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Experience Sampling Methods: A Modern Idiographic Approach to Personality Research

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Abstract

Experience sampling methods are essential tools for building a modern idiographic approach to understanding personality. These methods yield multiple snapshots of people's experiences over time in daily life and allow researchers to identify patterns of behavior within a given individual, rather than strictly identify patterns of behavior across individuals, as with standard nomothetic approaches. In this article, we discuss the origin and evolution of idiographic methods in the field of personality and explain how experience sampling methods function as modern day idiographic methods in this field. We then review four primary ways in which experience sampling methods have been used to foster idiographic approaches in personality research. Specifically, we highlight approaches that examine individual differences in temporal and behavioral distributions, situation–behavior contingencies, daily processes, and the structure of daily experience. Following a brief methodology primer, we end by discussing future directions for idiographic experience sampling approaches in personality psychology and beyond.

'Novel and somewhat daring methods will be required ...' (Allport, 1937; 20).

In 1937, Gordon Allport challenged the field of personality to develop 'novel and somewhat daring' research methods that would embrace the rich and complex nature of human personality – those regularities in the way an individual thinks, feels, and behaves. In particular, Allport called for the use of idiographic methods, which aim to identify patterns of behavior, thought, and emotion within an individual over time and contexts, rather than to strictly identify patterns of differences between individuals, as is the case with standard nomothetic approaches. Allport's call to methodological arms is exemplified by theorists including Murray, Mischel, and many others, who have promoted more personalized and contextualized approaches to understanding the science of personality.

In 21st century science, methods known as experience sampling are essentially modern day tools for realizing a within-person, idiographic approach. Experience sampling methods are also referred to as diary dairy methods (Bolger, Davis, & Rafaeli, 2003), ecological momentary assessment (Stone & Shiffman, 1994), daily process methods (Tennen, Affleck, Armeli, & Carney, 2000), and ambulatory assessment techniques (Fahrenberg, Myrtek, Pawlik, & Perrez, 2007). Although the names may be different, at their core, these methods share three qualities: they assess data in *natural settings*, in *real-time* (or close to real time occurrence), and on *repeated time* occasions.

Experience sampling methods are now part of the accepted methodological toolbox in personality research. Although they may no longer be novel, experience sampling methods are still somewhat daring and underutilized. We believe that experience sampling methods are underutilized for at least three reasons: (i) they often require an initial monetary investment; (ii) they appear complex and demanding; and (iii) their usefulness for the fundamental questions in personality psychology has not fully been appreciated. We believe that the initial investment can be minimized, that the intimidation factor is less than it appears, and that their usefulness will become increasingly apparent. In particular, we assert that idiographic questions are among those at the core of personality psychology, and that experience sampling methods are perfectly suited for addressing those questions.

In this article, we review experience sampling methodology as a modern idiographic tool in the science of personality. We begin with the idiographic approach – its definition, evolution, and role within the core of personality theorizing. Second, we describe experience sampling methods and explain why these methods function as modern idiographic approaches in the field of personality. Third, we discuss several lines of experience sampling research that exemplify this idiographic approach. We then give a brief methodology primer and end by discussing future directions for using experience sampling to foster idiographic approaches in the science of personality and other subfields in psychology.

Idiographic versus Nomothetic Methods

The terms 'idiographic' and 'nomothetic' have been attributed with various meanings within the psychological literature. We will refer to idiographic methods as those that aim to identify patterns of behavior *within the person across a population of experiences or situations*, and nomothetic methods as those that aim to identify patterns of behavior *across a population of individuals*, rather than for any given individual. An example is shown in Figure 1.

Idiographic methods require multiple data points per person, which are then analyzed to determine the relationship between variables for each

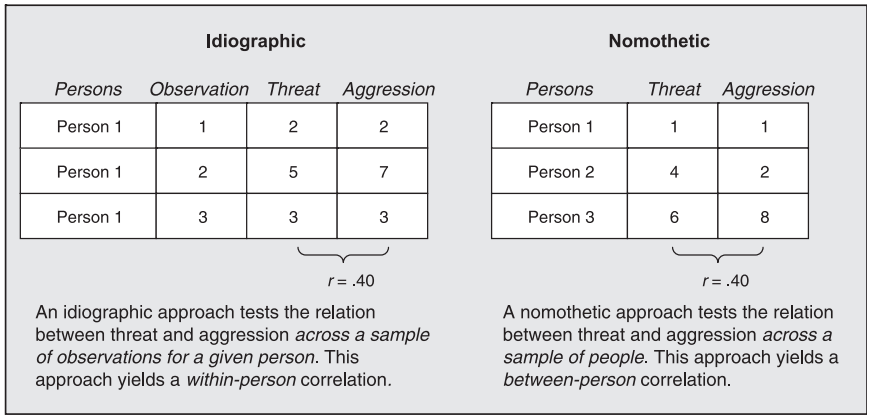

Figure 1 Contrasting idiographic and nomothethic methods in personality research.

individual. In the example in Figure 1, an idiographic approach would determine how changes in one variable, such as a specific belief (I feel threatened) correlate with changes in another variable, such as a specific action (aggress toward others) in the same person over time. Responses are analyzed for variation around each individual's mean, rather than a group mean. Thus, idiographic approaches yield 'within-person' patterns, each unique to one individual. This individual level pattern is about *intra-individual process*: Whether certain cognitions, emotions, or behaviors (e.g., threat and aggression) are yoked together in time for a particular individual. Some individuals may show stronger associations; others may show weaker associations. Idiographic methods test rather than assume that each individual will have similar relations between variables.

Nomothetic methods, in contrast, use data from all group members to determine the relationship between variables across individuals. For example, as shown in Figure 1, nomothetic methods would test whether people who believe something more strongly than others (I typically feel threatened) also tend toward a given action more than do others (I typically aggress toward others). Responses are analyzed for variation around the group mean. These differences are then averaged to get a common index (e.g., correlation coefficient, *r*) that is intended to apply to everyone. This approach yields a 'between-person' pattern (e.g., the overall relation between threat and aggression for a group of individuals). This group level pattern is about *relative ranking*: Whether those people who report higher than average threat also report higher than average aggression. It characterizes the average relation between threat and aggression but does not characterize the relation between threat and aggression for any one *individual* per se. It also does not capture whether threat and aggression are yoked in time.[1]

The Origin and Evolution of Idiographic Methods in Personality Psychology

Historically, the terms idiographic and nomothetic were introduced by the German philosopher Wilhelm Windelband (1894/1998) as an alternative way to classify academic disciplines. The goal of nomothetic disciplines, like physics, biology, and experimental psychology, was to develop general laws and principles, whereas the goal of idiographic disciplines, like history, was to understand a single event situated in time or place. Windelband made this distinction, in part, to classify the emerging field of experimental psychology, which fell awkwardly between the natural sciences and humanities. With this new classification, experimental psychology would be grouped as a nomothetic discipline that would generate general laws about people.

Academic psychology quickly aligned itself with a nomothetic perspective. Researchers set out to develop laws of behavior that applied to a population of individuals, rather than a specific individual. Methods that achieved nomothetic aims were considered the pathway to a true scientific discipline. This desire to be accepted as scientific meant that nomothetic approaches flourished in the early days of psychology, especially in investigations of the structure of personality. Between-person factor analysis distilled vast amounts of data into common dimensions that accounted for phenotypic variation across individuals. These approaches would eventually lead to the development of the Big Five personality traits of neuroticism, extraversion, openness to experience, conscientiousness, and agreeableness (reviewed in John & Srivastava, 1999). Implicit in this research was that once the 'structure of personality' was found (i.e., those set of five basic personality traits), all people could be understood as a unique combination of their position on each dimension. These approaches were so successful, in fact, that the word 'structure' came to refer almost synonymously to 'between-person structure of individual differences', whereas 'structure' more broadly refers to how components of a personality connect to each other.

Gordon Allport challenged this nomothetic approach from its very beginnings. He pointed out that nomothetic personality structures might describe a non-existent 'average individual', but might simultaneously *not* describe the structure of any actual person's personality. For example, idiographic analyses of a person's own personality structure may reveal a three- or six-dimensional structure of personality. From Allport's perspective, nomothetic approaches forced everyone into the same mold, thereby breaking down the integrity of each individual's structure and process. In Allport's words, 'An entire population (the larger the better) is put into the grinder and the mixing is so expert that what comes through is a link of factors in which every individual has lost his identity' (1937, 244).

Allport (1937) tried to argue that idiographic methods are actually within the core of personality psychology's scientific interests, alongside other core interests. One core goal of personality psychology is to understand the

structure and process of personality, that is, to understand how components of an individual's personality connect to each other (structure) and influence each other (process). For example, activation of a specific belief (I feel happy) may create an action tendency within a person (give to others). Furthermore, these components probably are connected to and influence each other in slightly different ways for each individual. Because idiographic methods study each person separately, they target such structures and processes directly by investigating how changes in one variable correlate with changes in another variable in the same person over time. By contrast, Allport argued that nomothetic approaches target structure and process indirectly. Differences between people are often used as proxies for change within one person, and co-occurrences of these differences are used as proxies for connections of variables within one person.

Allport called for a new science of 'personology' that would apply idiographic principles to the understanding of personality (Allport, 1937). The aim of this new science would be to understand the complex personality of a given individual, rather than the abstracted personality of a group of individuals. Although the methods of personology would be idiographic, the results of such investigations could help determine which findings were nomothetic. To stimulate his new science, Allport proposed a variety of individual-centered methods to study the complex order of variables within a given individual. Among these methods, Allport included within-individual analysis of longitudinal data.

Allport's campaign was not overwhelmingly successful. Two major objections to idiographic investigations persisted: first, due to limited variance and low power, idiographic methods did not have the scientific ability to test and verify hypotheses for the single subject being tested, and second, due to the normative idiographic sample size of 1, they did not generalize beyond the individual. For these reasons, idiographic pursuits were considered scientifically weak, low powered, and suitable only for biographers and clinicians (e.g., Winthrop, 1956). Although most researchers concluded that idiographic methods have their place and generate interesting ideas and examples, ultimately, they were considered a poor basis for science.

Nonetheless, idiographic approaches continued to develop, aided by several historical precedents in the 1950s. First, Du Mas (1955) proposed collecting data for multiple individuals, analyzing the data for within-person patterns, and then summarizing the data to allow for generalizations. This approach began to address objections about generalization. The second precedent occurred when behavior analysts began using structured diaries to collect behavioral records of individuals in naturalistic settings. These diaries were typically completed by trained observers who recorded the frequency, intensity, and duration of behavior (Hinde, 1959). A third historical precedent was the development of the 'critical incident technique' (Flanagan, 1954) or 'specimen record' (Barker & Wright, 1955), which consisted of collecting intensive, fine-grained data on one or two instances of the behavior of interest.

In sum, there are several major precedents, from within and beyond psychology, for idiographic methods. We believe that modern experience sampling methods build on these historical precedents by making idiographic methods more accessible and facilitating the direct study of structures and processes of personality.

Rationale: Experience Sampling Methods as Modern Day Idiography

In 1977, Csikszentmihalyi, Larson, and Prescott advocated the use of pagers as a tool for sampling people's experiences in daily life. This article marked the start of what we now call experience sampling methods. These methods built on the traditions described above[2] but broadened to include subjective experiences as valid data (for more history, see Nezlek, Wheeler, & Reis, 1983). Originally, the 'Experience Sampling Method' referred to a particular technique involving completion of a survey in response to a randomly signaling audible device like a pager. Today, the term experience sampling is used more broadly to refer to any naturalistic and repeated survey protocol. Reports may be completed in response to a variable signal, at pre-determined times (e.g., noon, 2 pm, 4 pm, nightly), or following a particular event (e.g., like a social interaction; *Rochester Interaction Record*; Reis & Wheeler, 1991). Experience sampling studies can last from several days to several months and employ a range of technologies (from paper-and-pencil questionnaires to computerized personal digital assistants, electronic diaries, and mobile phones; see *Primer* section; see Appendix).

Experience sampling methods function as powerful modern day idiographic methods that make idiographic investigations practical. They do so because of their *design* and *analysis* components. Their *design* yields multiple points of data for each individual studied, which allows for within-person analyses. For example, each person studied for just 2 weeks, surveyed about their experiences five times daily, and will generate 70 observations (5 surveys × 14 days). Moreover, these data are considered to be 'hierarchical' because the repeated observations are nested within individuals. This hierarchical data structure is shown in Figure 2.

The hierarchical data structure enables the *analysis* component that makes experience sampling truly idiographic. When the data are analyzed in an idiographic manner, each person's data are analyzed separately to generate an index that represents a lawful relationship between variables for that person. [Multilevel modelling (MLM), discussed below, actually analyzes all people's data simultaneously, but it is conceptually similar to analyzing each person's data separately.] Thus, the psychology of each person is considered separately, preserving much of the goal of idiographic analysis (i.e., to identify patterns of behavior within the person across a population of experiences or situations).

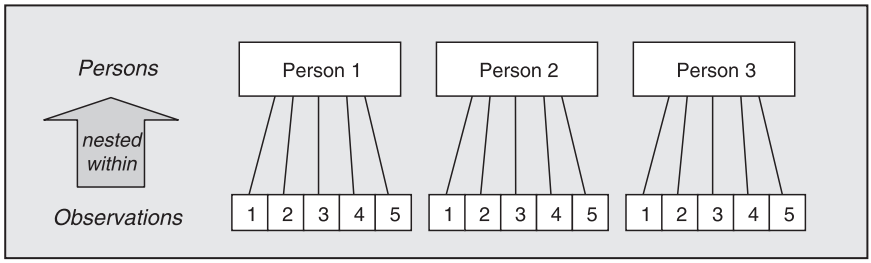

Figure 2 Experience sampling data are hierarchical because there are multiple observations 'nested within' individuals. Each observation consists of a completed survey with answers to multiple items.

A number of idiographic indices can be computed. These include a simple mean or average (reflecting a reliable aggregate of that person's typical experience over the sampling period; e.g., Epstein, 1979), the standard deviation (quantifying the degree of variability around a person's mean; e.g., Eid & Diener, 1999), a within-person correlation (reflecting the covariation between two variables for a given individual; e.g., Bolger & Schilling, 1991); a time-based slope (reflecting change in a variable over time), or any other index that captures some meaningful pattern for that individual.

Unlike analyses of single-case studies, analyses of experience sampling data go one step further to summarize these within-person patterns to make inferences to a larger population. For example, researchers may start by determining whether within-person associations are different across individuals. If so, researchers can model whether other factors, such as demographic characteristics or other aspects of the person, might account for some of the variability. However, generalizing to the norm does not deny that the starting point of the analysis is the individual.

Modern statistical procedures such as multilevel modeling (Raudenbush & Bryk, 2002) facilitate such analyses. Conceptually, MLM is similar to analyzing each person's data separately; in actuality, MLM analyzes all people's data simultaneously to test for within- and between-person patterns. For example, MLM can model a relationship within each person's set of data points (by a 'lower level' equation); test whether those within-person patterns are the same or different across people; and, if different, test whether other between-person variables (e.g., demographics, personality or cognitive variables) might account for that variance. Moreover, MLM produces outputs that are interpretable in much the same way as regression because the main output is a coefficient that describes the direction and magnitude of the relationship between a predictor and an outcome variable. However, the coefficient from MLM describes a relationship that occurs within a person (i.e., how changes in one part of a person's personality are

associated with changes in another part of that same person's personality over time). In addition, MLM allows different individuals to be described by different relationships between the variables. For example, MLM may indicate that the regression coefficient for the 'average' person is 0.30, and that the majority of people have coefficients between 0.00 and 0.60, distributed in a normal curve. Thus, it is built-in to MLM that relationships may differ from person to person (see Fleeson, 2007b, for step-by-step instructions for implementing MLM in SPSS; see also Kenny, Bolger, & Kashy, 2002; Nezlek, 2008).

Importantly, with these design and analysis components, experience sampling methods address the two central objections to idiographic investigations: that idiographic methods (i) lack power to make definitive conclusions about the individual being studied; or (ii) cannot generalize to other individuals. First, because experience sampling designs measure multiple variables on multiple occasions, yielding sufficient data for each individual, they allow researchers to test hypotheses and make definitive conclusions about a single person. In fact, MLM allows significance testing even if there is only one participant. The trick is that the significance test does not concern generalization to a population of other individuals. Instead, it concerns generalization beyond the particular occasions sampled to the one individual as a whole.

Experience sampling methods also address the second central objection to idiographic investigations – generalization across individuals. These approaches not only provide information about the relationship between two or more variables in each person taken individually, but they also reveal the range of these relationships that occur across people. MLM in particular excels at providing this joint information. In this way, such methods apply to more than one individual at a time, thus allowing generalization, while nonetheless beginning in the study of the individual. This type of hybrid idiographic–nomothetic design has also been called *idiothetic* (Lamiell, 1981) as well as *ipsative–normative* (Lazarus, 2000), where 'ipsative' refers to deviations around the individual mean and 'normative' refers to deviations around the group mean.

With both central objections to idiographic methods addressed, modern personality psychology can begin to address its more neglected core questions (i.e., those about the structures and processes that relate variables within a person's personality to each other). These questions reflect the spirit of Gordon Allport's call for the proper treatment of the individual in the science of psychology.

Experience Sampling Methods and Idiographic Personality Research

In this section, we review several ways in which experience sampling methods have fostered an idiographic approach in personality research.

Temporal and behavioral distributions

Experience sampling methods can reveal important time-based parameters of personality that can be derived only from sampling a person's responses over time. One of the simplest indices is an estimate of a person's typical or average response over a period of time, computed from the mean. Investigations using the mean often aim to understand the typical behavior or experience of individuals. For example, a researcher might want to know, on average, how happy or sad a person feels over a period of time.

Distributions of self-reported experiences also have variances, in addition to means, and variance reflects the fact that a person will not respond with the same intensity at each instance or across a range of situations. In other words, happiness ebbs and flows – and some people show greater range and variability in their moods (and cognitions, and behaviors, etc.) than others. MLM provides estimates of these variabilities, but in idiographic designs, variability is often estimated by computing the standard deviation of self-reported responses within an individual over time (e.g., Eid & Diener, 1999; Fleeson, 2001). The higher the standard deviation, the greater the overall variation and range in responding. Other temporal indices better capture the rate and period of variability (e.g., rapid vs. slow cycling) including spectral density estimates and circadian rhythmicity (Larsen, 1987; Jahng, Wood, & Trull, 2008).

As an example, Fleeson (2001) used a within-person variability approach to address long-standing questions in personality and to propose a new conception of traits. Fleeson started with the concept of a personality state (Cattell, Cattell, & Rhymer, 1947), which describes how much the individual is expressing a given trait in his or her behavior at the moment (e.g., how extraverted he or she is behaving in the moment over time). One goal was to answer the enduring question as to how consistent people are in their behaviour – does the typical person generally express the same traits on different occasions, or does the typical person express different traits on different occasions? To answer this question, Fleeson used experience sampling methods to determine the degree of within-person variability in personality states. The answer was that variability was surprisingly high (and consistency surprisingly low) – there was more variability within people than there was variability between people in the traits they were expressing at any moment. Based on this high degree of within-person variability in traits, Fleeson (2001) proposed a new conception of individual differences in traits, as entire distributions of behavioral states, rather than as single numbers or levels. The distribution, in turn, can be summarized by its parameters, such as its mean (typical state) or standard deviation (variability in states). Even its skew or kurtosis can be calculated as stable and unique parts of people's personalities.

Daily processes

The above examples all focus on within-person variability in single variables; however, idiographic methods can also reveal interesting patterns of within-person *co*variability in multiple variables. This approach is exemplified in *daily process research*, which uses experience sampling methods to examine the dynamic within-person relations between components of personality (cognitions, emotions, situations, and behaviors) in daily life (Tennen et al., 2000). These approaches are at the core of process-based idiographic personality because they investigate how components of personality interact with and influence each other.

For example, a daily process approach using experience sampling methods can directly test how the occurrence of certain cognitions or emotions (e.g., reduced feelings of control), in turn, may be followed by a certain type of behavior (e.g., seeking social support). This research is done using a combined idiographic–nomothetic approach in which two or more self-report variables are measured longitudinally over time (e.g., feelings of control and social interactions, measured once or multiple times daily). Then, typically MLM procedures are used to compute how the two variables are correlated within each person over time. The resulting 'within-person slopes' can range from 0 (indicating no association between control and social support) to 1 (or –1), reflecting a perfect positive (or negative) correspondence between control and social support. Daily process researchers also recognize that within-person slopes commonly vary in size or direction. In these situations, researchers typically ascertain whether there are other factors that might account for the variation.

In a classic example (Bolger & Schilling, 1991), researchers modeled the within-person association between daily stressors and anxiety. Most people in the study felt more anxious on days with stressors and less anxious on days without stressors; hence, the typical within-person association was positive. However, people higher in neuroticism showed even stronger within-person associations between daily stressors and negative affect (called stress 'reactivity'), which is now recognized as a hallmark personality process associated with neuroticism.

Personality characteristics as if-then, situation–behavior contingencies

Another idiographic account of personality is that it consists of situation-based contingencies: Individuals adjust their behavior according to their situation, and they do so consistently and idiosyncratically (Allport, 1937; Mischel & Shoda, 1995). This account of personality is exciting in that it recruits cognitions, beliefs, and flexibility, to explain personality. Fournier, Moskowitz, and Zuroff (2008) demonstrated that such an account of personality can be investigated fruitfully with experience sampling methods. For 20 days, participants filled out a paper record of their behavior

following every interpersonal interaction that lasted at least 5 minutes. They reported their own behavior in terms of an important nomothetic model of traits (i.e., the interpersonal circumplex model). Participants reported how agreeable vs. quarrelsome and dominant vs. submissive they were in each interaction. Participants also reported the behavior of the other people in the interaction using these circumplex traits, as a measure of the situation. This model created four types of situations – agreeable-dominant situations, agreeable-submissive situations, quarrelsome-dominant situations, and quarrelsome-submissive situations.

To determine whether individuals changed their behavior systematically with the situation, Fournier et al. (2008) formed *behavior profile signatures* for each participant for each behavior. A behavior profile signature indicates how much that person engages in that behavior in each of the situation types. For example, a participant's profile for agreeableness represents how agreeable he or she was, depending on the four situations. The resulting profiles revealed changes in behavior according to the situation. Importantly, different individuals changed their profiles in different ways, demonstrating idiosyncratic contingencies of behavior on situations, and these individual differences endured over time. This research investigated the basic processes of personality, found individual differences in those processes, and did so with techniques that allowed statistically verified conclusions.

Structure of daily experience

Structural investigations seek to discover the dimensions that account for regularities in a person's momentary experience. This approach has been used frequently to reveal intra-individual variations in the structure of emotional experience (Barrett, 1998; Carstensen, Pasupathi, Mayer, & Nesselroade, 2000). In this approach, experience sampling methods are used to obtain multiple emotion reports over time (e.g., reports of how happy, sad, or angry a person feels in daily life). These reports are then factor analyzed for each person separately to determine the number and type of dimensions that accounts for regularities in experience for that individual (e.g., Barrett, 1998; Carstensen et al., 2000; Nesselroade, 2001). The resulting within-person structure reflects the type of phenomenological distinctions a person is making in his or her experience. This research shows that some people are much more likely to characterize their emotional experiences in broad global terms (e.g., along a single dimension of good–bad), whereas others make more complex distinctions in their experiences (Barrett, 1998; Carstensen et al., 2000).

Brief Primer: How to Conduct an Experience Sampling Study

Today, there are numerous resources available for conducting experience sampling studies. The *Recommended Resources* at the end of the article provide

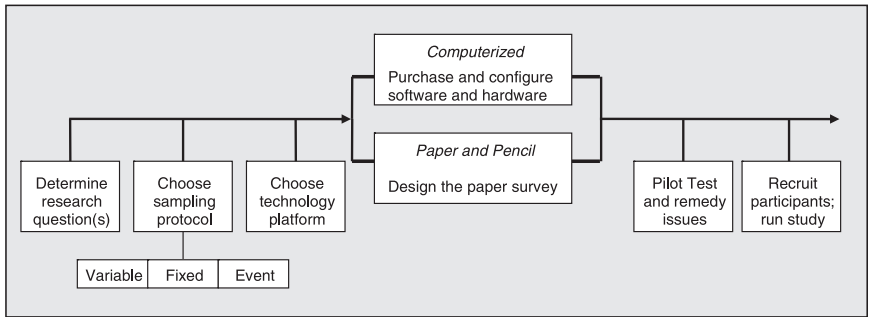

Figure 3 Key steps to conducting an experience sampling study.

much more detailed information; however, we highlight the key steps in Figure 3. After determining the research question, the next step is to choose the appropriate sampling protocol (variable time-based, fixed time-based, or event-based) and technology platform (computerized versus paper-and-pencil). These sampling protocols and technology platforms – and their advantages and disadvantages – are summarized in the Appendix.

As seen in the Appendix, the choice of sampling protocol depends on the nature of the phenomena under investigation. Some protocols are easier to implement and less burdensome to participants than others (e.g., once daily diary); however, these factors should not be the sole reason for choosing a protocol. Other factors include the number of observations per day (typically between 1 and 10) and the length of the sampling period (typically between 3 and 30 days). Although these protocols are discussed separately, multiple protocols can be employed in the same study.

The choice of technology platform (computerized or paper-and-pencil) reflects a trade-off between cost, complexity, and control. Computerized methods cost more and are more challenging to implement, but they provide the greatest control over the timing elements (i.e., by controlling when reports are made and/or time-date-stamping each report). For this reason, some researchers view computerized platforms as the only valid platform. Although there is evidence that people may not complete paper-and-pencil reports according to the proper schedule (Stone, Shiffman, Schwartz, Broderick, & Hufford, 2002), there is also evidence showing that paper-and-pencil methods are valid and can be equally informative (Green, Rafaeli, Bolger, Shrout, & Reis, 2006). This 'Paper or Plastic' debate has clarified several things. First, it is now acknowledged that computerized methods may be better in circumstances necessitating precise timing control and assurance (Tennen, Affleck, Coyne, Larsen, & DeLongis, 2006); however, extreme concerns with paper-and-pencil studies may be overstated. Compliance with paper-and-pencil questionnaires are aided by frequent collection of surveys and the establishment of good working relationships with participants (see Green et al., 2006).

Of course, there are several limitations of experience sampling methods. They can be time and resource-intense, and potentially burdensome to participants; however, these limitations vary depending upon the sampling protocol. Even with the most intensive protocols, participant burden can be minimized by reducing the number of reports or length of the study. Experience sampling methods could also evoke 'reactivity' when the act of measuring experience changes the experience being measured. Although reactivity has rarely been shown, clinical research suggests that reactivity could occur if highly motivated people report on a negative behavior they would like to change (Korotitsch & Nelson-Gray, 1999). Finally, experience sampling methods are still bounded by the conditions of self-report. Although these methods may eliminate memory biases, the self-reports may still be affected by socially desirable responding or self-deception.

Future Directions: Personality Psychology and Beyond

Experience sampling methods, and the idiographic–nomothetic models they support, offer new directions for psychological inquiry. Here, we offer a sampling of potential directions for personality, clinical and health psychology, with a focus on what we consider the most pressing issue in each area.

Personality

Experience sampling methods offer a promising method for integrating social cognitive and trait approaches to understanding personality, which traditionally have been at odds with one another. Social-cognitive approaches emphasize variability within a person in behavior and the situations and cognitive variables that underlie such variability. Their goal is for personality to be an explanatory science, in which personality psychologists explain why people are the way they are. Trait approaches, in contrast, emphasize consistency within a person, and describing differences between people. They favor biological or genetic accounts of personality variables.

Fleeson (2001; 2007a) and Fournier et al. (2008) proposed that experience sampling may provide a way to integrate the two approaches by showing that the differences between people in their traits may be explained partly by within-person, social-cognitive processes. Fleeson (2007a) did this with the traits of the Big Five. Participants reported their current situation and the current degree to which they were expressing each of the Big Five traits, both along continuous dimensions. For example, they reported how anonymous the situation was from 1 to 6 and how extraverted they were being from 1 to 6. For each situation–trait pair, MLM analyses revealed both the average within-person association and also the degree to which individuals differed in within-person associations. For example, it turned out that the average individual reliably lowered his or her extraversion in anonymous situations, meaning that trait expression may be explained by

social-cognitive processes of responding to situations. However, individuals differed significantly from each other in that association, such that some individuals actually and reliably increased their extraversion in anonymous situations. Fournier et al. (2008) revealed similar patterns with the traits of the interpersonal circumplex (see Donnellan, Lucas, & Fleeson, forthcoming, for several additional examples in a special issue about this future direction).

Clinical psychology

Despite clinical psychology's success in developing empirically validated treatments, the assumed mechanisms of even its most successful treatments have been called into question (Kazdin, 2007; Morgenstern & Longabaugh, 2000). For example, in a recent summary of the literature on mechanisms of change in psychotherapy research, Kazdin concludes '... after decades of psychotherapy research, we cannot provide an evidence based explanation for how or why even our most well studied interventions produce change, that is, the mechanism(s) through which they operate' (1).

We believe that experience sampling methods hold tremendous promise for understanding the mechanisms of change. For example, if a successful depression treatment is thought to influence well-being through self-esteem processes, then, following the treatment, an individual's feelings of self-esteem should be less likely to plummet in response to interpersonal rejection in daily life. These are precisely the sorts of temporal contingencies testable with experience sampling methods. Indeed, Kazdin goes on to call for 'more fine grained analyses ... to study the unfolding of processes over time' (17) as a key to discovering treatment mechanisms. While Kazdin (2007) points to the investigation of hypothesized real-time biological mechanisms, we also suggest that experience sampling methods offer clinicians the opportunity to similarly examine hypothesized psychological mechanisms in real time.

Emergent work also suggests that experience sampling methods can be used to detect earlier responses to antidepressants than would otherwise be attainable (Lenderking, Hu, Tennen, Cappelleri, Petrie, & Rush, 2008). Such applications would complement established experience sampling research on the experiences and symptoms associated with clinical disorders (e.g., deVries, 1992; Kwapil, 2009; Silvia, Myin-Germeys, Anderson, Coates, & Brown, forthcoming).

Health psychology

With notable exceptions (e.g., Stone & Shiffman, 1994; Zautra, Fasman, Parish, & Davis, 2007), health psychologists, like their personality and clinical counterparts, have focused on nomothetic (group mean) level analysis. As a result, health psychology has missed important opportunities to evaluate health related processes and interventions designed to alter those processes.

For example, interventions designed to increase self-efficacy to cope with pain should produce changes in treated patients' ability to employ effective coping strategies on high pain days. This inherently within-person temporal dynamic unfolds over the course of a day or even over several hours. Yet, pain researchers almost invariably measure mean levels of coping efficacy and pain among group members, while hypothesizing within-person idiographic processes. We encourage health psychologists to match their elegant within-person hypotheses with equally elegant idiographic–nomothetic study methods.

Conclusion

Experience sampling methods are powerful tools for realizing a modern idiographic approach to personality research. With their repeated measures design and within-person analysis components, experience sampling methods are, fundamentally, focused on the individual. Research using experience sampling methods preserves *individuals* as the unit of analysis, which fosters insight into the dynamics of how *individuals* think, feel, and behave. Such individual-centric approaches are core to the past, present, and future of personality as an explanatory science. Allport challenged us to use 'novel and somewhat daring methods'. We believe that experience sampling methods are daring enough to meet his challenge.

Recommended Resources

Experience sampling methods in personality

Conner, T., Barrett, L. F., Tugade, M. M. & Tennen, H. (2007). Idiographic personality: The theory and practice of experience sampling. In: R. W. Robins, R. C. Fraley, & R. Kreuger (Eds.), *Handbook of research methods in personality psychology* (pp. 79–98). New York, NY: Guilford Press.

Tennen, H., Affleck, G., & Armeli, S. (2005). Personality and daily experience revisited. *Special issue, Journal of Personality*, *73*, 1465–1483.

Tennen, H., Suls, J., & Affleck, G. (1991). Personality and daily experience: The promise and the challenge. *Journal of Personality, Special Issue*, *59*, 313–337.

Guides for conducting experience sampling methods

Bolger, N., Davis, A., & Rafaeli, E. (2003). Diary methods: Capturing life as it is lived. *Annual Review of Psychology*, *54*, 579–616.

Conner, T., Barrett, L. F., Tugade, M. M. & Tennen, H. (2007). Idiographic personality: The theory and practice of experience sampling. In: R. W. Robins, R. C. Fraley, & R. Kreuger (Eds.), *Handbook of research methods in personality psychology* (pp. 79–98). New York, NY: Guilford Press.

Hektner, J. M., Schmidt, J. A., & Csikszentmihalyi, M. (2006). *Experience Sampling Method: Measuring the quality of everyday life.* Thousand Oaks, CA: Sage.

Fahrenberg, J., Myrtek, M., Pawlik, K., Perrez, M. (2007). Ambulatory assessment – Monitoring behavior in daily life settings. A behavioral-scientific challenge for psychology. *European Journal of Psychological Assessment*, *23*, 206–213.

Reis, H. T. & Gable, S. L. (2000). Event sampling and other methods for studying daily experience. In: H. T. Reis and C. M. Judd (Eds.), *Handbook of research methods in social and personality psychology* (pp. 190–222). New York, NY: Cambridge University Press.

Shiffman, S., Stone A. A., & Hufford, M. R. (2007). Ecological momentary assessment. *Annual Review of Clinical Psychology*, *4*, 1–32.

Computerized experience sampling method resources

Barrett, L. F., & Barrett, D. J. (2001). An introduction to computerized experience sampling in psychology. *Social Science Computer Review*, *19*, 175–185.

Ebner-Priemer, U. W., & Kubiak, T. (2007). Psychological and psychophysiological ambulatory monitoring – A review on hardware and software solutions. *European Journal of Psychological Assessment*, *23*, 214–226.

Le, B., Choi, H. N., & Beal, D. J. (2006). Pocket-sized psychology studies: Exploring daily diary software for Palm Pilots. *Behavior Research Methods*, *38*(2), 325–332.

Websites: http://www.ambulatory-assessment.org; http://www.experience-sampling.org; http://myexperience.sourceforge.net/; http://www.cfs.purdue.edu/mfri/pages/PMAT/

Short Biographies

Tamlin Conner is an Assistant Professor at the University of Otago in New Zealand. She received her PhD in social psychology at Boston College and postdoctoral training in health and personality psychology at the University of Connecticut Health Center. Her research is ecological in nature and aims to understand individuals' psychological functioning in real-world situations. Currently, she uses experience sampling methods to investigate daily emotional well-being, stress reactivity, and alcohol use. She is considered an expert in this methodological approach and has written numerous articles on the theory and practice of experience sampling. She regularly reviews for top-tier journals and is a founding member of the international Society for Ambulatory Assessment (http://www.ambulatory-assessment.org).

Howard Tennen received his PhD from the University of Massachusetts in 1976. He is a Board of Trustees Distinguished Professor at the University of Connecticut and Editor of the *Journal of Personality*. His research is

in the areas of health psychology, stress and coping, adaptation to threatening events, and the application of daily diaries to personality, health, and clinical research. His work using diary methods has examined processes related to coping with everyday stress, chronic pain, asthma, alcohol use, and depression. He has also used diary methods to evaluate the efficacy and mechanisms of action of psychological and pharmacological interventions.

William Fleeson has received training in personality, social, cognitive, and lifespan developmental psychology in his efforts to understand the whole person. He received his PhD from the University of Michigan in 1992 and postdoctoral training at the Max Planck Institute for Human Development in Berlin, and is now Kirby Faculty Fellow and Associate Professor in the Department of Psychology at Wake Forest University. His research interests include personality, self-regulation, adult development, and psychological well-being. Some current research focuses on computational microbehavioral psychological health; other current research focuses on distinguishing between those human efforts that lead to successful, satisfying lives and those that lead to dead ends, frustrated hopes, and wasted resources. His work on distributions of behavior and their implications for the nature of personality won the Society of Personality and Social Psychology's Theoretical Innovation Prize.

Lisa Feldman Barrett, PhD, is currently Professor of Psychology and Director of the Interdisciplinary Affective Science Laboratory at Boston College, with appointments at Harvard Medical School and Massachusetts General Hospital. Dr. Barrett received her PhD in clinical psychology in 1992 and has since received additional training in social and personality psychology, psychophysiology, cognitive science, neuroanatomy, and cognitive neuroscience. Her research focuses on very basic questions of what emotions are, both from both the standpoint of the psychologist (who measures behavior) and the neuroscientist (who measures the brain). Dr. Barrett is an elected Fellow of the Association for Psychological Science, the American Psychological Association, and the Society for Personality and Social Psychology. In 2007, she received an NIH Director's Pioneer Award for innovative research on emotion. She is also the recipient of an Independent Scientist Research Award from the National Institute of Mental Health, a Career Trajectory Award in Experimental Social Psychology, the James McKeen Cattell Award, and an American Philosophical Society Fellowship. She is a founding Editor-in-Chief of the *Emotion Review* and sits on the editorial boards of top-tier journals in both psychology and neuroscience. Dr. Barrett's lab has been continually funded by the National Science Foundation since 1998 and currently receives support from the NIH Director's Pioneer Award program in the National Institute of General Medicine, the National Institute on Aging, and the Army Research Institute. Dr. Barrett has published over 90 papers and chapters, including a National Research Council white paper on the nature of emotion. She has edited three books on the science of emotion, including

the current edition of the *Handbook of Emotion*. She also wrote the current entry on emotion for *World Book Encyclopedia*.

Endnotes

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1 Within-subject (i.e., repeated measures) methods, such as those tested by repeated measures analysis of variance, get closer to direct study of within-person processes, but they remain nomothetic because they still attempt to identify average patterns rather than patterns within each subject.
2 The modern use of structured diaries to gather self-report data owes much to the seminal work of behavior analysts, though this important antecedent is almost never acknowledged.

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Appendix Different Types of Experience Sampling Protocols and Technology Platforms

Sampling Protocol		**Technology Platform for Self-Report**[1]		**Cost**	**Complexity**	**Control**[2]	**Participant Burden**
Variable Time-Based Reports are made in response to a semi-random signal through the day (e.g., 3–8×'s daily); signal times are unknown.	When to use: For momentary experiences that are (i) ongoing (e.g., mood), (ii) susceptible to memory bias, (iii) or may be adversely affected by knowing when a report will be made.	*Computerized*	Personal Digital Assistant	$$$$$	******	******	Moderate (3× daily) to High (7 × + daily)
			Palmtop Computer	$$$$$	******	******	
			Mobile Phone (calls)	$–$$$	*****	******	
			Mobile Phone (texting)	$–$$	*****	******	
		Paper-and-pencil (augmented)	Paper booklet with signalling device (pager, watch, text message)	$	****	**	Moderate
Fixed Time-Based Reports are made at fixed times (e.g., 10am/2pm/5pm or once nightly); reporting times are known and anticipated. Once-a-day reports are also known as *daily diary methods*.	When to use: For experiences and behaviors that are (i) less susceptible to memory bias (ii) able to be recalled over the prior interval; (iii) not disrupted by mental preparation; and (iv) temporally investigated (e.g., circadian rhythms).	*Computerized*	Personal Digital Assistant	$$$$$	*****	******	Low (1× daily) to Moderate (4× daily)
			Palmtop Computer	$$$$$	*****	******	
			Telephone call in to IVR[3]	$-$$$	***	*****	
			Internet Survey	$$	**	*****	
			E-mail	$	*	***	
		Paper-and-pencil	Paper booklet	$	*	**	Low

Appendix *Continued*

Sampling Protocol		Technology Platform for Self-Report[1]		Cost	Complexity	Control[2]	Participant Burden
Event-Based Reports are made following an event.	When to use: To measure processes surrounding specific events.	*Computerized*	Personal Digital Assistant	$$$$$	*****	***	Low (rare events) to
			Palmtop Computer	$$$$$	*****	***	High (freq. events)
			Telephone call in to IVR	$-$$$	***	***	Low (rare events) to High (freq.
		Paper-and-pencil	Paper booklet	$	*	**	events)

Note: [1]There are other exciting technology platforms that do not use self-report. These platforms enable ambulatory recording of *naturalistic sound* such as the Electronically Activated Voice Recorder (EAR; Mehl, Pennebaker, Crow, Dabbs, & Price, 2001), *physiology* (e.g., Lifeshirt from VivoMetrics), *movement* (e.g., portable accelerometers), and *location* (Context-Aware Experience Sampling, CAES; http://web.mit.edu/caesproject/). [2]Control refers to whether the researcher can control and confirm the exact dates and times a person completed the survey. [3]Interactive Voice Response (IVR) is a call-in system that presents and records answers to survey questions.

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