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Intraindividual personality change: Situational influences, patterns of change, and frequency-based measurement

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INTRAINDIVIDUAL PERSONALITY CHANGE:
SITUATIONAL INFLUENCES, PATTERNS OF CHANGE,
AND FREQUENCY-BASED MEASUREMENT

An Abstract of a Thesis
Submitted
in Partial Fulfillment
of the Requirements for the Degree
Master of Arts

Carol Tweten
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August 2014

ABSTRACT

A large amount of research supports the idea that little change in personality occurs over time (e.g., Caspi & Roberts, 2001). However, changes in an individual's personality across different situations, known as intraindividual, or within-person, variability, has not received nearly as much empirical attention, in part due to the difficulties inherent in measuring personality across situations. The present study evaluated a measure of within-person variability called frequency-based measurement by comparing it with situational personality expression. The study involved two phases: a one-time measure of trait personality using frequency-based measurement and a five day experience sampling (ESM) study involving repeated measures of state personality.

Mean levels of the Big Five traits (i.e., extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience), as measured by the frequency-based format, were significantly positively correlated with ESM measures of the traits, providing initial construct validity for this novel format. A major prediction in the study, that frequency-based variability in personality would be related to the state variability found in the ESM study, was not supported. However, variability in frequency-based measures of conscientiousness and neuroticism were related to both self-monitoring and self-concept clarity, and frequency-based variability in agreeableness was related to self-concept clarity. All of these relationships were small, indicating some divergent validity for frequency-based measurement.

Finally, variability in any one of the Big Five traits was significantly positively correlated with variability in all of the other traits, in both measures (i.e., frequency-based

measurement and ESM ratings). This provides support for traitedness (Baumeister & Tice, 1988), a theoretical approach to intraindividual variability that could help to explain why some individuals vary more than others depending on the situation. Overall, the present study found some support for the validity of frequency-based measurement as a method of evaluating intraindividual personality variability without the need for cost and time-intensive longitudinal studies.

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and Frequency-Based Measurement

has been approved as meeting the thesis requirement for the
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CHAPTER 1

INTRODUCTION

Change in personality traits and the factors that may lead to such change (i.e., the person-situation debate) continue to be important conversations in the personality literature. Despite the overwhelming amount of research that supports the interactionist approach, which argues that the person and the situation are not mutually exclusive, this classic debate persists (for a review, see Funder, 2006).

On the person side of the debate are trait researchers who support overall stability of personality. These theorists argue that traits represent an overall average, which shows stability in behavior over time and across situations as the number of occurrences increase (Epstein, 1979). More specifically, the trait perspective maintains that the aggregate analysis of traits (i.e., averaging self-reported trait ratings) often finds a central tendency that does not vary significantly over long periods of time, especially later in life (Caspi & Roberts, 2001). However, with this approach, trait theorists are typically only able to predict an individual's behavioral tendencies, not situation-specific behaviors (Mischel, 1979); this leaves a major purpose of personality psychology, the ability to predict behavior based on personality characteristics, partially unfulfilled (Allport, 1937).

The situation side of the debate, on the other hand, consists of state theorists who support the important role that situations play in defining one's personality (Mischel 1968, 1979). Whereas trait theorists argue for stability, state theorists find significant variability in personality across situations, especially across differing situations (e.g., Brown & Moskowitz, 1998; Diener & Larsen, 1984; Robinson, 2009).

The importance of the situation, and arguably the person-situation debate as a whole, became salient as a result of Walter Mischel's 1968 book *Personality & Assessment*. The book contains a chapter in which Mischel questioned the concept of traits as stable characteristics within people. As evidence for his perspective, he noted that research examining traits and behavior consistently finds correlation coefficients no higher than .30, which he suggested is quite low as only 9% of the variance is explained by the traits. Up until that point, it was widely accepted that personality was purely dispositional (Kenrick & Funder, 1988), and therefore Mischel's extreme argument against the utility of traits had a significant impact on the field of personality, even described as having "the effect of a bombshell" (Barenbaum & Winter, 2008, p. 16). It has since become less influential, as it has been pointed out on numerous occasions that: (1) a .30 correlation is not necessarily small; (2) some of Mischel's important delay of gratification work included correlations of .30; and (3) a .30 correlation in support of traits does not necessarily mean .70 in support of the situation (for a review of responses to Mischel's critique, see Kenrick & Funder, 1988).

In 'bombshell' effect of Mischel's book also served as a push for an interactionist approach, such that the person and the situation interact to produce behavior. In support of this approach, researchers find that behavior is found to vary across differing situations, but tends to be consistent within similar situations (e.g., two social situations; Furr & Funder, 2004). Thus, stability and instability of personality can coexist.

As such, rather than debating person versus situation, a more relevant dynamic to discuss may be clarifying temporal and situational variability of personality. Inherently,

the two forms of variation are connected, as situational variability implies a certain degree of temporal variability. However, personality research tends to focus heavily on temporal stability and less on situational variability. The reasons for this are not always theoretical, though. Indeed, methodological difficulties inherent in measuring personality across situations present significant obstacles for studying situational variability (Furr & Funder, 2004). To better understand both the theoretical and methodological issues facing personality researchers, the following review of literature first describes the Big Five factors of personality and their associated theoretical assumptions. The concept of within-person variability is then discussed, as well as three methods for measuring it: repeated measures designs, defining the situation, and frequency-based measurement. Finally, self-monitoring and self-concept clarity, aspects of the self-concept relevant to variability across situations, are described.

The Big Five

The Big Five is a widely used taxonomy of personality (Costa & McCrae, 1992; McCrae & Costa, 1987). The Big Five defines personality as consisting of five major factors: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience. These five factors, or traits, have been researched in a number of contexts and are consistently found to be valid across most people and cultures (McCrae & John, 1990).

Extraversion characterizes someone who is talkative, assertive, and sociable (McCrae & Costa, 1987). Highly extraverted people tend to have higher self-esteem (Visser & Pozzebon, 2013), and are more likely to utilize social media sites such as

Facebook (Jenkins-Guarnieri, Wright, & Hudiburgh, 2012). Agreeableness entails the characteristics of being kind, understanding, and trusting (McCrae & John, 1990).

Agreeable people are more likely to volunteer (Carlo, Okun, Knight, & de Guzman, 2005) and prefer to resolve conflicts through compromise as opposed to threats or physical force (Jensen-Campbell & Graziano, 2001). The expression of extraversion and agreeableness tends to be external in nature, in that they are both associated with prosocial behavior (Carlo et al., 2005) and tend to be more accurately perceived by external observers (Mehl, Gosling, & Pennebaker, 2006; Naumann, Vazire, Rentfrow, & Gosling, 2009).

Conscientiousness describes an organized, careful, and thorough individual (McCrae & Costa, 1987). These individuals tend to work more hours per week (Chang, Rosen, Siemieniec, & Johnson, 2012) and are less likely to use illegal drugs (Turiano, Whiteman, Hampson, Roberts, & Mroczek, 2012). Neuroticism is synonymous with being moody, anxious, and insecure (McCrae & Costa, 1987). Neurotic individuals are more likely to report depressive symptoms (Barnhofer, Duggan, & Griffith, 2011), negative affect, and stressful life events (Espejo et al., 2011). Conscientiousness and neuroticism tend to be expressed internally, such that conscientiousness is associated with more intrinsic aspirations (Visser & Pozzebon, 2013) and neuroticism is associated with negative self-views (e.g., low self-esteem; Shackelford & Michalski, 2011).

Openness to experience is generally thought of as being imaginative, original, and daring (McCrae & Costa, 1987). Individuals high in openness, also sometimes called culture or intellect, are willing to acquire new knowledge (Ziegler, Danay, Heene,

Asendorpf, & Buhner, 2012) and tend to be less politically conservative and to value self-enhancement (von Collani & Grumm, 2009).

Neural Correlates

The five factors have several important neural correlates. In fact, the study of these relationships has become a sub-field called personality neuroscience (DeYoung, 2010). Using neuroimaging methods such as magnetic resonance imaging (MRI), functional magnetic resonance imaging (fMRI), and positron emission topography (PET), researchers are able to glean information as to the brain's size, structure, and activity (DeYoung, 2010). A review of this research suggests that of the five factors, brain structure and activity are most relevant to neuroticism, although important correlates exist for all five factors (Kennis, Rademaker, & Geuze, 2013).

In terms of brain size and structure, a MRI study found extraversion to be positively related to the size of the medial orbitofrontal cortex, an area related to reward sensitivity (DeYoung et al., 2010). Agreeableness was related to areas involved in social information processing (DeYoung et al., 2010). More specifically, it was negatively related to the superior temporal sulcus, involved in interpreting the actions and motivations of others. The authors posited that perhaps agreeable individuals can more easily and quickly engage in these cognitions. Agreeableness was also positively related to the posterior cingulate and fusiform gyrus, both associated with higher-order processing of others' beliefs (DeYoung et al. 2010). Conscientiousness was positively related to the size of the middle frontal gyrus, an area important in short-term memory and planned action (DeYoung et al., 2010).

Neuroticism, but not the other four factors, has shown an inverse relationship with total brain volume (Bjornebekk et al., 2013). However, as is the case for all of these neural correlates, the direction of causality cannot be determined. It is unclear whether having high neuroticism leads to smaller brain volume or if having smaller brain volume results in the trait of neuroticism. In addition to total brain volume, other research finds neuroticism to be negatively related to the size of the hippocampus, an area related to anxiety, but positively related to the mid-cingulate gyrus, associated with responses to physical or emotional pain (DeYoung et al., 2010). The fifth factor, openness, was unrelated to total brain volume or the size of any brain structure.

Recently, change in brain structures over time has also been examined (Kapogiannis, Sutin, Davatzikos, Costa, & Resnick, 2013). Healthy older adults (at time 1, $M=72$, $SD=7.7$), in a two-year longitudinal study, demonstrated significant changes in brain structure volumes, despite no mean-level trait changes. Extraverted individuals, for example, had larger areas in the temporal lobes and prefrontal cortex (PFC), and smaller areas in the hippocampus and parietal lobes. Agreeableness was associated with larger areas in the temporal and parietal lobes and smaller Wernicke's area (associated with language) and smaller areas in the PFC. Neuroticism was related to larger fusiform areas and smaller areas in the orbitofrontal cortex (OFC), PFC, and hippocampus. Individuals high in conscientiousness had larger areas in the PFC and hippocampus and smaller areas in the temporal lobes and OFC. Finally, high openness was associated with a larger thalamus and smaller areas in the PFC and parietal lobes (Kapogiannis et al., 2013).

In addition to examining the size and structure of the brain, studying brain activity is also important to personality neuroscience. Using fMRI, extraversion, openness, and emotional stability are positively related to activity in the PFC, important in higher-order thinking, when viewing positive stimuli and when anticipating a reward (Kennis et al., 2013). Conversely, individuals high in neuroticism demonstrate increased PFC activity in response to negative or emotional stimuli. Neuroticism also has positive associations with activity in the amygdala, hippocampus, parietal lobe, and occipital lobe in response to negative/emotional stimuli. Temporal lobe activity, though, decreases. For the other four traits, temporal activity and parietal activity increases in response to positive stimuli (Kennis et al., 2013).

Although useful, neuroscientific research is sometimes inconsistent. For example, a different study (Britton, Ho, Taylor, & Liberzon, 2007) found no relationship between neuroticism and PFC or amygdala activity when viewing negative stimuli, but did find a positive relationship with PFC when viewing positive stimuli. These inconsistent findings typically result from small sample sizes, given the costly nature of imaging technology, which reduces power and introduces any number of confounds. The material used as stimuli also tends to differ between studies. Overall, though, personality neuroscience has made important contributions to our understanding of the biological bases of personality, and in particular, the Big Five factors.

Five-Factor Model

The five-factor model (FFM), the theory associated with the Big Five, operates under three major assumptions: universality, comprehensiveness, and stability (McCrae

& John, 1990). The universality assumption implies that these five traits are found across cultures. Researchers measured personality dimensions in 50 countries across six continents and found the same five factors in a majority of them (McCrae & Terracciano, 2005). However, cross-cultural universality has not always been supported. A lexical approach to defining personality using the Chinese dictionary, for example, found that a seven-factor model fit best (Zhou, Saucier, Gao, & Liu, 2009). Further, a lexical examination of seven languages (i.e., Chinese, English, Filipino, Greek, Hebrew, Spanish, and Turkish) found identical six-factor models in each (Saucier, 2009). These findings indicate that the universality assumption may not always be warranted. For the purposes of the present study, though, the widely used Big Five factors are useful for examining personality change, particularly among a United States sample (Srivastava, 2014).

The second assumption, comprehensiveness, assumes that the five factors encompass personality as defined by multiple measures. The California Q-Set, for example, consists of 100 items a rater can place into one of nine categories (i.e., from least characteristic to most characteristic). When comparing the five factors with this measure in self, peer, and spouse ratings, significant positive correlations are found for all five traits (McCrae, Costa, & Busch, 1986).

The five factors have also been examined in relation to the Myers-Briggs Type Indicator (MBTI; McCrae & Costa, 1989), which defines 16 distinct personality types based on four dichotomous qualities: extraversion-introversion (EI), sensation-intuition (SN), thinking-feeling (TF), and judgment-perception (JP). These four qualities seem to

map onto four of the five Big Five factors, in both self and peer reports of personality. Not surprisingly, EI (high extraversion) positively correlates highly with extraversion. Further, SN (high intuition) positively correlates with openness, TF (high feeling) with agreeableness, and JP (high judgment) with conscientiousness (McCrae & Costa, 1989). Neuroticism was positively correlated with TF (high feeling) for self-report but not peer-report, which is not entirely unexpected given the internal nature of the trait (e.g., neurotic individuals tend to have low self-esteem; Shackelford & Michalski, 2011). Overall, comparing the five factors to other measures of personality finds support for the comprehensiveness assumption.

The last, and most relevant assumption to the present study, is that traits remain stable, both temporally and situationally, in large part due to their heritability. Twin studies have been conducted to determine the heritability of personality traits (e.g., Borkenau, Riemann, Angleitner, & Spinath, 2001). These studies examine the degree to which monozygotic (MZ), or identical, twins are similar to each other in comparison to dizygotic (DZ), or fraternal, twins. If a trait is heritable, MZ twins, who are genetically identical to each other, should be more similar on that trait than are DZ twins, who share only 50 percent of their genes. A study of German adult twins confirmed this pattern for all five of the Big Five factors, such that for self, peer, and researcher ratings, MZ twins averaged higher rates of similarity than did DZ twins (Borkenau et al., 2001). A cross-cultural examination of both German and Canadian twins found a similar pattern, even among the facets of each trait (e.g., anxiety is a facet of neuroticism; Jang, McCrae,

Angleitner, Riemann, & Livesley, 1998), indicating strong support for the heritability, and thus stability, of personality traits.

However, differences in the degree and pattern of stability emerge when separately examining temporal and situational stability. A large amount of research, for example, finds that temporal stability increases with age. A literature review of longitudinal research suggests that, after age 30, mean trait ratings tend to stabilize (Caspi & Roberts, 2001). However, a meta-analysis of 92 longitudinal samples disagrees with this assessment (Roberts, Walton, & Viechtbauer, 2006). Whereas researchers agree that personality change after around age 30 is less frequent and reduced in magnitude, Roberts et al. (2006) find that change does still occur. After dividing the samples into eight 10-year age ranges (with five above the age of 30), they found that social vitality and openness decreased and agreeableness increased between ages 60 and 70, conscientiousness increased in all ranges between 30 and 70, and emotional stability increased between ages 30 and 40 and 50 and 60. Ultimately, change in personality becomes less likely over time, but mean-levels of traits do indeed change, even in later life.

In addition to temporal stability, FFM also assumes that personality is stable across situations. Whereas our understanding of temporal personality change is aided by longitudinal data and meta-analytic techniques, research examining situational consistency is less developed. However, this research tends to support the conclusion that important within-person variability exists in personality across situations (e.g., Fleeson, 2001), in direct contradiction to the FFM assumption of stability.

Within-Person Variability

Presuming that traits remain stable across situations ignores within-person, or intraindividual, variability. For example, an individual may display higher levels of extraversion in a social situation as opposed to a work situation, despite having a temporally consistent average level of extraversion. Overlooking this meaningful source of variability precludes the trait perspective from predicting situation-specific behavior, an important purpose of personality psychology (Allport, 1937).

An early theoretical explanation for within-person variability is the existence of metatraits, or traitedness (Baumeister & Tice, 1988; Bem & Allen, 1974). This theory explains that some people (traited individuals) may show more consistency in personality than others (untraited individuals), and that these differences in consistency can be detected by casual observers (Bem & Allen, 1974). By definition, untraited individuals cannot be placed on all trait dimensions, as not every trait exists within that individual. Their behavior is therefore more variable (Baumeister & Tice, 1988). Although this concept seems counterintuitive to our understanding of personality's heritability, it is not entirely incompatible. Whereas heritability is a group-level statistic, traitedness is person-level. Although never examined together, it is entirely possible for the two to coexist, similar to the coexistence of mean-level stability and situation-level variability. Further, it is also possible that traitedness itself could be somewhat heritable.

In validation of the concept of traitedness, Britt (1993) examined previously established relationships (e.g., a positive relationship between personal identity and private self-consciousness) to determine if those more traited on one or both of the

characteristics would demonstrate the predicted relationship more so than untraited individuals. Under the operational definition of traitedness as a low standard deviation of standardized responses, the relationship between personal identity and private self-consciousness was higher for individuals traited on both constructs than for individuals untraited on both or traited on one but untraited on the other. These differences, according to Britt (1993), “provide strong support for the metatraits construct” (p. 557), although it can be argued that research examining alternative operational definitions is needed.

Other attempts to validate the construct of traitedness utilize similar problematic operational definitions. For example, Zuckerman et al. (1988), for a given trait, directly asked participants how “influential in terms of how you behave” the trait is, how much “you vary from one situation to another” on the trait, and “how publicly observable is your behavior” in relation to the trait (p. 1012). These questions exhibit extremely high face validity, making them particularly susceptible to social desirability, a variable not included as a control in analyses.

Because traitedness lacks a reliable operational definition, very little research exists on the cognitive, genetic, or neural mechanisms underlying the construct. Further, the existence of traitedness inherently relies upon the variability of traits, rather than the central tendency (i.e., mean score), and as noted above, researching within-person variability in personality has some methodological challenges which researchers have tried to address in a number of ways.

Trait Measurement

Evaluating within-person variability and its relationship to the situation requires unique, alternative forms of measuring personality traits. In particular, two forms of measurement have been consistently found to be effective in detecting within-person variability: repeated measures designs and situation assessment. Most integral to the present study is a third, less researched method called frequency-based measurement.

Repeated Measures Designs

One strategy for evaluating variability in personality traits is the use of repeated measures of state personality via the experience sampling method (ESM), or diary studies. Several researchers have employed this approach (e.g., Augustine & Larsen, 2012; Baird, Le, & Larsen, 2006), and found that it provides a more complex picture of personality in comparison to traditional trait measures. Illustrating this complexity, Fleeson and Gallagher (2009) conducted a meta-analysis of fifteen ESM studies of trait and state personality in adolescent, undergraduate, and community samples. They found the Big Five traits to have only small to moderate positive correlations with a single state ($r_s=.21-.37$) and the mean of states ($r_s=.38-.53$; Fleeson & Gallagher, 2009). Importantly, the majority of variance across the fifteen studies was within-person, as opposed to between-person (with the exception of openness, for which they were equal). An additional ESM study found similarly large proportions of variance in Big Five states (ranging from 48 to 70 percent) to be accounted for by within-person variability (Heller, Komar & Lee, 2007). These findings support the conclusion that while there are

aggregate, temporal correlations between personality and behavior, within-person variability explains an important portion of the variance.

Repeated state measures can also be used to create a density distribution (i.e., a scatter plot of state personality ratings), which also reflects both the ‘mean of states’ and within-person variability (Fleeson, 2001, 2007; Fleeson & Leicht, 2006). Using the density distribution approach, state personality varies in undergraduate samples as a function of state life satisfaction, state positive and negative affect, and state approach and avoidance goals (Heller et al., 2007), as well as state interpersonal trust (Fleeson & Leicht, 2006). While the use of undergraduate students presents a bias in the research, especially because personality is typically less stable among this age group (Caspi & Roberts, 2001), finding that state personality varies in reliable, systematic ways indicates its importance in our understanding of personality as a whole. Although further research in across-situation variability should be conducted with older samples, a wide age range is far more critical when researching temporal stability.

In addition to measuring personality, repeated measures designs can be used as a measure of behavior. Mehl and colleagues (e.g., Mehl, et al., 2006; Mehl & Pennebaker, 2003; Mehl, Pennebaker, Crow, Dabbs, & Price, 2001; Mehl, Robbins, & Deters, 2012) have championed a methodology called the Electronically Activated Recorder (EAR) for measuring behaviors in repeated measures studies.

The EAR technology involves the use of a recording device (initially a tape recorder) that can be programmed to record 30-second snippets of a participant’s environment at regular intervals (i.e., every 12 minutes over 2-4 days; Mehl et al., 2001).

After collecting a series of 30-second recordings from a participant, researchers can then code them for the context and behavior at the time (e.g., social circumstance, having a serious conversation, expressing fear). The biggest advantage to this method is that researchers can gain a report of behavior that is relatively more objective than self-report methods, increasing its ecological validity. Although a lack of visual information is certainly a disadvantage, Mehl and colleagues have demonstrated that researchers are able to ascertain a large amount of information from the EAR audio, including participants' location, social interactions, activities, and even mood. For example, Robbins, Mehl, Holleran, and Kasle (2011) coded EAR data for sighing among patients with arthritis and found that frequent sighing was related more to depressive symptoms than to pain.

As related to personality, the EAR, and the more recent Apple iEAR application, have been used to understand the degree to which personality traits are manifested in daily behaviors (Mehl et al., 2006). The findings resemble what would intuitively be expected: extraverted individuals spend more time talking, agreeable people are less likely to use swear words, conscientiousness is associated with being in class more often, neuroticism is related to time spent arguing, and more open individuals spend more time in public places (e.g., bars, restaurants, coffee shops; Mehl et al., 2006). Overall, the EAR methodology demonstrates validity in assessing behavior, especially in relation to personality traits, and can serve an important function in understanding personality variability.

Situational Context

An individual's situational context can have a significant impact on his or her personality, such that contextual changes can influence the degree of stability or variability within one's personality. However, determining what constitutes a 'situation' presents a challenge (Mischel & Shoda, 1995), because observable features of a situation (e.g., how many people one is with) may hold very different meaning from one's internal perception of a situation (i.e., the aspects that are most salient to the individual). As a result, the research defining the specific situational factors that affect state personality is limited.

An early study utilized three dichotomous categories of situational personality change for the sake of simplicity: social versus alone, work versus play, and novel versus typical situations (Diener & Larsen, 1984). More recently, an exploratory factor analysis of 810 observed situations across a sample of 81 undergraduate students, resulted in seven major factors, or categories: social situations, school work in class with others, school work at home or alone, recreating (e.g., video games, tennis), getting ready for something (e.g., shower, brushing teeth), work (i.e., employment), and unpleasant situations (e.g., sick, looking for lost cell phone; Sherman, Nave, & Funder, 2010, 2012).

Other research has focused on dimensional characteristics of the situation. For example, Fleeson (2007) developed a series of items, each with a Likert-type response scale, meant to evaluate various aspects of the situation. Example items include "How structured was the situation around you? (from 1, *no structure at all*, to 7, *highly structured*)" and "Was the last half hour free time or fulfilling an obligation? (from 1,

pure free time, to 7, purely obligation)” (p. 834). A more recent set of studies identified a systematic set of eight factors to define the situation as well as scales of varying lengths to measure them (Rauthmann et al., in press). These are: Duty, Intellect, Adversity, Mating, pOsitivity, Negativity, Deception, and Sociality (DIAMONDS). Rather than placing situations into categories, these dimensional approaches take into account the complexity of any given situation and allow for a wider array of statistical analyses.

The social nature of a situation, a characteristic shared by all of the above approaches, is especially relevant. Specifically, one’s social roles (e.g., with parents, with friends, with coworkers) can influence self-reported personality traits, such that extraversion is rated highest with friends and lowest with coworkers, neuroticism highest with parents, and conscientiousness highest with coworkers (Robinson, 2009). This finding suggests that type and level of closeness of a particular relationship can affect one’s personality expression. Additionally, social category primes (e.g., hippies, jocks) can influence individuals to begin identifying with stereotypical characteristics of the social category, whether or not it fits their initial self-concepts (Kawakami et al., 2012), demonstrating trait malleability based on contextual factors, and in particular, social factors.

However, research measuring personality changes across contexts often explicitly asks participants to rate themselves in multiple social roles at once, which is subject to role comparisons and social desirability (Heller, Watson, Komar, Min, & Perunovic, 2007). A less biased method of understanding the effect situational context has on personality variability is via diary studies. Using ESM, which measures variables in a

more naturalistic setting, research suggests that variability in mood (Diener & Larsen, 1984), interpersonal behavior, and reported trait levels (Brown & Moskowitz, 1998) can be more easily detected and directly related to the situation than single measures of the same constructs. Additionally, patterns begin to emerge in situation pairs, such that stability or variability in one pair of situations is related to the same pattern in a different pair of situations, a phenomenon researchers call *if...then...* profiles.

If...then... profiles help provide a theoretical understanding of how a person interacts with a situation, and explain the patterns of variability often found in personality research. This cognitive affective process system (CAPS; Mischel & Shoda, 1995) suggests that two individuals who have similar aggregate levels of a trait can display different behaviors across situations. For example, consider a situation in which peers are approaching two children who have the same mean level of verbal aggression across situations. However, in this situation, one child responds with a higher than average level of aggression, whereas the other child responds with a lower than average level of aggression. These two children, regardless of averaging similar aggression levels across situations, differ in how much aggression is shown in the situation (Mischel & Shoda, 1995). These variations in behavior will theoretically begin to follow a predictable pattern of *if...then...* contingencies. *If...then...* profiles are also evident in lay perceptions of personality, providing further support for CAPS theory. Specifically, lay observers can perceive personality traits of an individual (e.g., agreeableness) as a function of the social context and the individual's perceived motivation in that context (Kammrath, Mendoza-Denton, & Mischel, 2005).

Frequency-Based Measurement

More recently, researchers have adopted the use of frequency-based measurement in order to detect within-person variability in a single measurement, as opposed to repeated measures via ESM studies (Fleisher, Woehr, Edwards, & Cullen, 2011). Although some research has attempted something similar by calculating the standard deviation of Likert-type scores within each of the Big Five factors as a measure of variability (e.g., Reddock, Biderman, & Nguyen, 2011), it is argued that traditional Likert-type scales, which ask participants to average their behavior over a lifetime, require a high level of cognitive effort (Edwards & Woehr, 2007). Alternatively, frequency-based measurement asks participants to report the percentage of time over a specific time period (e.g., six months) that a statement (e.g., “I am the life of the party”) describes their behavior very accurately, very inaccurately, or neither accurately nor inaccurately.

Recent research provides evidence of strong psychometric properties for this format of measurement (Edwards & Woehr, 2007; Fleisher et al., 2011). Edwards and Woehr (2007), the first to suggest this format for personality, found that frequency-based ratings are highly correlated with traditional (Likert-type) ratings of personality in an undergraduate sample. Additionally, need for cognition and goal orientation demonstrated almost identical correlations with Likert-type and frequency-based ratings of the Big Five in an undergraduate sample, demonstrating convergent validity for the format (Fleisher et al., 2011). Ultimately, the purpose of the frequency-based measurement is to create a distribution of behavior frequencies associated with the

expression of personality traits (Fleeson, 2001) without the need for self/other agreement, ESM (i.e., calculating the ‘mean of states’), or relying on the mean scores of Likert-type trait measures. Frequency-based, then, would allow researchers to examine situational variability in personality with substantially less time, effort, and money, effectively solving several of the methodological problems discussed earlier.

However, the two above-cited studies remain the only published work on frequency-based measurement, despite calls for future research on the format (e.g., Bowler, Bowler, & Phillips, 2009). Thus, further examination is necessary to establish frequency-based as a valid measure of within-person variability. The present study fills this void. First, it is hypothesized that the personality variability measured via frequency-based will be similar to that of the personality variability measured across situations via ESM, thus providing construct validity. Second, frequency-based variability should be distinct (i.e., divergent) from two aspects of the self-concept most relevant to variability across situations: self-monitoring and self-concept clarity.

Self-Monitoring

Self-monitoring (SM) is defined as the degree to which an individual monitors his or her own display of behaviors and expression of emotions (Snyder, 1974; Snyder & Gangestad, 1986). Although seemingly similar to the concept of traitedness in that both constructs describe variability in behavior across situations, little to no correlation exists between the two ($r \leq .13$; Britt, 1993). SM has been examined across multiple contexts. For example, high self-monitors are better at hiding emotions such as happiness than low self-monitors (Friedman & Miller-Herringer, 1991), tend to be more extraverted and

better actors (Bono & Vey, 2007; Miller & Thayer, 1989), and are better at perceiving neuroticism and other traits in others (Sanz, Sanchez-Bernardos, & Avia, 1996).

High self-monitors tend to view social situations positively and as opportunities to gain status and manage others' impressions of them (Barrick, Parks, & Mount, 2005; Turnley & Bolino, 2001). This view frequently makes them more susceptible to situational influence in comparison to low self-monitors, who are less likely to make an effort to tailor their behaviors and/or emotional expressiveness based on the situation (Leone, 2006).

The moderating effect of self-monitoring on the trait-behavior relationship makes this variable especially relevant to the study of within-person variability in personality. For example, in an environment in which situational demands are especially salient, such as the workplace, SM moderates the relationship between the five factors and interpersonal behavior, such that extraversion, emotional stability, and openness to experience (but not agreeableness or conscientiousness) are positively correlated with supervisory ratings of interpersonal performance for low self-monitors (Barrick et al., 2005). Also in the workplace, SM moderates the relationship between conscientiousness and counterproductive work behaviors (CWBs), such that highly conscientious individuals who are also high self-monitors are less likely to commit CWBs that negatively affect the organization (Oh, Charlier, Mount, & Berry, 2014). The same effect of conscientiousness was not found among low self-monitors.

Self-Concept Clarity

Self-concept is defined as the combination of an individual's self-perceived characteristics; this combination may be more clearly defined for some individuals than others. Self-concept clarity (SCC) is "the extent to which the contents of an individual's self-concept (i.e., perceived personal attributes) are clearly and confidently defined, internally consistent, and temporally stable" (Campbell et al., 1996, p. 141). High SCC does not imply accuracy; however, having a clearly defined sense of one's individual and cultural identity is related to positive outcomes such as increased self-esteem and subjective well-being (Usborne & Taylor, 2010). Additionally, SCC is positively correlated with self-esteem, agreeableness, extraversion, and conscientiousness; negatively correlated with neuroticism; and is unrelated to openness (Campbell et al., 1996).

Although typically considered a trait, SCC itself has been found to vary based on the situation. For example, a 10-week longitudinal study surveyed participants twice per week and found that SCC varied as a function of daily events, such that it was higher on days with positive events and lower on days with negative events (Nezlek & Plesko, 2001). They also found SCC to vary based on negative affect and self-esteem; in fact, self-esteem accounted for 23 percent of the variance in SCC across the 10-week period. However, Nezlek and Plesko (2001) ultimately provide support for trait SCC, such that those with higher trait SCC demonstrated lower variability across situations in all state variables: state SCC, positive affect, negative affect, and self-esteem. Therefore, it is also

possible that within-person variability in state personality simply reflects low SCC; as such, the present study differentiated between these closely related constructs.

Current Study

The purpose of the present study was to provide validity to a novel method of measuring intraindividual variability and to contribute to a deeper understanding of how the person and situation interact. In order to do so, the present study evaluated frequency-based measurement as a more efficient measure of within-person variability than repeated measures designs by (1) providing further support for its construct validity by comparing it with situational expression of the Big Five personality factors; and (2) demonstrating its divergent validity by comparing it with variables shown to be related to within-person variability in behavior: SM and SCC.

These goals were explored in two phases. The first phase consisted of a trait measure of personality using frequency-based measurement, and measures of two self variables: SM and SCC. The second phase involved an ESM study consisting of repeated measurements of state personality and mood at the time of measurement.

The hypotheses in the present study were as follows:

1. The overall means of trait (via frequency-based measurement) and state (via ESM) measures of personality will be significantly positively correlated.
2. The within-person variability detected using frequency-based measurement will be significantly positively correlated with the within-person, across-situation variability detected in the ESM study.

3. SM will have small significant positive correlations with both measures of within-person variability (i.e., frequency-based measurement and ESM ratings of personality).
4. SCC will have small significant negatively correlations with both measures of within-person variability (i.e., frequency-based measurement and ESM ratings of personality).
5. Variability in mood will be significantly positively correlated with both measures of within-person variability (i.e., frequency-based measurement and ESM ratings of personality).

CHAPTER 2

METHOD

Design

The present study was a within-person repeated measures design with two phases. Phase 1 consisted of the following variables: trait personality, SCC, and SM. Phase 2 was an ESM study consisting of the variables state personality and mood.

Phase 1: Trait Measurement of PersonalityParticipants

Participants were 366¹ undergraduate and graduate students, ages 18 to 54 ($M=21.57$, $SD=5.01$), from a Midwestern university. The sample was 78% female and 92% Caucasian. See Table 1 for further demographic information.

Table 1

Phase 1 Demographic Information

<i>Year in School</i>	<i>%</i>	<i>Ethnicity</i>	<i>%</i>
Freshman	15.0	Caucasian	92.3
Sophomore	24.0	African-American	1.9
Junior	15.0	Hispanic	2.2
Senior	36.9	Asian	0.8
Graduate Student	8.7	Other	1.7

¹ 612 participants started the survey; only participants who were United States citizens and completed the entire Big Five measure were included in analyses (60%; see Missing Data section in Results). Missing data did not negatively impact power in this phase.

Procedure

A larger pool of 3620 students² attending the university were selected via simple random sampling by the university's Registrar's office and contacted by the researcher via email (see Appendix A). The email included a link to the online survey (created in Qualtrics), which included an informed consent statement and a measure of the Big Five factors of personality, as well as measures of SM, SCC, and demographics. The demographics questions appeared first, followed by the personality measure (with questions randomized), and then the measures of SM and SCC, which were counterbalanced. Participants were then asked questions related to interest in participating in a future study.

Following the questions, participants provided their email address so that they could be sent personalized personality feedback at a later time (see Appendix B) and be contacted if they were one of the three students chosen in the drawing for a \$25 Visa gift card. Lastly, participants saw a debriefing statement in which the purpose of the study was reiterated, contact information and resources (i.e., Counseling Center) were provided, and participants were thanked for their time.

Measures

Demographics. (Appendix C). Participants were asked eight researcher-created questions about their age, gender, ethnicity, and citizenship status. Further, they were asked to specify their major and minor (if any), as well as their identified year in school.

² The response rate for beginning the study was 17% ($N=612$) and the response rate for completing the study (i.e., meeting the inclusion criteria, $N=366$) was 10%.

International Personality Item Pool. The International Personality Item Pool (IPIP; Goldberg et al., 2006; Appendix D) is a 50-item measure of the Big Five personality traits. Items were rated using a frequency-based form of measurement, which asks participants to identify the percentage of time over the previous six months that each statement describes them ‘very accurately,’ ‘very inaccurately,’ or ‘neither accurately nor inaccurately,’ ensuring that these three percentages equal 100 percent. Example statements include, “I am the life of the party,” and “I pay attention to details.” The validity of this measure, as described in the introduction, was found when comparing frequency-based and Likert-type correlations with need for cognition and goal orientation (Fleisher et al., 2011).

The reported reliability of the frequency-based form of the IPIP has an average alpha of .78, which is comparable to the Likert type scale version of the IPIP, which has an average alpha of .82 (Edwards & Woehr, 2007). Reliability coefficients in the present study were as follows: Extraversion (E) $\alpha=.87$; Agreeableness (A) $\alpha=.77$; Conscientiousness (C) $\alpha=.79$; Neuroticism (N) $\alpha=.87$; and Openness (O) $\alpha=.78$, resulting in an average alpha of .82.

Self-Monitoring Scale. The revised Self-Monitoring Scale (SMS; Snyder & Gangestad, 1986; Appendix E) is an 18-item dichotomously-scaled (i.e., True or False) measure of how much an individual monitors his or her own behavior by observing surrounding cues and modifying behavior accordingly. Validity for this measure is evident via significantly positive self-peer correlations as well as a significant difference in scores between groups predicted to have differing levels of SM (Snyder, 1974).

Example items include: “I may deceive people by being friendly when I really dislike them,” and “I have trouble changing my behavior to suit different people and different situations.” The reliability of this measure in past research ($\alpha=.70$) as well as in the present study ($\alpha=.69$) is moderate.³

Self-Concept Clarity. The Self-Concept Clarity scale (SCCS; Campbell et al., 1996; Appendix F) is a 12-item measure rated on a 7-point Likert-type scale (ranging from 1, ‘strongly disagree,’ to 7, ‘strongly agree’). The scale purports to measure the degree to which an individual has a clear sense of his or her own self-concept. Example items include: “My beliefs about myself often conflict with one another,” and “In general, I have a clear sense of who I am and what I am.” Evidence of the validity of this measure includes test-retest reliability across four and five month intervals, a significant positive correlation with self-esteem, and a significant negative correlation with neuroticism (Campbell et al., 1996). The reliability of this measure in past research is high, with an alpha of .86, and even higher in the present study, with an alpha of .89.

Phase 2 Involvement. At the end of the survey, participants were asked questions related to interest in further research participation (Appendix G). They were first asked if they own and regularly use a smart phone. If they selected “Yes” to this question, they were asked about their willingness to participate in another, related study for further compensation. If they selected “Yes” to this question, they were further asked to provide

³ Although the Kuder Richardson-20 (KR-20) is intended as a measure of reliability for dichotomous data (i.e., 0-1), Cronbach’s alpha was developed later as an improved measure of reliability in that it is suitable for both dichotomous and continuous data. As such, alpha is equivalent to KR-20 for dichotomous data (DeVellis, 2012) and is therefore appropriate for this scale.

their email address and two 4-digit identification numbers: last four digits of cell phone number and first four digits of birthday (MMDD).

Open-Ended Feedback. Finally, participants were asked to provide open-ended feedback about the survey (Appendix H). Examples of these researcher-created questions include: “Did you have any problems with completing this study, or notice any errors?” and “What were your impressions of this study?” In response to these questions, only 15% of participants indicated disliking or having problems with the frequency-based questions.

Phase 2: ESM Study

Participants

Of the 275 participants in Phase 1 who owned and regularly used a smart phone, 87% indicated interest in participating in Phase 2. These 238 participants were emailed an invitation to complete Phase 2 (see Appendix I) that included a link to sign up for an instructional meeting. Overall, 64 participants (26.9%) completed this phase of the study, however two participants were removed from analyses because they were not United States citizens, leaving the total number at 62. This number of participants is much lower than initially proposed ($N=134$).⁴ Financial constraints limited the amount of money available for participant compensation; as a result, data collection was stopped after 64 participants. However, the initial power analysis assumed that analyses would be

⁴ Using an estimated ESM response rate of 74%, a power analysis was conducted for a correlation with a moderate effect size and power level ($r = .30$, based on other research examining the relationship between trait and state personality, e.g., Augustine & Larsen, 2012) and an alpha of .05. Based on these analyses, 134 Phase 2 participants were needed.

between-person, whereas power analyses for within-person analyses indicate that fewer than 35 participants were needed for this phase.⁵

The sample was 79% Female, 92% Caucasian, and ranged in age from 18 to 38 ($M=20.94$, $SD=4.13$). Further breakdown of demographics can be found in Table 2.

Table 2

Phase 2 Demographic Information

<i>Year in School</i>	<i>%</i>	<i>Ethnicity</i>	<i>%</i>
Freshman	22.6	Caucasian	91.9
Sophomore	22.6	African-American	1.6
Junior	11.3	Hispanic	1.6
Senior	37.1	Asian	1.6
Graduate Student	6.5	Other	3.2

Procedure

Data were collected in two waves: the first wave ($N=23$; collected during the period of October 9-13, 2013) and second wave ($N=39$; collected during the period of October 16-20, 2013) of participants completed 18-100% of the notifications ($M=80%$, $SD=18.6$). Because the first wave was conducted during the university's homecoming week, there was the possibility of a history threat to the validity of the data, such that participants in the first wave could have been more variable than average in their

⁵ The program used for power analysis, G*Power (Faul, Erdfelder, Buchner, & Lang, 2009), only has within-person options for ANOVA and MANOVA analyses. The specifics of the present study were entered for both, resulting in $N=16$ and $N=33$, respectively. These give a close approximation of the sample size necessary for the present study's within-person analyses.

personalities due to the unique events taking place. Independent samples *t*-tests were therefore conducted to detect this effect, but no significant differences emerged between the two groups of participants on any of the variables.

Prior to each wave, participants attended an instructional meeting in which formal informed consent policies were explained by the primary investigator and consent forms were signed. This meeting also included an overview of the survey questions and detailed instructions on downloading the mobile application (ShoutEm, www.shoutem.com) onto their personal smart phones. At the end of the meeting, the researcher answered any questions and excused participants. Reminder emails were sent to participants the day before their selected instructional meeting date and the day before their 5-day survey period began.

The survey was sent to each participant's smart phone four times per day for five days (i.e., Wednesday through Sunday) via 'push notifications' within the ShoutEm application (for a total of 20 entries). Each notification was sent at a random time within each of four blocks of time: 10 am-1 pm; 1 pm-4 pm; 4 pm-7 pm; and 7 pm-10 pm. No notifications were sent outside of this timeframe (i.e., between 10 pm and 10 am; see Appendix J for exact notification times and response rates). The brief surveys included 10 personality items, one item to evaluate mood, and 15 items assessing their current situation. Participants were advised to complete each survey within 60 minutes of the notification they received on their phones. After this time, the survey was no longer available and participants who were unable to complete the measure were advised to wait for the next notification. Following the 5-day period, participants were provided with an

electronic debriefing statement in which the purpose of the study was reiterated, contact information and resources (i.e., Counseling Center) were provided, and participants were thanked for their time

For agreeing to participate in this second phase, all participants received a set compensation amount (\$15.00) at the end of the study in addition to a possible extra \$1.00 at two random points during the study (up to \$2.00 total) for completion of the survey at that particular time point.⁶ Further, those who completed 90% or more of the surveys over the 5-day period (i.e., 18 or more; $N=37$) were entered into a drawing for one of four \$25 gift cards (see Appendix K for overall budget).

Compensation was distributed from the Psychology Department offices. The times and locations of availability were made known to participants via email. Each participant's compensation was placed in an individual envelope with only the ESM identifiers (i.e., partial phone and partial birthday) and compensation amount visible on the front. A receipt was also placed in each envelope (see Appendix L), requiring the student to provide their Student ID number and signature when picking up their envelope (per university guidelines). These receipts were given directly to the appropriate campus office; no copies or records of the identifying information were kept by the researcher.

Measures

Ten-Item Personality Inventory. The Ten-Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003; see Appendix M) is a 10-item measure of the Big

⁶ Participants were notified of this bonus compensation on their mobile device after having completed the time points (not prior to the study).

Five factors and is rated on a 7-point Likert-type scale. Example items include: “Extraverted, enthusiastic” and “Critical, quarrelsome.” The order of these items was randomized. The average alpha in past research for the inter-item reliability for each factor (two items each) is .55, which is relatively low. However, the significantly positive 6-week test-retest correlation (mean $r = .72$; Gosling et al., 2003) and the convenience of a 10-item measure made the TIPI suitable for this ESM study. Additionally, the average alphas in the present study were somewhat higher than in past research. The average reliability coefficients across all ESM time points were as follows: $\alpha = .74$ (E), $\alpha = .60$ (A), $\alpha = .70$ (C), $\alpha = .77$ (N), and $\alpha = .62$ (O), resulting in an overall average alpha of .69. See Table 3 for the alpha of each trait at each time point as well as descriptive statistics.

Table 3

Reliability Coefficients of Phase 2 TIPI Big Five Measure

<i>Time Point</i>	<i>αE</i>	<i>αA</i>	<i>αC</i>	<i>αN</i>	<i>αO</i>
1 (<i>N</i> =48)	.82	.63	.44	.73	.53
2 (<i>N</i> =55)	.73	.23	.75	.62	.55
3 (<i>N</i> =56)	.82	.57	.76	.73	.76
4 (<i>N</i> =46)	.82	.83	.74	.71	.71
5 (<i>N</i> =46)	.76	.73	.79	.66	.81
6 (<i>N</i> =52)	.85	.44	.52	.73	.28
7 (<i>N</i> =50)	.75	.69	.57	.74	.67
8 (<i>N</i> =51)	.88	.59	.77	.80	.71
9 (<i>N</i> =48)	.73	.71	.66	.79	.48
10 (<i>N</i> =51)	.48	.42	.76	.68	.55
11 (<i>N</i> =56)	.82	.69	.70	.80	.38
12 (<i>N</i> =52)	.75	.54	.72	.81	.73
13 (<i>N</i> =40)	.73	.70	.77	.73	.56
14 (<i>N</i> =47)	.72	.44	.48	.79	.68
15 (<i>N</i> =42)	.87	.64	.75	.74	.74
16 (<i>N</i> =47)	.74	.67	.65	.85	.64
17 (<i>N</i> =47)	.60	.78	.83	.88	.73
18 (<i>N</i> =41)	.74	.71	.78	.80	.64
19 (<i>N</i> =43)	.62	.31	.87	.81	.69
20 (<i>N</i> =34)	.61	.60	.64	.67	.54
21 (<i>N</i> =32)	.82	.51	.59	.89	.53
22 (<i>N</i> =33)	.62	.72	.82	.88	.64
Min	.48	.23	.44	.62	.28
Max	.88	.83	.87	.89	.81
<i>M(SD)</i>	.74(.10)	.60(.15)	.70(.12)	.77(.07)	.62(.13)

Mood. A single item asking participants to rate their mood at the present moment was also included (shown in Appendix M). This item was rated on a 7-point Likert-type scale ranging from ‘*very negative*’ to ‘*very positive*.’

Situation Characteristics. Lastly, participants were asked 15 questions evaluating aspects of their situation in the previous half hour (see Appendix M). This measure was adapted from Fleeson (2007) by the researcher. Example questions include: “How typical was the last half hour?” (on a scale from 1, ‘*very unusual*,’ to 7, ‘*occurs almost daily*’), and “How structured was the situation around you during the last half hour?” (on a scale from 1, ‘*no structure at all*,’ to 7, ‘*highly structured*’). These data were not included in the present analyses but did serve to ensure participants were surveyed in an adequate variety of situations. For example, participants were also asked the degree to which the last half hour was ‘*pure free time*’ (1 on the Likert-type scale) or ‘*purely obligation*’ (7 on the scale). Correlations among time points on this variable found that only 10 of the 190 relationships were significant. Descriptive statistics on this item also demonstrate variability across situations: (1) all response options were chosen (1-7) for all time points except one; and (2) mean scores ranged from 1.81 (more free time; $SD=1.66$) on a weekend day to 4.95 (more obligations; $SD=2.23$) on a weekday, demonstrating an expected pattern in variability.

Open-Ended Feedback. The day after the 5-day study was completed, participants were sent an email asking them to complete a 4-item researcher-created feedback survey, which yielded a 100% response rate (Appendix N). An example question from this survey was: “How accurately do you believe you were in completing each of the

surveys?” In response to this open-ended question, 84% of participants indicated that they had been “pretty accurate,” “very accurate,” or “completely accurate.” They were also asked to report any problems they experienced during the study. In response, 38% of participants indicated having at least one problem with their smart phone, their Wi-Fi connection, or the ShoutEm application. (Appendix N).

CHAPTER 3

RESULTS

Missing Data

There was a large number of missing data points in Phase 1. Prior to analyses, participants' data were removed if they were not United States citizens or if they did not correctly complete the entire frequency-based Big Five measure. Of the 612 participants who began the study: 1% were not United States citizens; 22% did not move beyond the demographics questionnaire; 6% completed less than 25% of the Big Five measure and neither of the self measures (i.e., SM and SCC); 4% completed less than 50% of the Big Five measure and neither of the self measures; 3% completed less than 75% of the Big Five measure and neither of the self measures; 2% completed less than 90% of the Big Five measure and neither of the self measures; and 2% completed the Big Five measure incorrectly (e.g., entering zero for all three percentages). Thus, 60% of the data ($N=366$) were included in the following analyses.

Hypothesis 1

To test the hypothesis that the overall means of the trait (i.e., frequency-based) and state (i.e., ESM) measures of personality would be correlated, the three frequency-based percentages were respectively weighted .01, .04, and .07, summed for a 1-7 rating for each item, and then treated as Likert scores, following the procedure of Edwards and Woehr (2007) and Fleisher et al. (2011). See Table 4 for an example of these calculations.

Table 4

Example Conversion from Frequency-Based to Likert-type Ratings

	<i>Inaccurate</i>	<i>Neither</i>	<i>Accurate</i>	<i>Sum</i>
<i>Participant Response</i>	10%	40%	50%	100%
<i>Multiplier</i>	.01	.04	.07	---
<i>Weighted</i>	.1	1.6	3.5	5.2

Note. Converted Likert-type ratings are in bold.

After reversing the appropriate items, Likert scores for each of the Big Five factors were summed to create five composite trait (Phase 1) scores. Five composite state (ESM) scores were also created for participants who completed both phases ($N=62$) by combining the two TIPI items for each trait at each time point and then averaging across time points. The Phase 1 and ESM composite scores were then correlated. See Table 5 for the correlation coefficients (in bold) and significance levels. As hypothesized, the mean trait and state scores were statistically significantly positively correlated for all of the Big Five factors ($r_s=.34-.66$).

Table 5

Correlations between Mean Trait and State Personality

		Trait Personality				
		<i>E</i>	<i>A</i>	<i>C</i>	<i>N</i>	<i>O</i>
State Personality	<i>E</i>	.66 ^{***} [.49, .78]				
	<i>A</i>	.36 ^{**} [.12, .56]	.34 ^{***} [.10, .54]			
	<i>C</i>	.25 [.00, .47]	.11 [-.14, .35]	.48 ^{***} [.36, .71]		
	<i>N</i>	-.21 [-.44, .04]	-.07 [-.31, .18]	-.25 [*] [-.47, .00]	.56 ^{***} [.36, .71]	
	<i>O</i>	.29 [*] [.04, .50]	.05 [-.20, .30]	-.04 [-.29, .21]	-.14 [-.38, .11]	.48 ^{***} [.26, .63]

*** $p < .001$, ** $p < .01$, * $p < .05$

Note. Hypothesized correlations are in bold. 95% confidence intervals are in brackets.

Hypothesis 2

The second hypothesis predicted that the within-person variability detected using frequency-based measurement would be significantly positively correlated with the within-person, across-situation variability detected in the ESM study. To test this hypothesis, within-person variability needed to be calculated. In order to be consistent with previous research (i.e., Edwards & Woehr, 2007; Fleisher et al., 2011), within-item standard deviations (*SDs*) were calculated for each frequency-based item, and then mean within-item *SDs* were calculated for each trait. See Table 6 for examples of these calculations. Note that the *SD* is higher for the most consistent row (i.e., 0%, 0%, 100%) than it is for the most variable row (i.e., 33%, 34%, 33%).

Table 6

Example Within-Item Standard Deviation Calculations for Frequency-Based

<i>Inaccurate</i>	<i>Neither</i>	<i>Accurate</i>	<i>SD</i>
10%	40%	50%	20.82
33%	34%	33%	0.58
0%	0%	100%	57.74

For state personality, it was decided a priori that participants who completed at least three of the time points would be included in analyses to allow for the calculation of *SDs*. All participants ($N=62$) met this criterion. For these participants, the mean personality state for each time point was calculated. Then, the *SD* across time points for each trait was calculated. Correlations were then conducted among the five *SDs* for frequency-based measurement and the five for the ESM study. Because lower frequency-based *SDs* indicate greater variability, these correlations are expected to be negative. See Table 7 for the correlation coefficients in bold.

Contrary to expectation, effect sizes indicated little to no relationship between trait and state variability. The relationship between frequency-based and ESM variability for openness trended toward statistical significance, but in the opposite direction, such that more variability across ESM time points was somewhat associated with stability across frequency-based items. Only conscientiousness demonstrated a relationship in the expected direction, although the small effect size was statistically insignificant.

Table 7

Correlations between Trait and State Variability (SDs)

		<i>Trait Variability</i>				
		<i>E</i>	<i>A</i>	<i>C</i>	<i>N</i>	<i>O</i>
<i>State Variability</i>	<i>E</i>	.01 [-.24, .26]				
	<i>A</i>	.06 [-.19, .31]	.17 [-.08, .40]			
	<i>C</i>	.06 [-.19, .31]	.01 [-.24, .26]	-.10 [-.34, .15]		
	<i>N</i>	.03 [-.22, .28]	.14 [-.11, .38]	-.03 [-.28, .22]	-.01 [-.26, .24]	
	<i>O</i>	.14 [-.11, .38]	.35** [.11, .55]	.11 [-.14, .35]	.22 [-.03, .45]	.22+ [-.03, .45]

** $p < .01$, + $p = .08$

Note. Hypothesized correlations are in bold. 95% confidence intervals are in brackets.

Although past research operationally defined variability for frequency-based items as the average within-item *SD*, a more robust measure of variability is that of variance (Ostroff & Fulmer, 2014). As a result, the same analyses were conducted using the variance for both frequency-based and ESM measures. See Table 8 for these analyses. Using the variances, the inverse relationship for openness noted above (i.e., more ESM variability related to less frequency-based variability) reached significance, and agreeableness trended toward significance, also in the opposite direction. The relationship for conscientiousness was almost identical and remained insignificant.

Table 8

Correlations between Trait and State Variability (Variance)

		<i>Trait Variability</i>				
		<i>E</i>	<i>A</i>	<i>C</i>	<i>N</i>	<i>O</i>
<i>State Variability</i>	<i>E</i>	-.08 [-.32, .17]				
	<i>A</i>	-.01 [-.26, .24]	.22⁺ [-.03, .45]			
	<i>C</i>	.01 [-.24, .26]	.09 [-.16, .33]	-.09 [-.33, .16]		
	<i>N</i>	-.04 [-.29, .21]	.19 [-.06, .42]	-.05 [-.30, .20]	.04 [-.29, .21]	
	<i>O</i>	.03 [-.22, .28]	.42 ^{**} [.19, .61]	.09 [-.16, .33]	.25 [^] [.00, .47]	.33^{**} [.09, .54]

** $p < .01$, [^] $p = .053$, ⁺ $p = .08$

Note. Hypothesized correlations are in bold. 95% confidence intervals are in brackets.

Hypothesis 3

It was predicted that SM, measured in Phase 1, would be significantly positively correlated with both measures of within-person variability (i.e., frequency-based trait measurement in Phase 1 and ESM ratings in Phase 2). This hypothesis was tested by first calculating an average score for the SM measure (i.e., mean of the items; 1 if in the keyed direction, 0 if in the opposite). Then, correlations were conducted among the *SDs* for frequency-based measurement for all five traits, *SDs* for the ESM study for all five traits, and the average SM scores. The same analyses were also conducted with variances. See Table 9 for the correlation coefficients.

SM had small significant correlations in the expected direction with frequency-based variability in conscientiousness and neuroticism measured in Phase 1. SM was also

related to Phase 1 frequency-based variability in openness, but in the opposite direction.

It was unrelated to all other variability scores.

Table 9

Correlations between Trait and State Variability and SM

		<i>Trait Variability (Frequency-Based) N=366</i>									
		<i>E</i>		<i>A</i>		<i>C</i>		<i>N</i>		<i>O</i>	
		<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>
<i>SM</i>		.01 [-.09, .11]	.01 [-.09, .11]	.07 [-.03, .17]	.08 [-.02, .18]	-.10 [^] [-.20, .003]	-.09 [#] [-.19, .01]	-.12 [*] [-.22, .02]	-.11 [*] [-.21, -.01]	.10 [~] [-.003, .20]	.11 [*] [.01, .21]
		<i>State Variability (ESM) N=62</i>									
		<i>E</i>		<i>A</i>		<i>C</i>		<i>N</i>		<i>O</i>	
		<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>
<i>SM</i>		.01 [-.24, .26]	.002 [-.25, .25]	-.03 [-.28, .22]	.02 [-.23, .27]	.05 [-.20, .30]	.09 [-.16, .33]	.04 [-.21, .29]	.05 [-.20, .30]	.03 [-.22, .28]	.05 [-.20, .30]

* $p < .05$, [~] $p = .06$, [^] $p = .07$, [#] $p = .08$

Note. *V*=Variance. ⁺Lower values indicate greater variability. 95% confidence intervals are in brackets.

Hypothesis 4

SCC, measured in Phase 1, was predicted to be significantly negatively correlated with both measures of within-person variability (i.e., frequency-based trait measurement in Phase 1 and ESM ratings in Phase 2). To test this hypothesis, a procedure similar to that of Hypothesis 3 was used. First, an average score was created for the SCCS by finding the mean of the items. Then, correlations were conducted among the *SDs* for frequency-based measurement for all five traits, *SDs* for the ESM study for all five traits, and the average SCC scores. The same analyses were conducted with variances. See Table 10 for the correlation coefficients.

SCC was significantly correlated in the expected direction with frequency-based variability in agreeableness and conscientiousness (and trending toward significance for neuroticism). SCC was also significantly related to ESM variability in conscientiousness, also in the expected direction. As expected, these effect sizes were small to moderate ($r_s < .30$). No other correlations between trait variability, ESM variability, and SCC were statistically significant.

Table 10

Correlations between Trait and State Variability and SCC

		<i>Trait Variability (Frequency-Based)⁺ N=366</i>									
		<i>E</i>		<i>A</i>		<i>C</i>		<i>N</i>		<i>O</i>	
		<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>
<i>SCC</i>		-.001 [-.10, .10]	.002 [-.10, .11]	.13* [.03, .23]	.12* [.02, .22]	.15** [.05, .25]	.15** [.05, .25]	.09^ [-.01, .19]	.09^ [-.01, .19]	.08 [-.02, .18]	.07 [-.02, .18]
		<i>State Variability (ESM) N=62</i>									
		<i>E</i>		<i>A</i>		<i>C</i>		<i>N</i>		<i>O</i>	
		<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>
<i>SCC</i>		-.05 [-.30, .20]	-.10 [-.34, .15]	-.24~ [-.46, .01]	-.27* [-.49, -.02]	-.27* [-.49, -.02]	-.28* [-.50, -.03]	-.18 [-.41, .07]	-.20 [-.43, .05]	-.20 [-.43, .05]	-.21 [-.44, .04]

** $p < .01$, * $p < .05$, ~ $p = .06$, ^ $p = .07$

Note. *V*=Variance. ⁺Lower values indicate greater variability. 95% confidence intervals are in brackets.

Hypothesis 5

Finally, it was hypothesized that variability in mood, measured in Phase 2, would be significantly positively correlated with both measures of within-person variability (i.e., frequency-based trait measurement in Phase 1 and ESM ratings in Phase 2). In order to test this hypothesis, within-person variability in mood was operationalized as the *SD* of mood ratings for each person. This *SD* for mood was then correlated with the *SDs* for all five traits in the ESM study and for all five traits in the frequency-based measure. The same analyses were also conducted with mood variance, frequency-based variances, and ESM variances. See Table 11 for correlation coefficients.

As hypothesized, mood variability was significantly positively correlated with all five ESM measures of variability (*SD* r s=.42-.65). However, mood variability was not related to any of the frequency-based measures of variability.

Table 11

Correlations between Trait and State Variability and Mood Variability

		<i>Trait Variability (Frequency-Based)⁺</i>									
		<i>E</i>		<i>A</i>		<i>C</i>		<i>N</i>		<i>O</i>	
<i>Mood Var.</i>		<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>
			-.03 [-.28, .22]	-.05 [-.30, .20]	.09 [-.16, .33]	.17 [-.08, .40]	-.15 [-.39, .10]	-.15 [-.39, .10]	-.09 [-.33, .16]	-.07 [-.31, .18]	.03 [-.22, .28]
		<i>State Variability (ESM)</i>									
		<i>E</i>		<i>A</i>		<i>C</i>		<i>N</i>		<i>O</i>	
<i>Mood Var.</i>		<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>	<i>SD</i>	<i>V</i>
		.51*** [.30, .67]	.51*** [.30, .67]	.62*** [.44, .75]	.63*** [.45, .76]	.42** [.19, .61]	.50*** [.29, .67]	.65*** [.48, .77]	.67*** [.51, .79]	.51*** [.30, .67]	.57*** [.37, .72]

** $p < .01$, *** $p < .001$

Note. *V*=Variance. ⁺Lower values indicate greater variability. 95% confidence intervals are in brackets.

Additional and Exploratory Analyses

Additional analyses were conducted to determine if differences existed between those who did and did not own smart phones as well as between those who did and did not participate in Phase 2. To determine whether sex differences influenced smart phone ownership and/or participation in Phase 2, chi-square analyses were conducted. No differences were found between men and women in likelihood of owning a smart phone, $\chi^2(1, N=361)= 1.17, p=.56$, or Phase 2 participation, $\chi^2(1, N=365)= .41, p=.81$.

In order to determine if smart phone ownership and/or Phase 2 participation was indicative of differences in personality, political orientation (PO), SM, and/or SCC, independent samples *t*-tests were conducted (see Tables 12 and 13). Individuals who owned smart phones tended to be more extraverted and conscientious. However, no other differences emerged between smart phone and non-smart phone users. Those who participated in both phases did not differ from those who only participated in Phase 1 on any of the variables.

Table 12

Differences between Smart Phone Owners and Non-Owners

	<i>Own Smart Phone</i>			<i>No Smart Phone</i>			<i>t</i>	<i>p</i>	<i>95% CI</i>	
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>			<i>Lower</i>	<i>Upper</i>
<i>Personality Means⁺</i>	275			87						
<i>E</i>		4.24	1.27		3.88	1.25	-2.28	.02	-.66	-.05
<i>A</i>		5.59	.82		5.59	.69	.07	.94	-.18	.20
<i>C</i>		5.18	.93		4.96	.98	-1.97	.05	-.46	-.0004
<i>N</i>		3.93	1.14		3.78	1.21	-1.04	.30	-.43	.13
<i>O</i>		4.98	.88		4.96	.85	-.13	.90	-.22	.20
<i>PO[±]</i>	275	3.63	1.44	87	3.62	1.51	-.08	.93	-.37	.34
<i>SM[^]</i>	275	.51	.20	87	.52	.16	.34	.73	-.03	.05
<i>SCC⁺</i>	275	4.86	.76	87	4.83	.76	-.34	.74	-.21	.15
<i>Personality Variability[°]</i>	275			87						
<i>E</i>		37.70	9.97		36.41	9.83	-1.06	.29	-3.69	1.11
<i>A</i>		40.59	10.00		39.55	10.67	-.83	.41	-3.50	1.42
<i>C</i>		39.92	9.32		37.75	9.41	-1.89	.06	-4.43	.09
<i>N</i>		36.30	9.14		35.92	10.71	-.29	.77	-2.89	2.15
<i>O</i>		37.91	9.84		35.72	10.03	-1.81	.07	-4.59	.19

⁺On a 1 to 7 Likert-type scale, [±]Scaled from 1=*Very Liberal* to 7=*Very Conservative*, [^]Average of SM items on a 0 to 1 dichotomous scale, [°]Lower *SD* values indicate greater variability

Table 13

Differences between Self-Selected Phase 2 Participants and Non-Participants

	<i>Participated</i>			<i>Did Not Participate</i>			<i>t</i>	<i>p</i>	<i>95% CI</i>			
	<i>N</i>	<i>M</i>	<i>SD</i>	<i>N</i>	<i>M</i>	<i>SD</i>			<i>Lower</i>	<i>Upper</i>		
<i>Personality Means⁺</i>		62			304							
	<i>E</i>		4.20	1.38		4.14	1.24	-.35	.73	-.41	.29	
	<i>A</i>		5.59	.77		5.59	.79	.02	.98	-.21	.22	
	<i>C</i>		5.28	.78		5.09	.97	-1.61	.11	-.41	.04	
	<i>N</i>		3.87	1.18		3.89	1.15	.10	.92	-.30	.33	
	<i>O</i>		4.98	.84		4.98	.87	-.04	.97	-.24	.23	
<i>PO[±]</i>		62	3.45	1.35		302	3.67	1.48	1.09	.28	-.18	.62
<i>SM[^]</i>		62	.51	.18		303	.52	.19	.48	.63	-.04	.06
<i>SCC⁺</i>		62	4.86	.87		302	4.86	.73	-.04	.97	-.21	.20
<i>Personality Variability[°]</i>		62				304						
	<i>E</i>		36.77	10.46		37.47	9.79	.51	.61	-2.01	3.42	
	<i>A</i>		39.98	11.02		40.41	10.00	.30	.77	-2.37	3.21	
	<i>C</i>		40.06	9.95		39.23	9.23	-.63	.53	-3.39	1.74	
	<i>N</i>		35.81	9.30		36.20	9.59	.30	.77	-2.22	3.01	
	<i>O</i>		36.59	9.30		37.52	10.00	.67	.50	-1.78	3.64	

⁺On a 1 to 7 Likert-type scale, [±]Scaled from 1=*Very Liberal* to 7=*Very Conservative*, [^]Average of SM items on a 0 to 1 dichotomous scale, [°]Lower *SD* values indicate greater variability

Finally, overall correlations were conducted for both trait variability (frequency-based; Table 14) and state variability (ESM; Table 15) to create a more complete picture of how variability in one Big Five trait relates to variability in the others.

Table 14

Frequency-Based Variability (SDs) among Big Five Factors

		<i>Trait Variability</i>				
		<i>E</i>	<i>A</i>	<i>C</i>	<i>N</i>	<i>O</i>
<i>Trait Variability</i>	<i>E</i>	1				
	<i>A</i>	.63*** [.56, .69]	1			
	<i>C</i>	.67*** [.61, .72]	.65*** [.59, .71]	1		
	<i>N</i>	.68*** [.62, .73]	.66*** [.60, .71]	.68*** [.62, .73]	1	
	<i>O</i>	.70*** [.64, .75]	.66*** [.60, .71]	.65*** [.59, .71]	.65*** [.59, .71]	1

*** $p < .01$

Note. 95% confidence intervals are in brackets.

Table 15

ESM Variability (SDs) among Big Five Factors

		<i>State Variability</i>				
		<i>E</i>	<i>A</i>	<i>C</i>	<i>N</i>	<i>O</i>
<i>State Variability</i>	<i>E</i>	1				
	<i>A</i>	.71*** [.56, .82]	1			
	<i>C</i>	.54*** [.34, .70]	.65*** [.48, .77]	1		
	<i>N</i>	.61*** [.43, .75]	.73*** [.59, .83]	.54*** [.34, .70]	1	
	<i>O</i>	.66*** [.49, .78]	.81*** [.70, .88]	.67*** [.51, .79]	.68*** [.52, .80]	1

*** $p < .001$

Note. 95% confidence intervals are in brackets.

CHAPTER 4

DISCUSSION

The present study examined the utility of frequency-based measurement as a novel method of evaluating intraindividual (within-person) variability in personality by comparing it to state variability measured via the experience-sampling method (ESM). Identifying within-person variability in personality using a frequency-based approach to measurement can provide an important contribution to the person-situation debate among personality researchers by lending support to a less time and cost intensive methodology.

Before validating the measurement format for evaluating variability, it is first important to establish that frequency-based measurement is measuring the Big Five traits as intended. As expected, the mean levels of trait and state personality measured via frequency-based and ESM were significantly positively correlated with moderate to large effect sizes. These trait-state correlations are similar to those found in past research using a Likert-type trait scale (e.g., Augustine & Larsen, 2012). This suggests that frequency-based measurement is successful in evaluating the Big Five factors and builds on the work of Fleisher et al. (2011) in providing further evidence for construct validity for the format.

Frequency-based variability in some traits was also significantly related to self-monitoring (SM) and self-concept clarity (SCC). As hypothesized, SM had small relationships with more variability in conscientiousness and neuroticism, but was unrelated to variability in extraversion or agreeableness. This could reflect the internalizing nature of conscientiousness (Visser & Pozzebon, 2013) and neuroticism

(Schackelford & Michalski, 2011), as opposed to more external characteristics of extraversion and agreeableness (Carlo et al., 2005). Because frequency-based variability was measured at one time and depended on self-reflection, it may be better at measuring variability for internal traits than external traits. If this were the case, though, it would be expected that the ESM measures of variability, which are more ecologically valid, would also be related to SM. However, SM was unrelated to ESM variability in any of the traits. It is more likely that these inconsistent findings reflect the low internal consistency of items on the scale used to measure SM, $\alpha=.69$. Further, the scale was rated on a true/false scale, and the forced-choice nature of items on this measure may have resulted in a lack of variability that could be important for detecting the hypothesized effects.

Unexpectedly, SM demonstrated a relationship with less, not more, variability in openness. Openness to experience describes individuals who intentionally enter into unique circumstances (Ziegler et al., 2012), so it is possible that trait openness itself plays a role in within-person variability. To examine this possibility, exploratory analyses were conducted among frequency-based variables, revealing that frequency-based trait openness had a moderate negative⁷ relationship with variability in state openness ($r=-.47$, $p<.001$, $N=366$). Frequency-based trait openness was also positively related to SM ($r=.21$, $p<.001$, $N=365$); individuals high in trait openness also tended to be high self-monitors. It is possible that openness moderates the relationship between SM and frequency-based variability in openness, such that SM is only related to variability among those with lower trait openness. However, this was not the case in the present study; there

⁷ Higher frequency-based values indicate lower variability.

was no interaction between SM and trait openness in predicting variability in openness. Future research should examine other possible interaction effects among the Big Five and SM in producing intraindividual variability.

SCC was expected to correlate negatively with variability in both frequency-based and ESM measures. This hypothesis was supported for both agreeableness, conscientiousness, and to some extent, neuroticism, such that having a less clear sense of self related to more variable expressions of these traits. Given the social nature of agreeableness, this is intuitive: without a strong internal sense of self, the expression of agreeableness relies heavily on the interpersonal context. As noted above, conscientiousness and neuroticism are internalizing in nature, so it is also unsurprising that their respective variabilities would be related to low SCC.

However, variability in openness and extraversion were unrelated to SCC in both frequency-based and ESM measures. Exploratory correlations found that trait (i.e., mean level) openness was unrelated to SCC in either frequency-based trait measurement ($r=.09, p=.10$) or using ESM methods of collection ($r=.16, p=.21$); these findings are consistent with past research on SCC and the Big Five (e.g., Campbell et al., 1996). It may be the case that because SCC is unrelated to average levels of openness, it is likewise unrelated to its variability.

Contrary to hypotheses, variability in extraversion was not related to either SM or SCC, calling into question the validity of the present study's measure of frequency-based measurement of extraversion. However, consistent with Campbell et al. (1996), SCC ratings were positively correlated with both frequency based trait extraversion ($r=.24,$

$p < .001$) and average extraversion ratings in the ESM study ($r = .24$, $p = .07$). In combination with the high internal consistencies and normal distributions for both extraversion (skewness = $-.28$) and SCC (skewness = $-.16$), the null results do not seem to be caused by poor measures. Rather, it may be that variability in extraversion is driven by different constructs or is entirely a function of the situation.

A key hypothesis of the study, that within-person variability in the trait and state measures would be significantly correlated, was unsupported. There are several possible reasons for this. First, the time-frames for each measurement were unequal; the frequency-based measure asked participants to consider past trait levels over the previous six months, whereas the ESM study required that participants rate current state levels of each trait over a 5-day period. It is possible that variability over six months and variability over five days may not be directly comparable. Future research should modify these time frames to be more similar to each other, possibly by extending the ESM study, limiting the frequency-based time frame, or both.

It is also possible that ESM ratings of state personality were influenced by participants' test-taking styles, more so than by the true content of items. Completing the same measure four times per day for five days, even with randomized items, may lead participants to begin selecting similar responses each time, thus reducing the across-situation variability. Indeed, ESM ratings had smaller response ranges than did frequency-based responses. There may also have been an element of social desirability in the ESM study. Mean ESM ratings showed high levels ($M_s = 4.27-5.57$ on a 7-point scale) of extraversion, agreeableness, conscientiousness, and openness, and low levels ($M = 2.78$)

of neuroticism. Being around people while completing the measures on their personal smart phones may have made participants more likely to answer in a socially desirable manner than if they had completed the measures while alone.

Limitations

The present study has some limitations. Methodologically, the ESM study in particular posed some unique challenges. The number and frequency of daily responses as well as the amount of participant compensation can have a large effect on the potential for attrition. Steps were taken to ensure the optimal number of responses and compensation, but attrition in ESM studies is extremely common. As expected, the percentage of responders at each time point differed, ranging from 69% to 92% (See Appendix J), and the average response rates on the first three days (Wednesday 83%, Thursday 84%, and Friday 83%) were higher than on the last two days (Saturday 73% and Sunday 80%). This could also have been a function of day of the week.

Further, the randomized signal-contingent design for the ESM study posed the possibility of a reduced response rate because participants were unaware of the specific time for each notification. However, the benefit of this design was an increased likelihood that a representative sample of situations was measured. Additionally, conducting this study on both weekdays and weekend days improved the validity of this study, as the researcher was able to gather information from typically structured school/work days in addition to less structured weekend days, although fewer responses were yielded on the weekend days.

The sample size in this study could also have been problematic. Although Phase 1 had enough participants to achieve an adequate power level, the ESM study may not have had a large enough sample. Although approximate power analyses demonstrated that within-person analyses require fewer participants, an exact analysis could not be conducted. Further, small sample sizes (i.e., $N < 250$) often result in unstable, unreliable correlations (Schönbrodt & Perugini, 2013). This could feasibly explain why effects were found for mean levels of traits ($N = 366$; Hypothesis 1) but not for within-person variabilities ($N = 62$; Hypothesis 2), as well as why the results were mixed for self-monitoring and self-concept clarity (between-person variables) in relation to within-person variabilities.

Sample characteristics may have similarly limited the results. For example, women tend to volunteer more for ESM studies and tend to respond to more signals than do men (Hektner, Schmidt, & Csikszentmihalyi, 2007). However, this was not the case in the present study. There were no sex differences in likelihood of participating, $t(361) = -.05$, $p = .96$, or in percentage of ESM responses, $t(60) = .28$, $p = .78$. Participants in ESM studies also tend to be more conscientious, intelligent, and well adjusted (Hektner et al., 2007). Fortunately, there were no differences between ESM participants and non-participants in personality traits, SM, SCC, or PO, nor were there any relationships between percentage of completed ESM surveys and any of the personality variables ($r_s = -.11$ -. 17 , $p_s = .42$ -. 90). However, the participants who chose to respond in both phases self-selected to do so, potentially introducing some systematic bias in ways not necessarily detected by the measures used in the present study. For example, there was no

measure of intelligence or achievement, leaving open the possibility that those who participated in the ESM study differed from those who did not in levels of intelligence.

The impact of self-perceptions may also limit the results of this study. If an individual perceives his or her personality as consistent or inconsistent, his/her responses may not accurately reflect behavior (Mischel & Shoda, 1995). Examining self-concept clarity and self-monitoring should aid in mitigating this limitation, but future research should include other self variables, as well as even an item asking participants the degree to which they believe their behavior is consistent across situations. Additionally, SCC may differ depending on the aspect of the self in question. It is argued that SCC is higher for aspects of the self that are internal and within an individual's control (e.g., kindness, honesty) and lower for aspects that are external and uncontrollable (e.g., physical appearance, social skills; Stinson, Wood, & Doxey, 2008).

Lastly, older adults tend to have higher levels of SCC than younger adults (Diehl & Hay, 2011). As a result, it is likely that the present study's relatively young sample had less defined self-concepts overall, which could have biased the results. Future research on within-person variability should be done using a sample with a wider and more representative age range.

Future Directions

The results of this study may open up several new lines of research as to the source, extent, and mechanisms of intraindividual variability. Specifically, future research should develop methods for evaluating traitedness: the idea that some individuals may more closely adhere to their mean trait levels and are therefore more

likely to express behavioral consistency (Baumeister & Tice, 1988; Bem & Allen, 1974). In developing the theory, Baumeister and Tice (1988) only briefly considered whether traitedness is trait-specific, such that an individual can be untraited on one trait but traited on others, or global, such that an individual is either completely traited or untraited. Whereas they hypothesized the former, the present study provides support for the latter: higher variability on one trait was significantly positively correlated with higher variability on all of the others, for both frequency-based and ESM measures of variability (see Tables 14 and 15). The same pattern has been found in the past, using a similar measure of ESM variability (Heller et al., 2007). Future research should further explore both possibilities; if it is indeed global, a measure of traitedness should be developed as a one-time measure of intraindividual variability that personality research is currently lacking.

An additional direction for future research is in defining the psychologically important aspects of the situation. Utilizing the DIAMONDS taxonomy (i.e., Duty, Intellect, Adversity, Mating, pOsitivity, Negativity, Deception, and Sociality; Rauthmann et al., in press) or the dimensional approach developed by Fleeson (2007) would aid in an understanding of the factors within and between situations that play a role in across-situation variability. It is possible that the insignificant relationship between trait (i.e., frequency-based) and state (i.e., ESM) variability found in the present study is because the situation was not taken into account. Past research finds that within-situation variability is far lower than between-situation variability (Furr & Funder, 2004), and

because the present study defined variability as being across all situations, the between-situation variability could have been overshadowed by the within-situation stability.

Finally, future research should continue to explore the use of frequency-based measurement. Although the present study found no relationship between frequency-based measurement and ESM measures of variability, there is other evidence within this study and related ones to suggest that frequency-based measurement can indeed serve a useful purpose in the realm of evaluating personality variability. First, the mean trait levels across both measures in the present study were highly correlated, indicating some construct validity for this form of measurement. Second, despite some inconsistent findings, the correlations between frequency-based variability and measured variables of self-monitoring and self-concept clarity were low. This suggests that the frequency-based format is measuring variability different from what is expected from a high self-monitor or an individual with an unclear self-concept.

Third, other research finds that frequency-based variability significantly predicts symptoms of personality disorders, which are inherently characterized by variability (i.e., Borderline Personality Disorder and Antisocial Personality Disorder; Tweten, Sacchetti, & Nesbit, 2014). Finally, as noted above, frequency-based variability and ESM variability have the same pattern of across-trait correlations. In fact, the average across-trait correlation for frequency-based variability ($r=.66$; see Table 14) is identical to the average across-trait correlation for ESM variability ($r=.66$; see Table 15). Ultimately, frequency-based measurement was able to replicate the pattern of variability found in an ESM study, which has high ecological validity. Taken together, these findings provide

convergent evidence to support that frequency-based measurement is evaluating a construct at least related to within-person variability in personality.

Conclusion

The present study evaluated a novel and recent form of measuring intraindividual variability in personality, a construct that remains somewhat illusive in the field and is difficult to measure, particularly in a way that is not immensely time, effort, and cost-intensive. Although the results did not validate frequency-based measurement of personality to the extent hypothesized, some divergent and construct validity was established, thus meriting future research examining this method.

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APPENDIX A

PHASE 1: EMAIL INVITE TO PARTICIPATE

Dear fellow UNI student,

Want to learn about your personality AND have a chance to win a \$25 Visa gift card? You are invited to participate in a study for my UNI Master's Thesis about personality in daily life. At the end of the survey, you'll get feedback about your personality and be entered in a drawing to win 1 of 3 gift cards. You'll also have the opportunity to participate in a second study for even more money! This survey should take about 25-30 minutes and will really help in understanding how personality works in day-to-day living.

The link to the survey is here: xxxxx

Thank you!

Carol Tweten

UNI Psychology Graduate Student

APPENDIX B

PHASE 1: PERSONALITY FEEDBACK

Your Extraversion Score is: _____

Scores 0-500: You tend to be an introvert:

Introverts like to have some alone time (McCrae & Costa, 1987). They are not very talkative or outgoing (McCrae & John, 1990) and tend to dislike change (von Collani & Grumm, 2009).

Scores 501-1000: You tend to be an extravert:

Extraverts usually like being around people (McCrae & Costa, 1987), have higher self-esteem (Visser & Pozzebon, 2013), and are more likely to use social media sites like Facebook (Jenkins-Guarnieri, Wright, & Hudiburgh, 2012).

Your Agreeableness Score is: _____

Scores 0-500: You tend to be disagreeable:

People who are not agreeable are more likely to be politically conservative (von Collani & Grumm, 2009). They can often be skeptical, critical (McCrae & John, 1990), and negative (Augustine & Larsen, 2012).

Scores 501-1000: You tend to be agreeable:

Agreeable people are usually kind and understanding (McCrae & John, 1990). They also volunteer more (Carlo, Okun, Knight, & de Guzman, 2005) and like to resolve conflicts through compromise (Jensen-Campbell & Graziano, 2001).

Your Conscientiousness Score is: _____

Scores 0-500: You tend to be messy:

People who are not conscientious are often described as being irresponsible and unorganized (McCrae & John, 1990). They don't care as much about what others think of them (Visser & Pozzebon, 2013), and they tend to get sick more often (Augustine & Larsen, 2012).

Scores 501-1000: You tend to be organized:

Conscientious people tend to work more hours per work (Chang, Rosen, Siemieniec, & Johnson, 2012) and are less likely to use illegal drugs (Turiano, Whiteman, Hampson, Roberts, & Mroczek, 2012). They also tend to be more agreeable but less open to change (von Collani & Grumm, 2009).

Your Neuroticism Score is: _____

Scores 0-500: You tend to be emotionally stable:

Emotionally stable people tend to be calm and relaxed (McCrae & John, 1990), have higher self-esteem (Visser & Pozzebon, 2013), and get sick less often (Augustine & Larsen, 2012).

Scores 501-1000: You tend to be moody:

Neurotic people are more likely to be emotionally expressive with others (Lavee & Ben-Ari, 2004), more likely to experience emotional concerns like anxiety (McCrae & Costa, 1987) and depression (Barnhofer, Duggan, & Griffith, 2011), and experience a greater number of stressful life events (Espejo et al., 2011).

Your Openness Score is: _____

Scores 0-500: You tend to avoid new experiences:

People who are not very open tend to dislike change and are often politically conservative (von Collani & Grumm, 2009). They also usually prefer to resolve conflict by simply accepting the situation or waiting for it to resolve on its own rather than addressing it directly (Jensen-Campbell & Graziano, 2001).

Scores 501-1000: You tend to be open to new experiences:

People who are very open are sometimes described as being imaginative, original, and daring (McCrae & Costa, 1987). They like to learn new things (Ziegler, Danay, Heene, Asendorpf, & Buhner, 2012), and tend to be less politically conservative and less prejudicial (von Collani & Grumm, 2009).

APPENDIX C

PHASE 1: DEMOGRAPHICS

1. What is your age? _____
2. What is your year (in credits)?
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
 - e. Graduate Student
 - f. Other _____
3. What is your gender?
 - a. Male
 - b. Female
 - c. Other
4. How would you describe your ethnicity?
 - a. White/Caucasian/European-American
 - b. Black/African-American
 - c. Asian/Asian-American
 - d. Pacific Islander/Native American
 - e. Other: _____
5. What is your major at UNI _____
6. What is your minor at UNI, if any _____
7. How would you rate your political orientation? 1 Very Liberal to 4 Moderate to 7 Very Conservative
8. Are you a citizen of the United States? Yes or No
 - a. If no, how long have you been in the United States?

APPENDIX D

PHASE 1: FREQUENCY-BASED MEASUREMENT

Please read these instructions very carefully:

For the next section, please think about **the last six (6) months**. You will be shown a series of statements and asked to describe the **percentage of the time** each statement was very accurate of you, very inaccurate of you, and neither accurate nor inaccurate of you. The three (3) percentages for each statement should **total 100%**.

For example:

Amy is taking the survey and considers the statement, “I am the life of the party.” She believes that this was very accurate of her 50% of the time in the last 6 months, very inaccurate of her 15% of the time, and neither accurate nor inaccurate of her the other 35% of the time, so her response looks like the table below. In her answer, the 3 percentages total 100%.

	% of time very in accurate	% of time neither accurate nor inaccurate	% of time very accurate	Totaled percent of time (adding up the row of cells)
I am the life of the party	15	35	50	100

Example 2:

Amy considers another statement, “I tend to be lazy.” In the last 6 months, this was very accurate of Amy 0% of the time, very inaccurate of her 60% of the time, and neither accurate nor inaccurate of her the other 40% of the time, so her answer looks like row below. Her answer again totals 100%.

	% of time very in accurate	% of time neither accurate nor inaccurate	% of time very accurate	Totaled percent of time (adding up the row of cells)
I tend to be lazy	60	40	0	100

Frequency-Based Personality Survey

Please fill in **3 percentages for each** of the statements below as honestly as possible based on your behavior in **the last 6 months**. Your answers will be kept completely anonymous.

	% of time very in accurate	% of time neither accurate nor inaccurate	% of time very accurate	Totaled percent of time (adding up the row of cells)
1. I am the life of the party.				
2. I feel little concern for others				
3. I am always prepared				
4. I get stressed out easily				
5. I have a rich vocabulary				
6. I don't talk a lot				
7. I am interested in people				
8. I leave my belongings around				
9. I am relaxed most of the time				
10. I have difficulty understanding abstract ideas				
	% of time very in accurate	% of time neither accurate nor inaccurate	% of time very accurate	Totaled percent of time (adding up the row of cells)
11. I feel comfortable around people				
12. I insult people				
13. I pay attention to details				
14. I worry about things				

15. I have a vivid imagination				
16. I keep in the background				
17. I sympathize with others' feelings				
18. I make a mess of things				
19. I seldom feel blue				
	% of time very in accurate	% of time neither accurate nor inaccurate	% of time very accurate	Totaled percent of time (adding up the row of cells)
20. I am not interested in abstract ideas				
21. I start conversations				
22. I am not interested in other people's problems				
23. I get chores done right away				
24. I am easily disturbed				
25. I have excellent ideas				
26. I have little to say				
27. I have a soft heart				
28. I often forget to put things back in their proper place				
29. I get upset easily				
	% of time very in accurate	% of time neither accurate nor inaccurate	% of time very accurate	Totaled percent of time (adding up the row of cells)
30. I do not have a good imagination				

31. I talk to a lot of different people at parties				
32. I am not really interested in others				
33. I like order				
34. I change my mood a lot				
35. I am quick to understand things				
36. I don't like to draw attention to myself				
37. I take time out for others				
38. I shirk my duties				
39. I have frequent mood swings				
	% of time very inaccurate	% of time neither accurate nor inaccurate	% of time very accurate	Totaled percent of time (adding up the row of cells)
40. I use difficult words				
41. I don't mind being the center of attention				
42. I feel others' emotions				
43. I follow a schedule				
44. I get irritated easily				
45. I spend time reflecting on things				
46. I am quiet around strangers				
47. I make people feel at ease				
48. I am exacting in my work				
49. I often feel blue				
50. I am full of ideas				

APPENDIX E

PHASE 1: SELF-MONITORING SCALE

For the following statements, please select 'True' if the statement applies to you or 'False' if the statement does not apply to you.

1. I find it hard to imitate the behavior of other people. (R)
2. At parties and social gatherings, I do not attempt to do or say things that others will like. (R)
3. I can only argue for ideas in which I already believe. (R)
4. I can make impromptu speeches even on topics about which I have almost no information.
5. I guess I put on a show to impress or entertain others.
6. I would probably make a good actor.
7. In a group of people I am rarely the center of attention.
8. In different situations and with different people, I often act like very different persons.
9. I am not particularly good at making other people like me. (R)
10. I'm not always the person I appear to be.
11. I would not change my opinions (or the way I do things) in order to please someone or win their favor. (R)
12. I have considered being an entertainer.
13. I have never been good at games like charades or improvisational acting.
14. I have trouble changing my behavior to suit different people and different situations. (R)
15. At a party I let others keep the jokes and stories going.
16. I feel a bit awkward in public and do not show up quite as well as I should. (R)
17. I can look anyone in the eye and tell a lie with a straight face (if for a right end).
18. I may deceive people by being friendly when I really dislike them.

Note: R indicates reverse-scored items.

APPENDIX F

PHASE 1: SELF-CONCEPT CLARITY SCALE

For the following statements, please indicate the extent to which you agree or disagree that each statement applies to you on a scale of 1 (strongly disagree) to 7 (strongly agree).

1. My beliefs about myself often conflict with one another.
2. On one day I might have one opinion of myself and on another day I might have a different opinion.
3. I spend a lot of time wondering about what kind of person I really am.
4. Sometimes I feel that I am not really the person that I appear to be.
5. When I think about the kind of person I have been in the past, I'm not sure what I was really like.
6. I seldom experience conflict between the different aspects of my personality. (R)
7. Sometimes I think I know other people better than I know myself.
8. My beliefs about myself seem to change very frequently.
9. If I were asked to describe my personality, my description might end up being different from one day to another day.
10. Even if I wanted to, I don't think I would tell someone what I'm really like.
11. In general, I have a clear sense of who I am and what I am. (R)
12. It is often hard for me to make up my mind about things because I don't really know what I want.

Note: R indicates reverse-scored items.

APPENDIX G

PHASE 1: INTEREST IN PHASE 2

1. Do you own, and regularly use an Apple or Android smart phone?
2. If yes, would you be interested in participating in a second study for further compensation?
3. If yes, please provide your email address so the researcher can contact you:

4. We need a way to match your answers from both studies. Instead of using identifying information, we ask that you provide 2 numbers unique to you:
 - a. What are the last 4 digits of your cell phone number: _____
 - b. What are the first 4 digits of your birthday (MMDD): _____

Thank you! We'll be contacting you with more information soon.

Please click to the next page.

-Page-

In order to be entered for the gift card raffle, please provide your email address so we can contact you if you win!

Email address: _____

Please click to the next page for some final questions and to submit your responses.

-Page-

APPENDIX H

PHASE 1: DEBRIEFING QUESTIONS

Some final questions:

What were your impressions of this study?

Did you have any problems with completing this study, or notice any errors?

Do you have anything else that you would like to add?

Thank you for taking the time to participate in this research study. If you have questions about the study or desire information in the future regarding your participation, you can contact the faculty advisor for this project, Sundé Nesbit, at the Department of Psychology at the University of Northern Iowa at 319-273-6776 or sunde.nesbit@uni.edu. You can also contact the office of the IRB Administrator, University of Northern Iowa, at 319-273-6148, for answers to questions about rights of research participants and the participant review process. If any part of this survey has left you feeling uncomfortable or upset, please utilize UNI's Counseling Center (<http://uni.edu/counseling/>), at 319-273-2676.

The data gathered from this study will be used to better understand how personality works in everyday life. The summarized findings with no identifying information may be presented at a psychology conference, and possibly published in a psychology journal.

We appreciate your willingness to participate in this research project, as much of the research in psychology is dependent on participation by individuals such as yourself. Thank you.

APPENDIX I

PHASE 2: EMAIL INVITE TO PARTICIPATE

Dear fellow UNI student,

Thanks for being willing to participate in a second study for my Master's Thesis! For this study, you'll download a mobile application onto your Smartphone and then use your phone to complete 4 tiny surveys each day for 5 days (so 20 tiny surveys total). For participating, you'll receive **\$15** at the end of the 5 days AND if you fill out at least 90% of the tiny surveys (18 or more), you'll be entered in another drawing for a **\$25 gift card!**

Convenient way to make some money, right? If you'd like to participate, I've set up some dates/times for you to come in with your mobile phone and download the application. You'll also be able to try it out to make sure it works and ask whatever questions you might have. It shouldn't take more than 20 minutes. If any of the dates/times listed don't work for you, not a problem! Just let me know and we'll work something out.

Here's where you can sign up for a time: xxxxxxxxxxxxxxxx

Thank you!
Carol Tweten
UNI Psychology Graduate Student

APPENDIX J

PHASE 2: NOTIFICATIONS AND RESPONSE RATES

Wednesday				
<i>Wave 1</i>	<i>%</i>	<i>Wave 2</i>	<i>%</i>	<i>Total</i>
10:28AM	78	12:23PM	79	80%
1:57PM	100	2:00PM	85	91%
4:25PM	91	4:46PM	92	92%
7:28PM	87	7:48PM	67	76%
		8:01PM	69	69%
<i>Totals:</i>	89%		78%	83%
Thursday				
<i>Wave 1</i>	<i>%</i>	<i>Wave 2</i>	<i>%</i>	<i>Total</i>
11:13AM	91	10:18AM	85	87%
4:01PM	91	1:40PM	87	88%
5:43PM	78	5:50PM	79	79%
9:09PM	87	8:21PM	77	81%
<i>Totals:</i>	87%		82%	84%
Friday				
<i>Wave 1</i>	<i>%</i>	<i>Wave 2</i>	<i>%</i>	<i>Total</i>
1:13PM	91	10:11AM	82	86%
3:26PM	83	1:11PM	90	86%
5:04PM	96	6:09PM	90	92%
		8:33PM	69	69%
<i>Totals:</i>	90%		82%	83%

(Table Continues)

Saturday				
<i>Wave 1</i>	<i>%</i>	<i>Wave 2</i>	<i>%</i>	<i>Total</i>
10:57AM	78	11:20AM	82	80%
2:42PM	65	1:42PM	74	70%
6:09PM	70	4:04PM	69	69%
9:38PM	65	7:13PM	79	73%
		9:09PM	69	69%
<i>Totals:</i>	70%		73%	72%
Sunday				
<i>Wave 1</i>	<i>%</i>	<i>Wave 2</i>	<i>%</i>	<i>Total</i>
11:43AM	87	10:16AM	69	75%
2:08PM	78	1:37PM	87	83%
6:40PM	65	5:23PM	82	77%
8:52PM	83	7:30PM	85	84%
<i>Totals:</i>	78%		80%	80%
Overall: 80%				

APPENDIX K

BUDGET

Item	Quantity	Cost	Source
Phase 1			
\$25 Visa gift cards	3	\$ 75.00	IAF
\$4.95 Activation Fee	3	\$ 14.85	IAF
Phase 2			
\$99 iOS developer account yearly fee	1	\$ 99.00	CSBS
\$58.90 ShoutEm monthly fee	2	\$117.80	CSBS
\$15.00 Participant Compensation	34	\$510.00	IAF
	23*	\$345.00	PI
\$2.00 Bonus Participant Comp	34	\$ 68.00	IAF
	23*	\$ 46.00	PI
\$25 Visa gift cards	4	\$100.00	PI
\$3.95 Activation Fee	4	\$ 15.80	PI
	Total Cost:	\$1391.45	
	IAF Total:	\$650.00	
	CSBS Total:	\$216.80	
	PI Total:	\$524.65	

*7 participants neglected to pick up their compensation.

Notes: IAF=Intercollegiate Academic Fund; CSBS=College of Social and Behavioral Sciences Graduate Research Award; PI=Primary Investigator's personal funds (some of this was supplemented by GoFundMe, an online crowd-sourcing website allowing me to collect donations from family and friends).

APPENDIX L

COMPENSATION RECEIPTS*

<u>Study IDs</u>	Amount Paid
Phone: XXXX	\$17.00
Birthday: XXXX	

UNI Student ID Number: _____

By signing below, I am acknowledging that I have received the payment amount in bold above.

Signature	Date
-----------	------

<u>Study IDs</u>	Amount Paid
Phone: XXXX	\$17.00
Birthday: XXXX	+ \$25.00 Gift Card
	\$42.00

UNI Student ID Number: _____

By signing below, I am acknowledging that I have received the payment amount in bold above.

Signature	Date
-----------	------

<u>Study IDs</u>	Amount Paid
Phone: XXXX	\$17.00
Birthday: XXXX	

UNI Student ID Number: _____

By signing below, I am acknowledging that I have received the payment amount in bold above.

Signature	Date
-----------	------

*To ensure confidentiality, each of these receipts were on a separate slip of paper and placed in individual envelopes with each participant's compensation.

APPENDIX M

PHASE 2: SURVEY

For identification purposes:

1. Please enter the last 4 digits of your cell phone #: _____
2. Please enter the first 4 digits of your birthday (MMDD): _____
3. How would you rate your mood at the present moment? (1 very negative to 7 very positive)

Next you will see some personality traits that may or may not apply to you. Thinking about **ONLY** the **last 30 minutes (half hour)**, please indicate the extent to which you agree or disagree that each statement applies to you on a scale of 1 (strongly disagree) to 7 (strongly agree), even if one characteristic applies more strongly than the other.

1. I see myself as: Extraverted, enthusiastic.
2. I see myself as: Critical, quarrelsome.
3. I see myself as: Dependable, self-disciplined.
4. I see myself as: Anxious, easily upset.
5. I see myself as: Open to new experiences, complex.
6. I see myself as: Reserved, quiet.
7. I see myself as: Sympathetic, warm.
8. I see myself as: Disorganized, careless.
9. I see myself as: Calm, emotionally stable.
10. I see myself as: Conventional, uncreative.

Next are some questions about your current situation. When answering these questions, please **ONLY** be thinking about the **last 30 minutes (half hour)**.

4. How typical was the last half hour? 1 very unusual to 7 occurs almost daily
5. During the last half hour, how many other people were present? (Number of others present was re-coded as 0, 1, 3 to 10, or 11 or more; If 0, skips to #10)
6. During the last half hour, how much did you interact with others? 1 not at all to 7 a lot
7. How well do you know the people around you? 1 not very well to 7 very well
8. How friendly were the people around you? 1 very unfriendly to 4 neither to 7 very friendly
9. How much status do those around you have? 1 less status than you to 4 equal to 7 more than you
10. How interesting was what you were doing? 1 not very interesting to 7 very interesting
11. During the last half hour, was what you were doing chosen by you or more imposed on you? 1 chosen to 7 imposed
12. Was the last half hour free time or fulfilling an obligation? 1 pure free time to 7 purely obligation

13. How structured was the situation around you during the last half hour? 1 no structure at all to 7 highly structured
14. During the past half hour, were you doing something for its own sake or as a means to get something else? 1 own sake to 7 for something else
15. How good are you at what you were doing during the last hour? 1 terrible to 7 excellent
16. Will you be (or were you being) evaluated on what you were doing during the last half hour? 1 not at all to 7 very much
17. Are there any other details you'd like to share about your current situation? (open-ended)

APPENDIX N

PHASE 2: DEBRIEFING

Survey Invite:

Dear fellow UNI student,

Thanks for participating in this second study for my Master's Thesis!
 For participating, you have earned **\$15** AND a **\$2** bonus AND if you filled out at least 90% of the tiny surveys (18 or more), you were entered in another drawing for a **\$25 gift card!** You'll be notified if you won this drawing when you pick up your compensation (instructions for pick-up below).

As a follow-up to the study, I have just 4 more questions for you. Please click the link below for these quick questions. Your answers will help me immensely in my future research!

To pick up your compensation, please come to **Baker ROOM NUMBER** between the hours of **X and X** on **DATES**. If none of these times will work for you, not a problem! Email me and we'll figure something else out. You'll need your **UNI student ID number** when you come (that's important!), and you'll be asked to sign a receipt indicating that you did indeed receive the compensation.

Don't forget, here's where you can answer the 4 quick questions: xxxxxxxxxxxxxxxx

Thank you!
 Carol Tweten
 UNI Psychology Graduate Student

Survey:

Some final questions:

What were your impressions of this study?

Did you have any problems with completing this study, or notice any errors?

How accurate do you believe you were in responding to each of the surveys?

Do you have anything else that you would like to add?

Debriefing Statement:

Thank you for taking the time to participate in this research study. If you have questions about the study or desire information in the future regarding your participation, you can contact the faculty advisor for this project, Sundé Nesbit, at the Department of Psychology at the University of Northern Iowa at 319-273-6776 or sunde.nesbit@uni.edu. You can also contact the office of the IRB Administrator, University of Northern Iowa, at 319-273-6148, for answers to questions about rights of research participants and the participant review process. If any part of this survey has left you feeling uncomfortable or upset, please utilize UNI's Counseling Center (<http://uni.edu/counseling/>), at 319-273-2676.

The data gathered from this study will be used to better understand how personality works in everyday life. The summarized findings with no identifying information may be presented at a psychology conference, and possibly published in a psychology journal.

We appreciate your willingness to participate in this research project, as much of the research in psychology is dependent on participation by individuals such as yourself. Thank you.