CHAPTER 1

Why Researchers Should Think "Real-World"

A Conceptual Rationale

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How much time do parents spend with their children of varying ages? Are people more likely to drink, smoke, or argue after a stressful day at work? Are women more talkative than men? Do emotional experiences change body chemistry? Does television watching really dull the mind? Does physical activity promote emotional well-being? Do people eat differently when away from home, or when others are around? How does air temperature affect activity and mood? Which kinds of social contact are shy persons most likely to avoid? Do antidepressant medications increase the quality of everyday life? How is behavior affected by the physical settings in which we live, work, and play?

Methods for studying daily life experiences have arrived, fueled by questions of this sort and new technologies. A recent search on Medline and PsycINFO revealed well over 2,000 published papers using some of the more common examples of these methods. Daily life experience methods are familiar, albeit not yet standard, tools in several literatures (e.g., medicine and health, emotion, social and family interaction). In the National Institutes of Health's *Healthy People 2020* initiative, Bachrach (2010) highlighted these methods among the "tools that can revolutionize the behavioral and social sciences," notwithstanding the fact that "researchers are still in the earliest stages of tapping into [their] vast potential." Similarly, Croyle (2007) describes methods for real-time data capture as critical tools for improving the accuracy and usefulness of self-reports in biomedical research. Moreover, new technologies (as described throughout this handbook) promise to increase dramatically the scope and accessibility of these methods. In short, there is every reason to expect that daily life research methods will become more influential in the near future.

There is some flexibility in what counts as a method for studying daily life, but most existing examples fall into one of two broad categories. The first, and more common, category includes self-reports of behavior, affect, and cognition, collected repeatedly over a number of days, either once daily (so-called *daily diaries*; see Gunthert & Wenze, Chap-

ter 8, this volume) or sampled several times during the day. These include the two best-developed daily life methods, the *experience sampling method* (ESM—Csikszentmihalyi, Larson, & Prescott, 1977; Hektner, Schmidt, & Csikszentmihalyi, 2007) and *ecological momentary assessment* (EMA—Shiffman, Stone, & Hufford, 2008; Stone & Shiffman, 1994), as well as event-contingent sampling (see Moskowitz & Sadikaj, Chapter 9, this volume), which is triggered by particular events (e.g., social interaction, sexual activity, exercise, or cigarette smoking). The second and newer category includes more technically sophisticated methods for capturing diverse, non-self-reported aspects of everyday experience, such as the auditory environment (see Mehl & Robbins, Chapter 10, this volume), psychophysiological status (see Schlotz, Chapter 11, and F. Wilhelm, Grossman, & Müller, Chapter 12, this volume), physical location (see Goodwin, Chapter 14, and Intille, Chapter 15, this volume), and proximity to particular other persons. Clearly these methods cover a diverse range of phenomena studied by behavioral and medical scientists.

Daily life protocols are intended to "capture life as it is lived" (Bolger, Davis, & Rafaeli, 2003, p. 580)—that is, to describe behavior as it occurs within its typical, spontaneous setting. By documenting the "particulars of life" (Allport, 1942), these methods provide extensively detailed data that can be used to examine the operation of social, psychological, and physiological processes within their natural contexts. A key premise of the daily life approach is that the contexts in which these processes unfold matter—in other words, that context influences behavior, and that proper understanding of behavior necessarily requires taking contextual factors into account. As the accessibility and popularity of daily life methods have increased, so too has researchers' ability grown in both range and complexity to ask and answer important questions about behavior.

The rationale for daily life measures is often couched in methodological terms; for example, that they eliminate retrospection bias or minimize selectivity in describing experiences (see Schwarz, Chapter 2, this volume). To be sure, these are important advantages, especially in those topical areas that must rely on self-reports (e.g., when the individual's personal experience is the focus of research). Nevertheless, as I argue later in this chapter, the conceptual advantages of daily life protocols provide an equally, if not more, compelling justification for their implementation. Daily life methods allow researchers to describe behavior as it occurs in natural contexts—a fundamental difference from investigations based on global self-reports or on behavior in the laboratory (Reis, 1994), perspectives that presently predominate in the behavioral science literature. Thus, daily life methods make available a different kind of information than traditional methods do, information that provides a novel and increasingly valuable perspective on behavior. The conceptual benefits of daily life methods are as important a reason for their growth as their methodological benefits.

My goal in this chapter is to present the conceptual case for why researchers should consider adding daily life methods to their methodological toolbox. I begin by discussing the kind of information that daily life methods provide, highlighting ways in which they complement more traditional methods. Following this, the chapter reviews in turn three conceptual bases for daily life research: ecological validity, the value of field research, and the need to take context seriously. Next, I describe the role of daily life data in description and taxonomies, a step of theory building that in my opinion has been underemphasized in the behavioral sciences. The chapter concludes with a review of the place of daily life methods in research programs. An overarching goal of this chapter is to provide a context for the remainder of this handbook. My hope is that greater appreciation of *why* these

methods are valuable for substantive research will make the *what* and *how* of subsequent chapters more compelling.

What Kind of Information Do Daily Life Methods Provide?

Let me begin by being clear about one thing: Self-reports are here to stay. There is information that no one but the respondent knows (Baldwin, 2000), including motives, goals, emotions, and thoughts, all of which are important and influential phenomena in their own right, which is why many theories about human behavior and interventions focus on them. Nevertheless, researchers and practitioners are often skeptical about self-reports; for example, Stone and colleagues comment, "It is naive to accept all self-reports as veridical" (2000, p. ix). Over the years, many methods have been developed to try to improve the accuracy of self-reports, most of which at best have had limited success. Daily life measures are still self-reports, of course, but as discussed by Schwarz (Chapter 2, this volume), they often represent a substantial improvement over more common retrospective methods.

Researchers have little disagreement that retrospective responses to survey questions, even when those surveys are well designed and carefully executed, can be biased (Schwarz, Chapter 2, this volume; see also Schwarz, 2007; Tourangeau, 2000). Wentland and Smith (1993) meta-analyzed a series of studies that included objective criteria against which the accuracy of self-reports could be evaluated. Across diverse topics and questions, accuracy ranged from 23 to 100%. It seems patently obvious that survey responses would be affected by the limits of human memory (Tourangeau, 2000); for example, few survey respondents likely can remember what they were doing on Tuesday, June 20, 1995, how frequently they bought lunch in their high school cafeteria, or how they felt after a trip to the dentist 5 years ago. Of course, accuracy issues of this sort pertain only to the kinds of variables and processes that people are able to self-report in the first place—that is, personal experiences and events. Daily life measures are also used to study variables about which people are unlikely to have access even when they occur (e.g., psychophysiological states), or to which people are unlikely to attend unless directed by researchers (e.g., ambient attributes of the physical environment). For these, retrospective surveys are not feasible.

It would be simple-minded to assume that because of the fallibility of memory, retrospective surveys are "wrong" and indices constructed from daily life accounts are "right." Rather, when properly investigated, each should be considered a valid indicator of experience viewed from a given perspective (Reis, 1994). Retrospective surveys concern reconstructed experience; they characterize circumstances from the person's current vantage point, reflecting the various cognitive and motivational processes that influence encoding, storage, retrieval, and assessment of episodic memories (Tulving, 1984; Visser, Krosnick, & Lavrakas, 2000). Daily life measures, in contrast, tap ongoing experience, or contemporaneous accounts of activity (often obtained in or close to real time) and the person's feelings about that activity. Both types of data are relevant to understanding human behavior. Researchers often want to know what actually happened, but sometimes they also want to know how people experience or understand events in their lives, given time to reflect on them—what McClelland, Koestner, and Weinberger (1989) called "systematic experience-based self-observation" (p. 700). In fact, because the transforma-

tional processes by which actual experiences are reinterpreted represent some of the most compelling phenomena in the behavioral sciences, comparisons of real-time and recollected responses can be particularly informative (Reis, 1994). This, of course, requires both kinds of measures.

Consider, for example, a program in which researchers are interested in identifying emotional consequences of social isolation among older adults. A survey researcher might ask participants, "How much social contact have you had within the past 2 weeks?", using anchors ranging from *None at all* to *A great deal*. Daily life researchers would likely argue, with good reason (as explained below and in later chapters of this handbook), that answers to this question are unlikely to correspond more than modestly (at best) with either subjective daily life indicators, such as reports from random or event-contingent diaries, or objective daily life indicators, such as might be obtained from video or audio records or from sensors placed in the home, or worn by participants on their apparel. On the other hand, there is good reason to believe that answers to a longer-term retrospective question (e.g., across 2 weeks) will reflect the older adult's perceived experience of inadequate social contact, a key component of dysfunctional loneliness (Cacioppo & Patrick, 2008). Neither measure is inherently better than the other. By combining both kinds of measures within a study, researchers might identify circumstances in which objective social contact is relatively frequent yet unfulfilling, as well as circumstances in which social contact is relatively sparse yet the individual nevertheless feels sufficiently connected to others. This sort of integration is likely to answer important questions about how life events are experienced.

In short, it is apparent that the methodological advantages of daily life methods contribute to their growing popularity (reflected throughout this handbook). The justifiable basis for such enthusiasm notwithstanding, researchers should remain mindful of the fact that momentary reports are still self-reports, and therefore are subject to construal by the respondent. Real-time, momentary reports of experience cannot substitute for retrospective accounts if the individual's reflections on his or her experience are the subject matter of investigation. For this reason, then, daily life measures should be considered a complement to retrospective measures, rather than a substitute for them. This logic suggests that the conceptual rationale for daily life measures may matter more than the methodological rationale. The remainder of this chapter describes this rationale.

Ecological Validity

The term *ecological validity* refers to whether a study accurately represents the typical conditions under which that effect occurs in the real world. This definition derives from Brunswik's (1956) principle of representative design, in which he argued that experiments must use representative samples of subjects *and* conditions in order to be generalizable.[1] Brewer (2000) characterizes ecological validity (which she calls "representativeness") as one of three primary criteria for external validity, or "whether an effect (and its underlying processes) that has been demonstrated in one research setting would be obtained in other settings, with different research participants and different research procedures" (p. 10). Brewer's two other criteria for external validity are robustness, or whether findings are replicated in different settings with different samples, or in different historical or cultural circumstances; and relevance, or whether the findings can be used to change behavior in the real world.

Researchers have long debated the relative priority of internal and external validity. This debate has emphasized the ecological validity component of external validity, inasmuch as replication and translation into practice are seldom considered controversial. On one side of this debate, researchers may lament the low priority often ascribed to representativeness (e.g., Helmreich, 1975; Henry, 2008; McGuire, 1967; Ring, 1967; Silverman, 1971). On the other side, researchers argue that because laboratory research is conducted to evaluate theories under carefully controlled conditions, questions about the applicability of those studies to real-world circumstances are more or less irrelevant—in other words, experiments are done to determine "what can happen" as opposed to "what does happen" (e.g., Berkowitz & Donnerstein, 1982; Mook, 1983; Wilson, Aronson, & Carlsmith, 2010). In the biological and physical sciences, researchers deliberately create unrepresentative conditions in order to examine the operation of particular mechanisms under controlled (but theoretically informative) conditions (e.g., observing the behavior of electrons in a vacuum). It is reasonable to assume that controlled conditions could be similarly informative for behavioral theories (Petty & Cacioppo, 1996).

For this and other reasons, students in the experimental behavioral sciences are usually taught that internal validity has higher priority than external validity—that it is more important to be certain that an independent variable is the true source of changes in a dependent variable than to know that research findings can be generalized to other samples and settings. For example, in one of the most influential methods volume of the 20th century, Campbell and Stanley described internal validity as the sine qua non of valid inference, while commenting that the question of external validity is "never completely answerable" (1966, p. 5). I do not disagree with this rank ordering of internal and external validity. Too often, however, the lesser priority of external validity is taken to mean low (or even no) priority, or, in other words, that external validity is of little concern. This can hardly be correct. If a process or phenomenon does not occur in the real world, how important can it be? And, perhaps more pointedly, if real-world conditions modify the operation of a process or phenomenon, would it not be important for the relevant theories to consider and incorporate those moderator variables? (See Cook & Groom, 2004, for a related discussion.)

Daily life protocols begin with the premise that ecological validity matters, in the sense that by studying behavior within its natural, spontaneous context (hence the name *ecological momentary assessment*; Stone & Shiffman, 1994), generalizability of settings and conditions is inherently less of an issue here than in laboratory research. To be sure, this will not always be the case. Studies conducted in very unusual settings (e.g., the National Science Foundation research station in Antarctica) might have little generalizability to other settings. Studies using invasive technology (e.g., placing prominent video cameras throughout the home, or having participants wear cumbersome physiological monitors) might alter settings sufficiently to nullify their representativeness. Ecological validity, in other words, is not guaranteed by the use of daily life methods but it reflects the correspondence between the conditions of a study and the conclusions that are drawn from it.

By observing phenomena in their natural contexts, without controlling other influences, behavioral processes can be investigated within the full complement of circumstances in which they are most likely to occur. Consider, for example, the possibility that alcohol consumption often takes place in the presence of others who are also drinking. A laboratory study, depending on its design, might not differentiate effects of drinking in social and solitary settings; a study using daily life methods would do so (e.g., Mohr et

al., 2001), thereby providing information about alcohol consumption that better reflects the way in which people actually drink. As discussed below, the laboratory context sometimes creates conditions that are rare in normal experience.

There are several other reasons why daily life protocols may have greater ecological validity than other protocols. For one, daily life studies can examine the nature and repercussions of events that cannot ethically or pragmatically be studied in the laboratory, such as health crises or abusive behavior in families. Of course, these events can be studied retrospectively, but such findings may be distorted by methodological biases, such as those reviewed by Schwarz (Chapter 2, this volume), as well as by suggestibility and lay theories about these events (e.g., Loftus, 2000; Ross, 1989). Another reason is that daily life methods are well suited to tracking how behavioral processes unfold over time; for example, how people adapt to divorce or chronic illness (Bolger et al., 2003). As mentioned earlier, retrospective accounts of change over time may be influenced by lay theories of change. Daily life measures, in contrast, assess change in real time, and are also sensitive to contextual factors that covary with adaptation to such events (e.g., divorce and chronic illness are often accompanied by changes in financial status and patterns of family interaction). A third and final reason is that real-time daily life measures typically assess respondents while they are physically located in the focal behavioral setting. Retrospective reports, in contrast, are usually obtained in different locales. Properties of the physical environmental (including others present) can influence self-reports and behavior.

Of course, ecological validity in daily life studies does not come without a cost, and that cost is typically less internal validity. This is most clearly the case in correlational (nonexperimental) designs, in which the target variables are tracked or recorded for some period of time, then correlated in theoretically relevant ways. The vast majority of published daily life studies rely on correlational designs, although there are also many true experiments (i.e., studies in which participants are randomly assigned to different conditions) and quasi-experiments (i.e., designs that include controls for certain potential artifacts of correlational approaches) (Campbell & Stanley, 1966). In these cases, internal validity fares better, although there still may be significant loss due to the inability to standardize the participants' environment.

Whatever one's position on these issues, debates about the relative importance of internal and external validity obscure a more fundamental point. No single study can minimize all threats to internal validity while simultaneously maximizing generalizability. Internal validity requires careful control of context, whereas external validity requires letting contexts vary freely. Because all methods have advantages and drawbacks, the validity of a research program is most effectively established by *methodological pluralism*—using diverse paradigms, operations, and measures to triangulate on the same concepts (Campbell, 1957; Campbell & Fiske, 1959). Laboratory settings are suitable for carefully controlled studies, because manipulations can be crafted there to test specific theoretical principles while controlling real-world "noise" and ruling out alternative explanations and potential artifacts (e.g., those factors that covary in natural settings with the key independent variable). Daily life studies complement laboratory studies by illustrating processes in more realistic, complex settings, thereby demonstrating the nature and degree of their impact.

The significance of this double-barreled approach goes beyond showing that processes established in laboratory research are also evident in the real world (a goal that

most scientists would find unambitious). Brewer expressed this idea succinctly: "The kind of systematic, programmatic research that accompanies the search for external validity inevitably contributes to the refinement and elaboration of theory as well" (2000, p. 13). In other words, *validity*, in the broadest sense of that term, depends on matching protocols, designs, and methods to questions, so that across a diverse program of studies, plausible alternative explanations are ruled out, important boundary conditions are determined, and the real-world relevance of a theory is established. Thus, the proper role of daily life research is not so much to provide findings that stand on their own as it is to contribute to methodologically diverse research programs that advance the depth, accuracy, and usefulness of science-based knowledge and interventions.

The Value of Field Research

Kurt Lewin, the father of modern social psychology, is widely known for his appreciation of social action field research. Lewin felt that field experiments would help researchers keep in touch with the real-world implications of their theories, countering a "peculiar ambivalence [of] 'scientific psychology' that was interested in theory … increasingly to stay away from a too close relation to life" (1951, p. 169). In the half-century that followed, social psychology and related fields blossomed, mostly on the back of laboratory experimentation. No doubt researchers gravitated to the laboratory because of its many benefits, including experimental control over variables, settings, and procedures, which allowed researchers to control extraneous influences and thereby maximize internal validity, as well as the convenience of undergraduate samples. Field experiments did not disappear, but they were at best an occasional presence in leading journals.

The advantages of laboratory experimentation have a price, however, in terms of increasing distance from Lewin's "close relation to life." Laboratory settings by definition isolate research participants from their everyday concerns and activities, and subject them to an artificial environment in which nearly all contextual factors—for example, physical features, goals, other persons involved, and even the possibility of getting up and doing something else—are determined by the experimenter. In field settings, in contrast, the physical and social environment is substantially more cluttered: People must continually contend with multiple stimuli that compete for attention; they must choose for themselves which tasks to pursue and how to engage them; and the option of changing settings or tasks is usually available. All of these can, of course, alter the results of research.

Weick (1985) makes a compelling case for the value of considering Lewin's "close relation to life" in interpreting the findings of research. Which of the following situations, he asked, gets "closer" to the human condition: a study of how subjects in a laboratory experiment tell a new acquaintance that she is about to receive a mildly painful electric shock, or a study of how a coroner announces death to next of kin; anticipating a mild electric shock in a controlled laboratory setting or learning how to work on high steel in a 21-story building; or, predicting the sequence in which light bulbs will light up or betting a week's salary on the spin of a roulette wheel? Weick argued that "distance from life" encourages ambiguity and subjectivity in behavior, and thereby reduces the informativeness of research.

Field settings do not guarantee "closeness to life," of course. Field settings can be trivial and uninvolving, just as laboratory settings can be consequential and intensely

engaging. (This is reminiscent of the distinction between *mundane realism*, or the extent to which the events of an experiment resemble real-world events, and *experimental realism*, or the extent to which an experimental scenario is involving; Wilson et al., 2010). Increasingly, however, laboratory studies command relatively little engagement from participants (Baumeister, Vohs, & Funder, 2007), a trend that seems likely to continue given progressively more stringent ethical limitations hampering researchers' ability to create scenarios that maximize attention and motivation. In contrast, carefully selected field settings can maximize engagement with little or no intervention by researchers. Compare, for example, the results of laboratory studies in which undergraduates rate pictures of hypothetical dates with studies based on actual interactions in a speed-dating context (Finkel & Eastwick, 2008). By being "closer to life," then, field studies can make the research setting absorbing and personally meaningful, thereby better illuminating human motives, defenses, affects, and thought processes.

It bears noting that the rationale for studying daily life experience does not assume that the events or time periods under scrutiny are intense or profound. Just the opposite is true, in fact: Everyday life activities are often so mundane and uncompelling that they slip under the radar of conscious awareness. (For example, how many times did you nod or say hello to an acquaintance yesterday?) To capture them, methods based on random sampling of moments are needed, such as ESM or EMA, because methods based on recollection and selection would likely lead participants to overlook the occurrence or details of very ordinary experiences. By focusing on random samples of the "little experiences of everyday life that fill most of our working time and occupy the vast majority of our conscious attention" (Wheeler & Reis, 1991, p. 340), daily life methods bring research "closer to life," not because the participant's attention has been galvanized but because natural activity has been observed. Representativeness is thus a key part of the rationale for field research. Theories of human behavior based solely on deeply meaningful, highly absorbing activities and major life events would surely neglect much of human experience.

Field research, especially field experimentation, is often equated with replication or application; that is, some researchers conduct field experiments to determine whether a phenomenon or process established in the laboratory also occurs in natural settings or, alternatively, can be applied to yield personal or social benefit. Although these purposes are surely valuable, they disregard the potential role of field research in theory development. Field settings are ideal for identifying an effect's boundary conditions and moderators. For example, the impact of a given variable may be enhanced or offset by other variables present in natural contexts but not in the controlled confines of the laboratory (Mortenson & Cialdini, 2010). Similarly, processes or phenomena may be influential among certain classes of individuals but not others. Perhaps ironically, then, the ability to control extraneous influences that gives laboratory experimentation much of its enviable power and precision may mask circumstances that affect the operation of basic behavioral processes within their likely natural conditions (Reis, 1983). On this basis, Mortenson and Cialdini (2010) advocated a "full cycle" approach to theory development: using laboratory experiments to refine theories, and using field studies to establish the nature and impact of these theories when experimental control is relinquished and natural circumstances are allowed to prevail.

Consider the following example. Laboratory experiments have established that exposure to violent media increases the tendency toward aggressive behavior in unconstrained social interactions (see Wood, Wong, & Chachere, 1991, for a review). Simple

laboratory experiments comparing exposure and no-exposure control groups are unrivaled in their ability to control extraneous sources of variance and to support a causal explanation for this effect. What these experiments do not indicate is whether this effect occurs when attention is divided (e.g., by text messaging, homework, or the presence of others), a natural circumstance of everyday media exposure. Do other experiences in the person's life, such as school, friendship, or family interaction, play a moderating role? Does the impact of media exposure vary when approving peers or disapproving parents are present? Are preexisting or chronic affective states influential? Do different types of violent media have differential effects? Do men and women, or aggression-prone and non-aggression-prone people, respond more or less strongly to media violence? Do selection biases determine who chooses to watch violent media? Daily life studies can address such questions and, on the basis of the evidence they provide, researchers might conduct further experimentation to consider causal mechanisms. In this way, laboratory experimentation and daily life studies conducted in the field can play complementary roles in advancing theories.

Field research can also play another, more innovative role in theory development, namely, to "scout out" new effects (Mortenson & Cialdini, 2010), that is, to suggest new processes and hypotheses worthy of further investigation. Daily life data are particularly well suited to "discovery-oriented" research (as contrasted with hypothesis testing). Daily life datasets tend to be large and rich in detail and description, affording ample opportunities for creative exploration and *data mining*—sorting through large amounts of data to identify complex, not readily apparent patterns of association. With suitably large datasets and increasingly sophisticated statistical procedures, it is possible to uncover important regularities that lead to theoretical or applied advances. Once identified, more traditional approaches can be used to verify and elaborate these discoveries.

A commonly cited advantage of field studies is that research participants may be unaware of being observed, thereby minimizing reactivity effects (Kimmel, 2004; Reis & Gosling, 2010). Unfortunately, this tends not to be the case in daily life studies, inasmuch as such studies require participants either to record information about current events (e.g., ESM, EMA) or to carry with them ambulatory recording devices. One way in which daily life researchers can minimize such effects is to emphasize the cooperative, nondeceptive intent of daily life research. Furthermore, by providing a brief adaptation period at the beginning of a study, people often become accustomed to protocols, minimizing reactivity effects. Reactivity effects are discussed in more detail by Barta, Tennen, and Litt (Chapter 6, this volume).

Finally, field research commonly provides access to larger, more diverse samples than does laboratory research. One reason why experimentation with college students became popular is the logistical difficulty of recruiting nonstudent samples to participate in laboratory studies (Sears, 1986). Time, availability, convenient access, and cost all favor the use of college students as research participants. With daily life studies, researchers have less incentive to prefer student samples over more diverse samples.

It is important to remember that the setting in which a study is conducted is independent of whether that study is experimental or nonexperimental. As mentioned earlier, daily life studies tend to use correlational designs, whereas Lewin-inspired social action research tends to be experimental or quasi-experimental. Nevertheless, daily life measures are readily adapted to experimental designs. For example, daily life measures can serve as outcomes in field experiments, such as to quantify everyday experience for

participants randomly assigned to an intervention condition or a control group. New technologies developed for daily life studies can also deliver experimental interventions. For example, Heron and Smyth (2010) review the results of *ecological momentary interventions* (EMIs)—interventions used to treat problems, such as smoking, anxiety, or eating disorders, that are delivered in ambulatory, time-relevant contexts by using palmtop computers or other mobile devices (Chapters 9–17 of this handbook discuss these technologies and their application). In summary, recent advances in ambulatory technology provide increasingly flexible tools for conducting experiments in field settings, allowing researchers to avail themselves of the advantages of experimentation and field research simultaneously.

Taking Context Seriously

The impact of context on behavior is fundamental. Ever since the pioneering research of Roger Barker (1968; Barker & Wright, 1954), most behavioral scientists have acknowledged that context affects behavior. Barker believed that to understand behavior, one had to first understand what sorts of behavior the setting—its context—was likely to evoke. Thus, he called on researchers to identify regularities in the properties of behavior settings (e.g., homes, classrooms, medical offices, or roadways) and the behavioral patterns that they evoked. Barker's proposition, widely accepted throughout the behavioral sciences, is particularly evident in two subdisciplines: *environmental psychology*, which studies the influence of the built and natural environment on behavior (Proshansky, Ittelson, & Rivlin, 1976; Stokols & Altman, 1987), and *social psychology*, which studies how the psychological properties of situations influence behavior (Ross & Nisbett, 1991).

Daily life research takes context into account in one of three ways. First, some studies seek to control context effects by assessing behavior in its natural (presumably, representative) context rather than in specialized environments. For example, blood pressure can be elevated when it is assessed in a doctor's office—the so-called "white coat syndrome"—suggesting the value of collecting ambulatory readings before prescribing medications to lower blood pressure (WebMD, 2010). Second, daily life research may assess context and behavior simultaneously, so that associations can be identified. Csikszentmihalyi and colleagues (1977) developed the ESM to examine "fluctuations in the stream of consciousness and the links between the external context and the contents of the mind" (Hektner et al., 2007, p. 6). Thus, many of their studies examine affective states among adolescents as a function of what they are doing. For example, *flow* (a mental state in which people are fully and energetically immersed in whatever they are doing) tends to be low among adolescents in many school activities and while watching television. Third, new technologies allow researchers to ask context-sensitive questions (Intille, 2007; Chapter 15, this volume). For example, accelerometers (which identify motion patterns) let researchers prompt participants to record their thoughts or feelings upon awakening or completing exercise. Similarly, questions tailored to the participant's location can be administered on the basis of readings from global positioning devices (e.g., on a crowded city street, at home, or in nature).

Laboratory experimentation sometimes does not consider the extent to which the laboratory setting itself may contribute to the outcomes of research. This seems ironic; if settings had no influence on behavior, why would they need to be controlled? Every labora-

tory has unique physical features, but beyond this, the laboratory setting itself may engender certain expectations and scripts (e.g., scientific legitimacy, serious purpose, suspicion about possible deception, concerns about being observed, the need for attentiveness), all of which may affect the participant's thoughts and behavior (Shulman & Berman, 1975). One example of this, *demand characteristics* (cues that suggest to research participants the behaviors that researchers expect of them), are a well-known source of bias in research (Wilson et al., 2010). To be sure, as described earlier, research findings obtained outside the laboratory are often influenced by context. However, those contexts tend to be characteristic of the participant's life and experience, which, far from being a confound to be eradicated, contribute to the ecological validity of daily life studies. Moreover, natural contexts tend to offer more distractions and alternatives (e.g., participants have some choice over what they do, when, where, and with whom), affording self-direction and spontaneous selection. In field research, the setting thus becomes fundamental to theoretical accounts of behavior (Weick, 1985). In a laboratory cubicle, participants can do little else but complete the tasks assigned to them by researchers as quickly as possible.

Contexts differ along many dimensions, some of which seem likely to have minimal impact on research. For example, administering a standardized survey in a classroom versus a laboratory cubicle may make little difference, whereas conducting a field experiment on the impact of affectionate smiles on attraction at a singles bar versus a laboratory room may matter more. Snyder and Ickes (1985) differentiated situations in terms of the strength of their cues about behavior. So-called strong situations are relatively structured, providing salient, unambiguous, and compelling cues about appropriate behavior. Weak situations, in contrast, are unstructured, offer few or no incentives, and have few or ambiguous cues to guide behavior. Snyder and Ickes propose that strong situations are likely to support normative theories—that is, most people behaving the same way—whereas weak situations are more likely to reveal individual differences (a sensible proposal that has yet to be tested empirically; Cooper & Withey, 2009). Either is amenable to daily life research.

More generally, the social-psychological study of situations provides a framework for conceptualizing the impact of context on behavior (see Reis & Holmes, in press, for a review). Three dimensions have received the most attention:

- *Nominal properties of the setting.* As mentioned earlier, environmental psychologists commonly study the physical properties of behavior settings, such as environmental stress (e.g., noise, crowding), space utilization, the impact of architectural or natural design, and ambient conditions (e.g., temperature, odor). Social-psychological research has extensively examined the role of situational contextual cues. For example, violent cues in a laboratory room (e.g., a poster depicting a gun) can increase aggressive behavior (Berkowitz, 1982), whereas the color red increases men's attraction to women (Elliot & Maier, 2009). Often, this form of influence occurs automatically (i.e., without conscious attention or deliberate intent) or outside of awareness (Dijksterhuis & Bargh, 2001).

- *Goals activated by the setting.* The meaning people ascribe to situations often depends on "what happened, is happening, or might happen" (Yang, Read, & Miller, 2009, p. 1019) with regard to their goals. Thus, to goal theorists, contexts influence behavior by activating certain goals, which then influence thought, affect, and behavior (Carver & Scheier, 1981). Situations activate goals both normatively and idiographically.

For example, achievement settings commonly activate performance and mastery goals, whereas social settings activate goals for acceptance and affiliation, but the specific form of these goals may vary from person to person (e.g., to achieve success or closeness vs. avoid failure or rejection) (Elliott & Thrash, 2002; Mischel & Shoda, 1999). Reis and Holmes (in press) suggest that the goal relevance of situations be conceptualized in terms of *affordances*: that situations do not dictate behavior, but rather provide opportunities for the expression of a person's wishes, desires, needs, and fears.

- *Other persons present or thought about in the setting.* Extensive research documents the impact of the interpersonal context of behavior—who else is present, one's history with that person and similar others in related situations, and what one is trying to accomplish with that person (Reis, Collins, & Berscheid, 2000). In other words, people do not respond to the same stimuli in the same way irrespective of others who are involved or affected, but they vary their behavior as a function of interpersonal circumstances. Sometimes this occurs because other persons become the focal aspect of the situation—for example, a romantic dinner date typically emphasizes the dating partner more than the meal. In other instances, the setting varies because of changes in patterns of interaction. One influential theory, interdependence theory (Kelley et al., 2003), explains this influence in terms of *outcome interdependence*: the nature and extent to which two or more persons depend on and influence one another with respect to their potential outcomes from an interaction.

Contextual factors can also be macroenvironmental, as recently highlighted by Oishi and Graham (2010). They argue that socioecological characteristics—"physical, societal, and interpersonal environments (e.g., climate, democracy, social networks) [that] affect the emotions, cognitions, and actions of groups and individuals" (p. 356)—have failed to receive sustained or systematic attention in psychological science. Although these factors can be difficult, if not impossible, to isolate or manipulate in the laboratory, they are well suited to investigation with daily life methods.

In conclusion, daily life studies approach research with a clear appreciation for the importance of context. By studying behavior in natural, appropriate contexts, researchers sacrifice control over settings in order to understand better how contexts influence behavior. Of course, contextual features can also be studied in laboratory experiments—most notably, by experimental manipulations of contextual variables. As valuable and necessary as such studies are, laboratory settings inevitably differ in subtle and perhaps not-so-subtle ways from the real-world circumstances they are intended to recreate. Thus, programs of research maximize their validity and usefulness by incorporating both kinds of studies.

Daily Life Methods as a Tool for Description and Taxonomies

Daily life methods have long appealed to researchers with an interest in description. For example, daily life studies have documented how people spend their time (Robinson & Godbey, 1997; Gunthert & Wenze, Chapter 8, this volume), how they socialize (Reis & Wheeler, 1991), what they eat (Glanz & Murphy, 2007), when they drink and smoke

(Collins & Muraven, 2007; Shiffman, 1993), and how they feel during various activities (Hektner et al., 2007). This is because daily life data provide detailed and relatively unbiased records of real-time, real-world experience. Representativeness is essential for descriptive research; otherwise, that which is being described would be skewed toward oversampled events or accounts. For example, descriptions of daily affect based on retrospections tend to paint a more extreme picture of emotional experience than do real-time diaries, presumably because muted emotional states, although more common than extreme affects, tend to be more easily forgotten and are therefore underrepresented in retrospective accounts (e.g., Thomas & Diener, 1990).

Descriptive data matter more than is generally acknowledged. For example, Asch explained, "Before we inquire into origins and functional relations, it is necessary to know the thing we are trying to explain" (1952, p. 65). Similarly, Reis and Gable commented, "To carve nature at its joints, one must first locate those joints" (2000, p. 192). Nevertheless, relative to hypothesis testing, description is an underappreciated and seldom practiced step in theory development in many of the behavioral sciences (Rozin, 2001). This is unfortunate. Perhaps this has occurred because, as Jones (1998) explains, empirically minded researchers often confuse descriptive research with "a loose assortment of observational techniques and 'negotiation' by interview" (1998, p. 48).

Daily life research, properly conducted, should not be so confused, of course. Description based on sound empirical methods contributes to theory development by characterizing the major and distinguishing features of the entities in question, thereby providing input for hypotheses about them, as well as informing investigations of their causal characteristics and typical behavioral sequelae. For example, in the biological sciences, Darwin spent years studying and cataloging barnacles and finches, generating observations that eventually led him to formulate the theory of evolution (Quammen, 2007). Budding researchers are often taught to derive their hypotheses top-down, from general theory to particular hypotheses. Yet bottom-up thinking can also yield useful insights: using descriptive databases to identify the nature of a phenomenon; the circumstances in which it is most likely to occur; and its typical covariates, consequences, and limiting conditions. This sort of information is also critical for applications of basic research. For example, knowing that adolescents often initiate risky behaviors in a social context (Jessor, 1992) suggests that certain kinds of interventions are more likely to be effective than others.

Inasmuch as descriptive data tend to be uncommon in the behavioral sciences, it may not be surprising that we have few generally accepted taxonomies for classifying our research subject matter into conceptually related categories. (This despite the fact that individuals and societies often rely on lay taxonomies for understanding key entities in their environment [e.g., plants and food sources; Atran, 1990].) Recognizing what a phenomenon is (and is not) can provide a foundation for theory development in behavioral science, just as descriptive taxonomies of species provide a foundation for biological theories (Kelley, 1992). It may seem to some readers that the worth of taxonomies is self-evident. At the most elementary level, a taxonomy helps to organize existing findings and theories. "A taxonomy is a system for naming and organizing things into groups that share similar characteristics" (Montague Institute, 2010). Much like the periodic table in chemistry or the *Diagnostic and Statistical Manual of Mental Disorders* (DSM) in psychopathology, a good taxonomy both facilitates identification of conceptual similarities among entities, and delineates the ways one entity differs from another. (This is similar

to establishing convergent and discriminant validity among constructs.) In the ideal case, taxonomies identify mutually exclusive categories, are sufficiently inclusive to cover all instances within a set, and can be applied unambiguously (Hull, 1998). More generally, a good taxonomy designates which aspects of a phenomenon need to be understood, which constructs might be fruitful in this regard, and how seemingly diverse entities might actually be related (Rozin, 2001).

Researchers interested in taxonomies have adopted several strategies to acquire the sort of comprehensive, representative datasets that are needed. For example, some researchers use a lexical approach: Dictionaries of common terms are created from multiple sources, based on the premise (first suggested by Sir Francis Galton) that important concepts in a culture are represented by words (e.g., Edwards & Templeton, 2005). This approach, although useful, typically does not take the frequency of occurrence into account. Daily life methods can provide ideal datasets for developing taxonomies. In one area, affect, ESM and daily diary data have already contributed significantly to ongoing debates about the best structure with which to represent emotion and mood (e.g., Russell & Feldman Barrett, 1999; Watson, Wiese, Vaidya, & Tellegen, 1999). Other examples can be imagined readily. For example, daily life data about social interaction might be used to create formal taxonomies of the nature and impact of relationships. Speech samples collected with the Electronically Activated Recorder might help build taxonomies of everyday language use (Mehl & Robbins, Chapter 10, this volume). Ambulatory or telemetric monitoring (Goodwin, Chapter 14, this volume) could help develop models of how and where people spend their time.

Daily life data might also help validate taxonomies developed through other means. For example, convergent and discriminant validity for different DSM categories might be established by comparing ESM or EMA data for individuals in different diagnostic categories. One would expect similar patterns of experience for people in closely related categories, but not in more conceptually disparate categories. Another example can be seen in research on the so-called "Big Five" personality traits, where daily life data have been useful in establishing behavioral evidence of this structure for personality traits (McCabe, Mack, & Fleeson, Chapter 18, this volume; see also John & Srivastava, 1999). Because daily life studies are ideally suited for studying how events or states unfold over time (Bolger et al., 2003), they also can help describe temporal attributes associated with taxonomic categories (e.g., how the behavior of different personality types or relationships evolves over time).

Conclusion

The existence of this handbook, and the extraordinary diversity of topics and methods encompassed within its pages, is a sure sign that daily life methods have established their niche in the ecology of behavioral science methods. Whereas not long ago the questions that daily life methods could address were limited by available technology, recent developments in miniaturization, accessibility of the Internet and mobile technology, and statistical tools that take full advantage of the data they supply suggest a promising future. It is easy to predict, then, that in the coming years daily life studies will be an increasing presence in scholarly journals.

This chapter has argued that the value of daily life research goes well beyond the minimization of cognitive biases (see Schwarz, Chapter 2, this volume) by assessing behavior in real time. These benefits are not inconsiderable, but they mask the more fundamental gains to be realized from a more contextually grounded approach to knowledge. If the behavioral sciences have learned anything in the century or so since they became major players in academic scholarship, it is that behavior is influenced by contextual factors. Whether the subject of one's attention is preferences among political candidates; health care decisions; consumer spending; emotions induced by life events; decisions to date, marry, or divorce; or learning in schools, context matters. As the various chapters in this handbook make plain, daily life studies are among the most effective methods for assessing the impact of context.

To be sure, daily life methods are not the only means to study the effects of context. Because of their various limitations (notably, the inability to hold extraneous factors constant in an experimental design), other methods will remain superior for certain research purposes. Rather, daily life research is most beneficial in helping to fulfill the promise of methodological pluralism first advocated by Campbell more than a half-century ago (Campbell, 1957; Campbell & Fiske, 1959). Simply stated, and as discussed earlier, validity is better understood as a property of research programs than of individual studies (Brewer, 2000). Although most researchers agree in principle about the desirability of supporting one's conceptualization through multiple and diverse methods, thereby ruling out method-bound explanations, this principle is honored more in the saying than in the doing. I believe that Donald Campbell, were he alive today, would be pleased to see the contribution of daily life methods to methodological pluralism.

In closing, one final argument in favor of daily life methods deserves mention: They're fun!

Note

1. It is interesting to note that Brunswik (1956) used the term *ecological validity* to mean something different from representative design. Hammond (1998) discusses in detail how Jenkins (1974) and Bronfenbrenner (1977), among others, redefined Brunswik's term to its current common usage, engendering some conceptual confusion.

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