beep she is simply seeing Pudge.] Although Maddi is reading, at the moment of the beep reading is not in her experience.

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Maddi 4.1: [Maddi was studying for a chemistry test.] At the moment of the beep, she is re-reading a sentence aloud. [Although she could not recall the words she was speaking

at the time of the interview, she was confident that at the moment of the beep she was reading them aloud in her direct experience.] She is re-reading the sentence to try to understand it, but that intention was not her experience.

Maddi 4.2: [Maddi was working on a math problem.] At the moment of the beep, she is adding 5+8 without, apparently, that addition (or anything else) being directly in her experience.

Maddi 4.3: At the moment of the beep, Maddi is watching the show *Once upon a Time* on Netflix. [In the show the character Regina had just found out that the character Henry had left, and Regina had an upset look on her face.] Maddi is absorbed in the show and particularly focused on Regina's devastated expression. Maddi has no experience of sadness or upset or anything besides being absorbed in the show and focused on the expression on Regina's face.

Maddi 4.4: [Maddi was reading posts on Facebook. She had read a particular line.] At the moment of the beep, she is hearing her own voice speaking the line. She is confident that she was experiencing this as hearing rather than speaking.

Maddi 4.5: At the moment of the beep, Maddi is reading *The Fault in Our Stars*, a scene in which "Hazel Grace" is watching America's Top Model on TV. Maddi innerly sees Hazel, with a pixie haircut, sitting on a couch watching TV. The seeing is quite detailed, including [in what was retrospectively surprising but at the moment of the beep unremarkable] the fact that the seen TV screen is blank, a gray screen. [Maddi was confident that she explicitly saw a gray screen, *not* that she simply was not paying attention to that detail of her seeing.] The seen TV is an old style square TV



with a rabbit ears antenna sitting on top of it [the type of TV was not specified in the reading]. Although Maddi is reading, that is not in her experience.

### **Georgia**

Georgia 2.1: [Georgia was having a fight with her boyfriend over Skype.] At the moment of the beep, she is focused on her emotions—a feeling of anger, sadness, upset, and frustration. This is a mental experience and not experienced in any part of her body.

Georgia 2.2: [Georgia was still having a fight with her boyfriend over skype. At the moment of the beep, she describes herself as “hysterically crying.”] Her experience is focused on her nose running, her eyes tearing, and her head pounding. These experiences are going on all at the same time and may be the feeling of sadness experienced in her body.

Georgia 2.3: [Georgia was thinking about the situation with her boyfriend.] At the moment of the beep, she has many different thoughts going on at the same time, but nothing in particular sticks out to her as being the main thought, and she cannot really identify specific content of any of the thoughts. The thoughts are generally about being disappointed with her boyfriend and the future, hopelessness, and depression. There is no visual aspect of the thoughts and no words.

Georgia 2.4: [Georgia was at home and had finished having a fight with her boyfriend.] At the moment of the beep, Georgia is focused on her throbbing head, her runny nose, her heavy eyelids as well as a feeling of being exhausted physically. At the moment of the beep, a feeling of being mentally exhausted is also in her experience.

Georgia 2.5: [Georgia was in her bed watching a movie (*Valentines Day*)] At the moment of the beep, she is just watching the movie and being carried along by it—not focusing on

any one thing in the scene. At the same time, she is also feeling sad and tired. She describes the feeling of being sad and tired as being 20% each of her experience and the movie as being 60% of the experience.

Georgia 2.6: Georgia, at this beep, is not sure what her experience is. It may be little to no experience, [or it could have been missed.]

Georgia 3.1: [Georgia was making a scrapbook with a friend of hers. She was reaching for a glue stick.] Georgia says aloud “I’ll make it work” (the piece of cloth she was working with was a little small).] At the moment of the beep, she is feeling her arm stretch (along the bottom of her bicep) [as she reaches for the glue stick] as well as feeling her eyebrows raise at that moment. At the same time, she innerly sees the square of black and white cloth with a teal ribbon to the side of it. Also, at the same time, she is focused on what she is saying out loud. She describes her experience as being split 10% her eyebrow, 30% her stretch, 40% the inner seeing of the cloth, and 30% what she is saying out loud.

Georgia 3.2: [Georgia was sitting with her friend looking at her Android phone.] At the moment of the beep, she is saying, “Sometimes iPhones are bullshit.” She experiences the speaking and not really on anything else at the moment of the beep.

Georgia 3.3: [Georgia was looking for a piece of hot glue that had become stuck to her sleeve.] At the moment of the beep, she is feeling confused. This confusion does not localize to any specific part of her body. At the same time, her eyebrows are pulled down and pressure from that is experienced in a small area in the center of her forehead.

Georgia 3.4: [Georgia was continuing to make a scrapbook with her friend.] At the moment of the beep, Georgia is saying, “If I do four pages a night I should be able to finish before I go to Chicago.” The saying is the only thing that is in her experience.

Georgia 3.5: [Georgia’s friend was holding a pen to the hot glue gun tip trying to melt off some hot glue that was stuck to it and it had started to burn and smell bad.] At the moment of the beep, Georgia is focused on the point where the pen is in contact with the glue gun. At the same time, she innerly speaks and hears “why would you do that?” in her natural voice.

Georgia 4.1: [Georgia was going into her friend’s dorm room.] At the moment of the beep, Georgia is focused on a pretty string of about 20 or so small lights strung from the ceiling and the window. At the same time, Georgia is hearing somebody in the hall jokingly say, “I’m a professional door opener.” She is more into the lights and the window (60%) than the person speaking (40%).

Georgia 4.2: [Georgia was talking to a friend about bras. She had just finished saying out loud “so you never go without a bra?”] At the moment of the beep, she is surprised and intrigued. This surprise/intrigue is more something cognitive than emotional. She describes it as a “surprised thought.” Her friend is grabbing her chest at the time and this may be in experience to a small extent.

Georgia 4.3: [Georgia was looking at a paper that told her at what times she could call her doctor to get the results of a test that she had had done.] At the moment of the beep, she is nervous. This is not a bodily feeling, but an uneasy, uncomfortable mental feeling. The times that she could call for her results are present in her experience as well. The nervousness is about 70% of her experience and the times to call are about 30%.

Georgia 4.4: [Georgia was sitting on her bed doing her Spanish homework. She was trying to copy a word with an accent in her assignment she was writing.] At the moment of the beep, she is feeling confused and frustrated because the accent won't copy. This confusion is perhaps experienced as a jumble of overlapping inner speakings that are saying things along the line of "What the heck?" "Why won't this work?" "Why isn't it coming up?" If she is innerly speaking, it is experienced in her own voice. She is also leaning over to look at her computer and the zooming in to the screen as she moves is in her experience.

Georgia 4.5: [Georgia was brushing her teeth.] At the moment of the beep, she is thinking something like "you've got to get up early to take Jaime to the airport in the morning." This may be innerly spoken in her own voice but without any words present. [We were unable to determine how this idea was present, though there was a sense that innerly speaking may have been involved even though there were not specific words.]

Georgia 4.6: [Georgia was lying in bed texting a friend of hers goodnight.] At the moment of the beep, she is innerly saying the words that she is texting, which are "goodnight, I hope you have a good trip". [This seems more like inner speaking than inner hearing but we could not be sure.] This is experienced in her own voice.

### **Felicity**

Felicity 2.1: [Felicity's boyfriend was giving her a foot massage.] At the moment of the beep, Felicity is feeling a stimulation sensation (75%), which involves feeling tinglings on the surface of her skin all over her body, as well as a wave of stimulation—almost arousal—moving up through the inside of her torso in waves, a few seconds apart.

All this tingling/stimulation/arousal is relaxed. She also feels the pressure on her foot, where the massage almost hurts (25%).

Felicity 2.2: [The beep caught Felicity as she was dozing off. As such, it is not clear what, if anything, was in her experience. She believed that she may have been in-between waking life and a dream. We skipped the interview about this beep.]

Felicity 2.3: [Felicity was typing some homework on the computer.] At the moment of the beep, Felicity may be innerly saying to herself the words she is about to type. [She was not sure what the exact words were. We are not sure if any words were actually present. We tried to bracket Felicity's presupposition that words must have been present, and we requested that if words are present, she tries to write down the exact words after the beep occurs.]

Felicity 2.4: [Felicity was about to access the Facebook app on her phone.] At the moment of the beep, Felicity is curious about what is on her Facebook newsfeed, and she is in the act of opening Facebook on her phone. [When the beep went off, Felicity was in the process of unlocking her phone,] and she may be innerly seeing the next step of what she has to do to open the Facebook app. The inner seeing, if it is present, involves seeing the app icon on the phone as well as its position on the screen, although the rest of the app icons on the screen are not seen. [Felicity may have been talked into the inner seeing experience due to the questioning or due to presuppositions; Felicity did not initially talk about inner seeing until it was suggested as a possibility. We tried to clarify with her the notion of the moment of the beep.]

Felicity 2.5: [Felicity was working on a math problem.] At the moment of the beep, some words like "I'm always making mistakes on math problems" or "I'm making mistakes again

as I always do, it's always the little things" or something similar may be present [but Felicity is not sure what the exact words were, if they were present, or how they were present if they were there. It is also possible that no words were present. We tried to reinforce that we are interested in the specifics of what is present, whether it's a thought or specific words.]

Felicity 2.6: At the moment of the beep, Felicity is feeling obligated to write something to give to her project partner for a class assignment. This obligation is experienced as an inner seeing of her project partner, as if he were standing in the distance, slightly to the right of her visual field, and standing elevated in the air. She does not see him clearly. At the same time, Felicity is feeling small amount of relief [which was somehow combined with the obligation, but seemed to have started earlier on the timeline] and is writing/copying information [which only occupied a small amount of Felicity's experience, if any]. [There is reason to be skeptical about this account because the interview may have led her into the inner seeing aspect.]

Felicity 3.1: [Felicity was watching WWE on TV.] At the moment of the beep, Felicity is innerly saying "This is so dramatic. This is not real. Oh, that looks real." The first two sentences are located inside the top, front of her head. The third sentence is located in the back of her head or behind her, and she is paying less attention to this sentence compared to the first two. These sentences are innerly said flatly, with no inflection. Although these sentences would have taken several seconds to say in real-time, Felicity's experience is that they all are one experience. However, they are still one-after-the-other and not experienced as simultaneous. [Felicity was confident that this three-sentence saying was one experience, even though the parts had different

characteristics. The beep came at the end of the three sentences, but it did not come at the end of the third sentence, even though that would be physically impossible.]

Felicity 3.2: [Felicity had done a math problem and realized it was incorrect.] At the moment of the beep, Felicity is innerly saying [and maybe also outerly saying or mouthing the words] “Where did I go wrong?” with an irritated, questioning inflection. She also is noticing, one after the other, the several parts of the problem and somehow analyzing them to see if that is the portion where she had gone wrong. This is a strong shifting of focus. [Even though it might have taken a second or two to look at one part, and then another second or two to look at another part, and then another, etc., it did \*not\* make sense to Felicity to identify the particular part she was looking at at the moment of the beep.] She is moving from part to part; that moving-from-part-to-part is one experience, not separable into first this, and then this.

Felicity 3.3: Felicity is innerly saying “plus m” (60%). She is also feeling the pressure of her teeth pressing together, and to a lesser extent her lips pressing together, as she silently mouths the “m” (25%). [This pressing together of her teeth might be caused by the orthodontic rubber bands she wears that pull her teeth strongly together.] She is also writing “+m” on her math homework, though this process is fairly automatic (15%).

Felicity 3.4: Felicity is innerly saying “I can never remember” (60%). She is also imaginarily projecting impatience, out from under the skin of her face and torso in the direction of her math homework. While it has a bodily location, just under her skin, this emotion-projection is not felt physically. [This was different from the tingling of 2.1, which was clearly felt bodily. Felicity was very confident about these aspects.]

Felicity 3.5: [Felicity was looking for a Critical Thinking PowerPoint on her phone. Felicity had been innerly repeating the words “Critical Thinking” to herself.] At the moment of the beep, she is innerly hearing/speaking one of the “Critical Thinking” repetitions [the experience is more of hearing than speaking]. She is also innerly seeing the words “CRiTiCAL THiNKiNG” floating a few inches in front of her eyes. The letters are white with black outlines, and the underline is black. [While Felicity understood the inner seeing to represent the words she was looking for, the actual words on the phone did not have lower-case “i”s, and seeing the “i”s in lower-case related to how Felicity handwrites them. It was remarkable (and seemed remarkable to Felicity) that whereas the words were seen as if typed on a computer, they had the lower-case-i that is a characteristic of her own handwriting.]

Felicity 4.1: [Felicity was rubbing her long braids with hair cream, one hand over the other moving down a clump of her braids.] At the moment of the beep, Felicity is feeling the ridges of the braids moving across the palms of her hands [which felt like beads]. This is a focus on the sensation, not on the practicality of the action, and involves perhaps 70% of her experience. She feels this more on her right hand than her left hand. She is also seeing her braids and her hands [in the mirror] (30%).

Felicity 4.2: [As she typed it,] Felicity is innerly saying the word “aspect” with no particular inflections (90%). She is also feeling the keys of her computer keyboard under her fingers [which are resting on top of the keys at the moment] (10%).

Felicity 4.3: [Felicity was typing the word “prescription” and trying to remember how to spell it.] At the moment of the beep, Felicity is innerly saying “prescrip,” and the saying has substantial energy behind it (90%). She is also somehow sensing the letters “p r e s c r



i p,” which are located about 6-8 inches in front of and slightly above her forehead. Whereas they have this location, Felicity is confident that she is not innerly seeing them, and that her way of apprehending these letters is not visual. She somehow recognizes that the specific letters are there, present to her, but not seen.

Felicity 4.4: [At the moment of the beep, Felicity is reading her chemistry textbook, a phrase which ended with the words “oxidant identification.”] This equally involves seeing the words on her computer screen and innerly saying them quietly and slowly (90%). [We did not fully clarify whether she was innerly saying “oxidant identification” or whether she was saying the sentence, which included the words “oxidant identification.”] She is also feeling the pressure on the left, lower portion of her lip (10%) [produced by the side of her left index finger, but that was not experienced]. She comprehends what she is reading.

Felicity 4.5: [Felicity was talking to a friend about time.] She is in the act of talking, although the talking itself is only a little (10%?) in experience. Mostly, Felicity is innerly seeing some collage-like presentations of things that related to past times. The seeings occur rapidly (perhaps faster than one per second) one after the other, like a slide show. At the moment of the beep, she is primarily seeing her mother and father, an apartment building behind them, and a car; behind them she sees a background of smoky black, a very dark grey or black with the texture of smoke or fog [the assemblages are collage-like because they seem as if the items in them are imported from a variety of scenes and do not form a coherent picture]. The presentation that had appeared the current seeing is also faintly seen—she sees a car (not the same car as in the main

seeing), and the presentation that she is about to bring into existence is seen even more faintly. All of these seeings have the background of smoky black.

Felicity 4.6: [Felicity was looking in her mirror and applying mascara.] At the moment of the beep, Felicity is feeling pressure on the “top” of her foot, outside of her left foot as it pressed into the ground (70%). [The interview did not adequately clarify what Felicity meant by “top.” Perhaps most likely she meant the bottom of the area in front of her toes, but it is possible that she had something in mind that was not merely the toe-end of her foot perhaps the top of the bone.] She describes the sensation as a “tired pressure” [because of how she had been and currently was standing.] Felicity is also (30%) looking at her eyelashes [in the mirror] to make sure they are the way she wants them to look.

### **Olivia**

Olivia 2.1: At the moment of the beep, Olivia is drawn to/involved in the swirling of steam [that rose out of her cup of tea], noticing how it swirls, the dots or packets of steam, and intently looking for larger particles in the steam [which she had seen just a few moments prior to the beep but which were not now present] (60%). She is also singing along to the radio, though this is something she is doing mostly outside of experience. [She explained that she knew the song well] (25%). She is also thinking that she does not want to spill the tea, and this thinking is not present in words, images, etc. (15%).

Olivia 2.2: At the moment of the beep, Olivia is feeling a cold gust of wind swirl around her entire face (60%). She also experiences a worded thought – [she could not recall the exact words, but they were something like “Damn, it’s cold” or “it’s really cold,” or

“Wow, it’s cold”] (40%). There is no inner or outer voice to these words [She was confident that some specific words were present, and she was producing them. RTH thinks there is reason to be skeptical of the worded nature of her thinking, or that she was thinking at all.]

Olivia 2.3: [Olivia was staring blankly at the floor.] At the moment of the beep, Olivia might have a faint experience of her professor’s voice, [RTH adds, but VB disagrees] the sound of it, but not the semantics of it, or she might have no experience.

Olivia 2.4: At the moment of the beep, Olivia is visually searching for her phone in her bag, and she is seeing a sweater inside her bag (60%). She is also innerly saying “PhonePhonePhone” in her own voice, with an urgent tone, and with no pauses between iterations (40%).

Olivia 2.5: This sample was not discussed, as Olivia had just adjusted the beeper and likely caused it to beep. She did not collect a sample.

Olivia 3.1: [Olivia was listening to a song.] At the moment of the beep, Olivia is experiencing a worded thought – “I should text Leo that the song IS sad,” with an emphasis on the word “is.” [These exact words were present, though they were voiceless – that is, they were not innerly or outerly spoken or heard]. At the same time, Olivia is singing the song and comprehending (without words) how sad the words are in a particular line of the song.

Olivia 3.2: At the moment of the beep, Olivia smells a flowery perfume, and she notices in a cognitive kind of way the niceness of the smell (70% for both the sensory and the cognitive aspect). She also feels the wind on the right side of her face (30%).

Olivia 3.3: [Olivia was in class and she had something she wanted to contribute to the discussion.

Another girl in the classes was speaking.] At the moment of the beep, Olivia is actively attending/studying the girl's speech pattern, awaiting/anticipating the end of the girl's comments so that Olivia could speak. The awaiting/anticipating involves specifically listening for the end of the comment, focusing on the pattern of speech [as opposed to the semantic meaning of the girl's comments, which was not in experience—she didn't know what the girl was saying, only that the pattern revealed that she was not yet finished].

Olivia 3.4: [Olivia was listening to a song.] At the moment of the beep, Olivia is in imagination transported back to the first time she heard the song. She is Olivia seeing bright light coming through the open window blinds of her boyfriend's dorm room – she is primarily focused on the bright light and how it makes things brighter. This seeing is in first-person point of view. She also sees the computer on the desk in the periphery of her vision, and while her boyfriend is not seen, she knows him to be in the room behind her. At the same time, Olivia is feeling a light happy/nostalgic feeling. [While the song was still playing, it was not in experience.]

Olivia 3.5: [Olivia was on her phone, skimming through Google search results of the alchemical symbol for time.] At the moment of the beep, Olivia is skimming the text to find an article that includes a list or a chart. The notion of a chart or list is vaguely present to her, and [rather than actively looking for something], she is waiting for some indication that a chart or list will show up if she clicks on one of the results she is looking at.

Olivia 3.6: Olivia is feeling a slight headache in the front, middle portion of her head. She is also somehow cognitively aware that the headache has a somewhat annoying/nuisance-like quality.

Olivia 4.1: [Olivia was looking at rings online.] At the moment of the beep, Olivia has words present: “What shape would make my fingers look thinner?” The words have no voice and are not innerly or outwardly spoken or heard. However, those specific words are present with a questioning inflection on the end. She also is seeing an oval-shaped ring [on her computer screen], or perhaps seeing lines that showed the cut of the gem [her description of what she was seeing was highly subjunctified, as she repeated the phrase “I think”]. She also experiences a thought/intention to look up which shapes make fingers look thin on the internet, which is a low-level thought. The words present and the seeing are each about 40% of experience; the thought/intention is about 20%.

Olivia 4.2: [Olivia was reading her Italian textbook.] At the moment of the beep, Olivia is repeating the phrase “prepositions used with a definite article” [which she had just read] in her mind. As in 4.1, the specific words are present and sequential, but they do not have a voice or auditory quality; the beep catches her between the words “with” and “a.” She is also trying to remember what a definite article meant, which involves innerly seeing her class notes in an effort to recall where the notes are located on the page. She innerly sees her loose-leaf note pages fanned out on her brown desk, with red ink written on them. She is not reading the ink, but she is trying to match the page to the information she is looking for. The inner seeing is located about 1-2 feet in

front of her eyes, [in the same space that her textbook existed in reality]. The words and inner seeing are about equally present (50% each).

Olivia 4.3: Olivia is innerly seeing herself walking toward her ex-boyfriend from about 20 feet away [as she had done some weeks before]. It is afternoon, she is outside, and her ex-boyfriend is leaned up against a college dormitory building, wearing a plaid, red shirt and his hair is long and curly. She sees him from a first person perspective, in motion. At the same time, Olivia is feeling sad, which she experiences as a rising pressure or “welling” that fills the lungs of her chest and rises up the back of her neck to her eyes. The seeing was 60% of her experience and the feeling was 40% of her experience.

Olivia 4.4: Olivia is trying to prevent herself from thinking deeply about various thoughts that are entering her mind. She experiences a block, like a vertical wall or barrier that divides the front half of her mind from the back half, that is located in the middle of her head, mostly internally. This block serves to prevent her from thinking deeply and keeps her thoughts superficial. The block is somehow experientially present (that is, is not merely metaphorical), but is not innerly [or outerly] seen or physically felt. Her mind is jumping between thoughts, and she does not experience any of the specific thoughts at the moment of the beep – simply her attempt to keep the thoughts superficial.

Olivia 4.5: [Olivia was filling out an Italian worksheet.] At the moment of the beep, Olivia is outwardly saying “LLL-aaa” in a drawn-out fashion [as she wrote “La” on her sheet, though the writing itself was not in experience]. Her experience is of producing the “LLL-aaa” [rather than hearing herself say it]. At the same time, the word “La” is present in her mind, with no innerly auditory or vocal qualities.

Olivia 4.6: Olivia is innerly seeing herself and some friends at Town Square. From a third-person point of view, she innerly sees herself in between two friends who are all sitting on black metal chairs around a black metal table outside of Yogurtland [while Yogurtland was not seen, she knew it to be just out of sight behind them]. Olivia sees that the innerly seen Olivia is wearing sunglasses, though she does not see any other specifics of people's attire. She also knows two other friends are present in the scene, but they are not directly seen as they are out of view. The inner seeing is in color and in motion. She also hears general sounds of chatter and laughter, but no specific words.

### **Kevin**

Kevin 2.1: At the moment of the beep, Kevin is innerly seeing a vacuum cleaner, and then innerly sees a different vacuum cleaner, and then another; about 5 different vacuums are innerly seen sequentially and very quickly. He is innerly seeing their details like orientation, buttons, and colors. His interest is in the shape and size of the vacuums, but it is not clear whether this interest was experientially present at the moment of the beep. He is unsure if there is one particular vacuum present at the moment of the beep or if there were several or even all are present in experience at the beep. [The orientation of the vacuums is also in experience, but he did not attend to that detail when taking notes after the beep]. There might be some cognitive process of deciding which vacuum to buy, but he cannot definitively remember if that is directly present at the moment.

Kevin 2.2: [This beep was skipped as it is likely Kevin caused the beep by fiddling with the beeper volume dial.]

Kevin 2.3: [Kevin was watching a comedy TV show.] At the moment of the beep, Kevin is somehow thinking about a famous person about whom a joke had just been made. He is thinking about the person and that person's past. [He did not remember who the person was, but believes he could have identified who it was if he had thought to write it down.] This thinking is not present in words or pictures.

Kevin 2.4: At the moment of the beep, Kevin is innerly speaking the words "When should I start this paper". The words are in his voice, but he is not sure of the inflection. [He did not identify when the beep occurred during this sentence, but believes he would have been able to both identify the location and inflection of his voice if he had known we are interested in that.] Kevin is also seeing a piece of paper on the desk in front of him. The inner speaking is about 60% of his experience, while the seeing is about 40%.

Kevin 2.5: [Kevin was watching the TV show Portlandia; they had just made a joke about weird fruits vegetables.] At the moment of the beep, Kevin is innerly seeing his mom standing in a farmers market, holding a strange piece of fruit in her right hand. Kevin innerly sees the scene from a vantage point of about 7 or 8 feet above and away from the scene. He is innerly seeing his mother on the left facing a fruit stand on the right and is seeing the right side of his mom's face and body. The inner seeing is clear, The details of the environment are not present. [He did not think the inner seeing was in color, but wasn't sure]. [There was some sense that he was thinking in general about how the Portlandia situations applied to his own family, but it seemed that that thinking was not present in his experience at the moment of the beep.]



Kevin 2.6: [Kevin was going through a checklist of the things he needed to bring to rugby practice. The checklist items included cleats, a rugby shirt, rugby shorts, and a rugby ball, and possibly more, we didn't ask]. At the moment of the beep, some of these items are present as words and some as inner seeings. They are present sequentially and very quickly. [He was not sure what specific item he was thinking about when the beep occurred]. [The checklisting seemed to last about 5 seconds, and it seems that Kevin is not yet focused down on the actually occurring in experience, rather than the characterization of an event.] Kevin might also be simultaneously thinking about when he needed to leave for rugby practice. [He was fairly confident he had been thinking about that somewhere in the vicinity of the beep, but he was unsure if that was ongoing as a separate cognitive process at the moment of the beep].

Kevin 3.1: [Kevin was riding his bike.] At the moment of the beep, Kevin is seeing the road in front of him [he was choosing the path he would take and looking for debris or other features that would make a path desirable or undesirable]. He sees the road curving to the right; his path will cross over the road to the left side. [He did not see any debris, but said he would have noticed it if it had been in his path.]

Kevin 3.2: At the moment of the beep, Kevin is feeling dustiness on the palm and fingers of his left hand. He does not experience the sensation as positive or negative, simply dusty, and he is equally feeling dustiness on both his palm and fingers.

Kevin 3.3: [Kevin was re-watching the Super Bowl half-time show, and was thinking about instruments not being hooked up to microphones]. At the moment of the beep, Kevin is looking for the plugs on the guitars that lead to the microphones. He is looking at all the guitars as they appear on the screen, and the beep catches him looking at a

particular guitar. [When asked, he described this as being different from the first beep in the sense that it was a more focused and specific search as opposed to a general scanning.]

Kevin 3.4: [Kevin was deciding which of his aunt and uncle's cars he would take tomorrow.] At the moment of the beep, he is innerly seeing the two cars, a black BMW and a tan/maroon Mazda, in the garage as if viewed from the driveway. The cars are seen clearly, in vivid color and in detail as they exist in reality, except the license plates are fuzzy whitish squares and do not have numbers. That is, it is *not* merely that he is not paying attention to the license plates, but rather that he is seeing an indistinct region. Around the cars against the walls of the garage are indistinct colors without details. [In reality, there are various things along the walls of the garage, and Kevin described these colors probably conveying these objects but that they weren't clearly seen.]

Kevin 3.5: [Kevin was getting up to get water with a specific cup.] At the moment of the beep, Kevin is innerly seeing the clear plastic cup/mason jar in vivid detail and in color. He innerly sees the Rebel mascot in red on the front and the redness seen through the cup, which he understands as the letters "UNLV" seen backwards and slightly cut off by the mascot, as if he is looking at the cup in reality.

Kevin 4.1: [Kevin was looking in the trash can at his home.] At the moment of the beep, Kevin is innerly seeing the one blue dumpster and two green dumpsters in a row as they appear in real life at Dayton. He is particularly noticing the colors of the dumpsters. He also is innerly seeing a trash bag going into the middle dumpster, as if he had just thrown the trash bag. The inner seeing is clear and in color. [Kevin thought the trash bag was in motion, but wasn't confident].

Kevin 4.2: [Kevin was worrying about people at the party stealing things from his home.] At the moment of the beep, Kevin is innerly seeing a bottle of wine being carried out of his house by a tall man. The bottle of wine and the surrounding hallway, bookcase, door, and so on are clear and in focus, while the man is unspecified—not focused upon or perhaps unclear-- and does not represent anyone in particular. The man is seen walking out the front door and is seen from inside the house. The hallway, the front door, and the partially open door to the wine cellar are all seen as they exist in reality.

Kevin 4.3: [A friend had mentioned taking a swim but that it was too cold.] At the moment of the beep, Kevin is somehow remembering a time when he was cold as a result of getting out of the pool when it was very cold out. He also might be feeling cold from a breeze coming from the open door. It is unclear whether he is feeling cold (either imaginarily or in reality), or whether he is recalling being cold.

Kevin 4.4: [Kevin was looking at the dirty countertop.] At the moment of the beep, Kevin is innerly seeing the arrangement and details of the candle holder, napkin holder, and box of tissues on a clean countertop as they had been before the party. The inner seeing is very clear and detailed and he is focused on both the arrangement of the items and the details including glue spots on the candlestick holder, the horizontal bar holding the napkins down, and the blue and green colors on the tissue box. That is, these details were sensory awarenesses.

Kevin 4.5: At the moment of the beep, Kevin is primarily wiping water off the counter. He might also be thinking negatively about having to do the clean-up: why he is the one to clean it up, and it would be easier for someone else to do. [These thoughts had been present before and after the beep occurred, and were ongoing during the wiping

up action, but it was not certain whether they were present at the moment of the beep. If they were present, they were not present in words or pictures]. [It was unclear whether or not the unsymbolized thinking was actually present at the moment of the beep or if Kevin believed he was continuously thinking these things and so they must have been present.]

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## Curriculum Vitae

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### EDUCATION

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<b>Ph.D.</b>	<b>University of Nevada, Las Vegas</b> Doctoral Program in Clinical Psychology (Advisor: Russell Hurlburt, Ph.D.)	Expected Spring 2019
<b>M.A.</b>	<b>University of Nevada, Las Vegas</b> Doctoral Program in Clinical Psychology (Advisor: Russell Hurlburt, Ph.D.) GPA: 4.0 (Cumulative)	2017
<b>B.A.</b>	<b>College of the Holy Cross, Worcester, MA</b> Bachelor of Arts, Psychology, <i>Magna Cum Laude</i> GPA: 3.77 (Cumulative); 3.79 (Psychology Major) Directed Readings Senior Thesis: Empowering Healthy Mindedness (Advisor: Mark Freeman, Ph.D.)	2009

### CLINICAL EXPERIENCE

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<b>Doctoral Practicum Student</b>	2016 -Present
University of Nevada, Las Vegas Counseling and Psychological Services (CAPS) Supervisor: Emily Slife, Ph.D.	

#### Responsibilities & Training

- Provide individual counseling within a brief therapy model to a caseload of approximately 7 clients per week
- Use an integrative theoretical approach with a primary focus in Interpersonal/Psychodynamic psychotherapy and incorporate DBT, CBT and ACT interventions when appropriate.
- Treat diagnoses including affective, anxiety, personality disorders, trauma, and eating disorders

- Conduct weekly intakes and risk assessments and provide crisis intervention when needed
- Attend weekly case rounds with interdisciplinary team

**Doctoral Graduate Assistant**

2016 -Present

University of Nevada, Las Vegas

The UNLV Partnership for Research, Assessment, Counseling, Therapy and Innovative Clinical Education (PRACTICE)

Supervisor: Noelle Lefforge, Ph.D.

Responsibilities & Training

- Provide long-term individual therapy to a caseload of approximately 6 clients per week
- Co-facilitate young adult process group (ages 16-22)
- Use an integrative theoretical approach with a primary focus in Interpersonal/Psychodynamic psychotherapy and incorporate DBT, CBT and ACT interventions when appropriate.
- Conduct intakes and treat diagnoses including affective, anxiety and personality disorders
- Manage front desk, answer phones, collect payment and schedule clients
- Administer phone intakes
- Conduct weekly billing audits

**Doctoral Practicum Intern**

2015 -Present

Sandstone Psychological Practice

Supervisors: Christina Aranda, Ph.D. (Therapy) & Janell Mihelic, Ph.D. (Assessment)

Responsibilities & Training

- Provide long-term individual therapy to a caseload of approximately 3-5 clients per week
- Use an integrative theoretical approach with a primary focus in Interpersonal/Psychodynamic psychotherapy and incorporate DBT, CBT and ACT interventions when appropriate.
- Conduct intakes and treat diagnoses including affective, anxiety and personality disorders
- Provide neuropsychological and psychodiagnostic assessments

**Doctoral Practicum Student**

2014 -2015

University of Nevada, Las Vegas

The UNLV Partnership for Research, Assessment, Counseling, Therapy and Innovative Clinical Education (PRACTICE)

Supervisors: Noelle Lefforge, Ph.D. (Therapy) & Stephen Benning, Ph.D. (Assessment)

Responsibilities & Training

- Provided long-term individual therapy to a caseload of approximately 4-6 clients per week

- Conducted intakes and provided neuropsychological and psychodiagnostic assessments
- Administered structured clinical interviews using the SCID-5 and SCID-II
- Trained in scoring and interpreting results, report writing, and provision of therapeutic feedback to clients

## RESEARCH EXPERIENCE

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**Graduate Research Assistant** 2013 -Present  
 University of Nevada, Las Vegas  
 Descriptive Experience Sampling (DES) Lab, Las Vegas, NV  
 Supervisor: Russell Hurlburt, Ph.D.

### Responsibilities

- Draft IRB proposals
- Oversee data management for DES studies
- Organize and conduct quality assurance on DES data
- Document and participate in DES interviews
- Review and edit DES interview write ups

**Research Assistant** 2011 - 2013  
 Uniformed Services University of the Health Sciences  
 Center for the Study of Traumatic Stress, Bethesda, MD  
 Supervisors: Robert Ursano, M.D. and Carol Fullerton, Ph.D.

### Responsibilities:

- Prepared, formatted and submitted Institutional Review Board (IRB) applications, protocol amendments, and continuing reviews
- Drafted informed consent forms and recruitment scripts
- Regulated all study logistics during data collection and managed master interview schedule for multiple data collection sites
- Oversaw data management: built tracking and survey databases, monitored data entry progress and generated data reports
- Facilitated intervention workshops with Soldiers post-deployment following Principles of Psychological First Aid (PFA)

## PUBLICATIONS

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Marzell, M., Morrison, C., Mair, S., **Moynihan, S.** & Gruenewald, P. J. (2015). Examining drinking patterns and high-risk drinking environments among college athletes at different competition levels. *Journal of Drug Education*, 45(1), 5-16. Doi: 10.1177/0047237915575281



Kelsey, J., Heavey, C., Brouwers, V., Lapping-Carr, L., **Moynihan, S.**, & Hurlburt, R. (2016). The frequency of inner speaking as measured by questionnaire and descriptive experience sampling. Manuscript submitted for publication.

Brouwers, V., Heavey, C., Lapping-Carr, L., **Moynihan, S.**, Kelsey, J., & Hurlburt, R. (2016). Silent reading is *not* silent speaking of the text: On investigating pristine inner experience. Manuscript submitted for publication.

## PRESENTATIONS

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**Moynihan, S. A.**, Turner, D., Brouwers, V., Kelsey, J. M., Lapping-Carr, L., Heavey, C. L., & Hurlburt, R. T., (2016, April). *Can questionnaires capture inner experience? A validation study of the Nevada Inner Experience Questionnaire*. Nevada Psychological Association (NPA) Annual Conference, Reno, NV.

**Moynihan, S. A.**, Turner, D., Brouwers, V., Kelsey, J. M., Lapping-Carr, L., Heavey, C. L., & Hurlburt, R. T., (2015, May). Validating the Nevada inner experience questionnaire through an inner speaking perspective. In R. T. Hurlburt (Chair), *The inner experience of inner speaking, reading fiction, and reading erotica: What's really going on?* Symposium conducted at the meeting of the Western Psychological Association, Las Vegas, NV.

**Moynihan, S. A.**, & Hurlburt, R. T., (2015, March) *Inner Experience during Marathon Running*. Graduate and Professional Student Research Forum, University of Nevada, Las Vegas, Las Vegas, NV.

Brouwers, V., Kelsey, J. M., Turner, D., Lapping-Carr, L., **Moynihan, S. A.**, Heavey, C. L., & Hurlburt, R. T., (2015, May). Inner experience while reading classical fiction. In R. T. Hurlburt (Chair), *The inner experience of inner speaking, reading fiction, and reading erotica: What's really going on?* Symposium conducted at the meeting of the Western Psychological Association, Las Vegas, NV.

Kelsey, J. M., Brouwers, V., Turner, D., Lapping-Carr, L., **Moynihan, S. A.**, Hurlburt, R. T., & Heavey, C. L., (2015, May). Inner experience and self-ratings of self-talk. In R. T. Hurlburt (Chair), *The inner experience of inner speaking, reading fiction, and reading erotica: What's really going on?* Symposium conducted at the meeting of the Western Psychological Association, Las Vegas, NV.

Naifeh, J. A., Dempsey, C. L., Santiago, P. N., **Moynihan, S. A.**, Fullerton, C. S., Benedek, D. M., Nock, M. K., Heeringa, S., Kessler, R. C., Stein, M. B., Colpe, L. J., Schoenbaum, M.,

Scanlon, M., & Ursano, R. J. (2012, June). *Overview of the Army Study to Assess Risk and Resilience in Servicemembers (Army STARRS)*. Annual DoD/VA Suicide Prevention Conference, June 2012, Washington, DC.

## TEACHING EXPERIENCE

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**Graduate Teaching Instructor** 2015 -2016  
University of Nevada, Las Vegas  
Psychology Department  
Undergraduate Course: Introduction to Psychology

### Responsibilities

- Facilitated two introductory sections of Psychology per semester.
- Planned and teach lectures on a wide range of topics in psychology.
- Lead productive, engaging classroom discussions.
- Designed sound exams that accurately reflect course content.

## COMMITTEES AND ORGANIZATIONS

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**Mentor, Outreach Undergraduate Mentoring Program (OUMP)** 2013 - 2017  
University of Nevada, Las Vegas  
Psychology Department

### Responsibilities:

- Support and advise undergraduate students through the graduate school application process

**Treasurer, Clinical Student Committee** 2014 - 2015  
University of Nevada, Las Vegas  
Psychology Department

### Responsibilities:

- Managed committee funds
- Coordinated annual interview weekend for potential incoming clinical students
- Arranged and oversaw mentoring system for incoming clinical students
- Organized social functions for students

## HONORS AND AWARDS

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- **Nevada Psychological Association Travel Award, \$200**  
Nevada Psychological Association, 2016
- **Graduate Program Student Association Research Sponsorship Funding, \$150**  
University of Nevada, Las Vegas, 2015
- **Graduate Program Student Association Research Forum Honorable Mention Presentation**  
University of Nevada, Las Vegas, 2015
- **Graduate College Recruitment Scholarship**  
University of Nevada, Las Vegas, 2013-2014
- **Alumni Academic Scholarship**  
College of the Holy Cross, 2009