

STUDYING SOCIAL INTERACTION WITH THE ROCHESTER INTERACTION RECORD

Harry T. Reis
Ladd Wheeler

Suppose you were given the task of describing in some detail the differences in social life between two categories of people—males and females, the lonely and the not lonely, the beautiful and the plain, or college students and young marrieds. “In some detail” would probably mean that you would want to know if one group had more social interactions than the other, or more dyadic interactions, or more opposite-sex interactions, or longer interactions, or more enjoyable interactions, or more intimate interactions, or a larger number of partners, and so forth. The list could get very long as you considered the problem. Deciding what you wanted to know, however, would be the easy part of the task; getting to know it would be much tougher. Barring following each person around and observing his or her behavior, your first thought would be to construct a questionnaire. Such a questionnaire, however, would assume an almost computer-like respondent, one who had entered details of all interactions and had the necessary software to retrieve and report them with great accuracy. This is clearly not realistic, and we say more about that below. There is, however, a method to approximate this ideal sequence. This method is called the Rochester Interaction Record (RIR).

For the past quinquennial, we and our colleagues and students at Rochester have worked with the RIR, a diary procedure for assessing and characterizing patterns of social interaction in everyday life. By social interaction, we refer to all situations involving two or more people in which the behavior of each person is in response to the behavior of the other. Conversation is not necessary, although in practice most interaction involves talk. The RIR is designed to be a flexible tool for providing information about various features of social participation, be they objective (e.g., amount of contact, number of different partners) or subjective (e.g., perceived intimacy, enjoyment). It is further intended to serve

both descriptive and hypothesis-testing functions. Thus, the obtained data can be used to describe and compare persons on a broad variety of interaction parameters, or to evaluate theoretically driven propositions outside the experimental laboratory.

The RIR is one of several new methods for examining the nature and impact of daily life experience (Tennen, Suls, & Affleck, in press). Whereas prior methods have focused on major life events or personal interpretations of past experience, this approach is concerned with the multitude of "small events" that compose everyday activity and thought. Our presumption is that there are important and unique understandings of human social behavior to be obtained through the study of social phenomena as they are manifested in ongoing, spontaneous social life. As a consequence, daily event-recording procedures, such as the RIR, and laboratory experimental methods are best considered complementary strategies in programmatic research. In laboratory studies, one finds out how people behave in situations in which we as experimenters place them; in daily life-event studies, one learns which situations people place themselves into, and how they react in those situations. Later in this article we present several examples of the theoretical advantages offered by this dual approach.

In this article, we provide a brief overview of the RIR, as well as its rationale, usages, and limitations. We seek to orient the reader and potential researcher to the technique, and to furnish an overview of the various procedural and psychometric concerns that have guided our work. Because we believe that theoretically useful conclusions are the *sine qua non* of methodological innovation in the behavioral sciences, we will also describe some of the findings that have emerged from studies using the RIR and related instruments, both in our own studies and in the work of others.

This article has five major sections. The first two sections describe the rationale for the RIR, including comparison with traditional methods in interaction research. In the next segment, we present the technique itself in terms of its essential procedural and data analytic details. A discussion of reliability and validity issues is included in this section. The fourth part of this article provides an overview of studies that we and others have conducted with the RIR. Finally, we discuss the application of the RIR and related methods to other problems in social psychology.

I. Why a Diary Procedure?

The RIR was first applied to study the changes in interaction patterns that occur during the first year of college (Wheeler & Nezlek, 1977). Although various attitudinal and behavior summary questionnaires existed (for example,

those used in the famous Michigan studies), none appeared adequate for the purpose of describing in precise detail ongoing patterns of spontaneous social activity in everyday life. The potential benefits of such an instrument were apparent. For one, it could be used to paint a vivid and highly detailed portrait of a person's social interaction. (It has always seemed odd to us that despite the field's facility with elegant theories of the myriad components of social interaction, we could not answer such elemental questions as "How much do people socialize?" and "Are most interactions enjoyable?") Second, if the various components could be measured precisely and distinguishably, then it would be possible to develop and evaluate theories about the nature and pattern of social interaction in everyday life. Third, and most appealing to us as traditionally trained experimental social psychologists, these data could be used to test, within the flow of spontaneous, everyday behavior, hypotheses about variables presumed to affect social participation (e.g., gender, physical attractiveness, personality traits) or be affected by it (e.g., loneliness, health, self-consciousness).

Questions about social interaction are certainly not new to the behavioral sciences. Two general strategies have traditionally been utilized in this research: self-report questionnaires and behavioral observation. We next discuss weaknesses in these methods that led us to develop the diary approach.

A. SELF-REPORT QUESTIONNAIRES

In the first approach, subjects are asked, via standardized questionnaires, to report their social experiences during a specific, recent time interval, typically anywhere from the past week to the past year. For example, in a study of social activity in the elderly, Lemon, Bengtson, and Peterson (1972) had subjects answer the question "How often do you get together with your close friends (neighbors, relatives)?" to provide estimates of interaction frequency. In another study, designed to validate measures of social and emotional loneliness, Russell, Cutrona, Rose, and Yurko (1984) asked subjects a variety of questions, such as how often they had been on a date in the past 2 weeks, how many friends they currently had, and how satisfying their current relationships were, compared to 1 year ago. Such measures can be useful as descriptions of people's global perceptions of their social activity, but because the rating process requires them to filter and aggregate events that span extended time periods and multiple occasions and partners, they should not be viewed as descriptions of actual social interaction (Huston & Robins, 1982). Instead, they are best seen as personalized impressions of social activity that have been percolated, construed, and reframed through various perceptual, cognitive, and motivational processes.

There are three stages through which subjects must proceed to arrive at global impressions of the sort most questionnaires require, all of which are liable to

substantial distortion: *selection* of representative events and/or partners, *recall* of the characteristics of those events, and *aggregation* across multiple events. Here we briefly review the relevance of each of these problems to the distinction between standard questionnaires and diary methods. A more detailed discussion of cognitive biases relevant to questionnaire construction is provided by Schwarz (1990).

1. Selection

Selection poses potential problems for several reasons. For one, instructions rarely indicate whether subjects should describe all social interactions or a more narrowly defined set. Without explicit instructions to the contrary, subjects often assume particular criteria for delimiting the domain of events that seem to matter most: emotional significance, enjoyability, purely social (as opposed to task) functions, or formal (versus spontaneous) occurrence, for example. Moreover, even well-specified criteria for inclusion can be misunderstood by subjects, or produce idiosyncratic interpretations (Belson, 1981).

Another, more important reason why selection biases can affect responses to global questionnaires concerns people's difficulty in storing and retrieving detailed information about repetitive and often mundane events in long-term memory. Within the social cognition literature, many studies have demonstrated that the most available exemplars—instances that easily come to mind—influence judgments more strongly than less available events (e.g., Fazio, 1986; Tversky & Kahneman, 1982). Undoubtedly, certain social interactions are likely to be more cognitively available than others—a traumatic argument, an extremely intimate conversation, a recent meeting, a newly acquired or lost love, or a betrayed trust. It is improbable that the events being described are selected randomly or representatively (Halverson, 1988), especially when the time period subjects are asked to describe is lengthy. Instead, memorable, recent, and frequent events are more likely to be reported.

Characteristics of the questionnaire-administration situation may also influence the selection of events to be described. Mood and mood-related cognitions may affect memory retrieval, such that mood-congruent events are more likely to be recalled than mood-incongruent events (Blaney, 1986; Gilligan & Bower, 1984; Isen, 1984). This is true even when mood is induced by extraneous factors. Ehrlichmann and Halpern (1988) asked subjects to recall incidents cued by various words. Subjects were more likely to recall happy incidents when the room was filled with a pleasant odor; when the odor was unpleasant, they were more likely to recall unpleasant incidents.

Indeed, the mere act of asking questions may influence event selection. Consider a study by Goodhart and Peters (1986). To activate memories of socially supportive interactions, subjects were instructed to think about and evaluate

previous situations in which they had received tangible or self-esteem support from friends. Subsequently, various self-descriptive questionnaires were administered. Compared to a control group, the priming task induced lower self-esteem and feelings of self-control and positive affiliation, especially among females. Presumably, raising these events to conscious awareness made salient feelings of dependency, thereby diminishing perceptions of self-efficacy. Questionnaires can, depending on their focus, nonrandomly call particular past interactions to attention, altering subsequent recollections and assessments. More generally, research on the self-referencing effect—namely the phenomenon that having to decide whether given words refer to the self or not enhances later recall of those words, especially when they apply to the self (e.g., Rogers, Kuiper, & Kirker, 1977)—suggests that questionnaires can, by virtue of their format or timing, selectively influence subsequent recall of social activity.

These findings suggest that people's recollections of which social events did and did not take place within a specified interval may exhibit considerable inaccuracy. An extensive program of research into recall accuracy has been conducted by Bernard and Killworth and their colleagues (e.g., Bernard & Killworth, 1977; Bernard, Killworth, & Sailer, 1982; Killworth & Bernard, 1976). Their research focused on whether people remember who they talk to, as well as on moderating variables that might increase or decrease accuracy. For example, in a 1982 study, 57 scientists who were part of an existing computer-network communication system were asked with whom they had communicated, and how often, during specified intervals of 1 to 30 days occurring between 1 day and 2 months ago. Objective information was available from the networking records. Of partners listed during the interviews, 30% had not actually been in communication with the subject. Furthermore, subjects had forgotten 66% of those partners who had actually communicated with them. When asked to name their most frequent communication partner, 52% of subjects chose the wrong person. As might be expected, maximum error rates were obtained for shorter target intervals assessed at least 2 weeks afterward (note that most questionnaires utilize time periods exceeding 2 weeks), but even longer intervals of relatively recent vintage (e.g., 1 week of communication assessed 1 week later) produced inaccuracy rates not substantially lower than the study means.¹

¹A recent paper by Kashy and Kenny (1990) questions the conclusiveness of this program of research. These authors argue that the results of Bernard and colleagues are confounded, given that they used aggregate data and did not partition the variance into actor, partner, and relationship components. In reanalyses of the original data, Kashy and Kenny found differential results for these three components. They found that people were not very accurate when estimating how frequently they interacted in general (the actor component). Only when estimating relative interaction with a specific partner (the relationship component) were accuracy coefficients significant. Thus, while their results qualify the conclusions of Bernard and co-workers, they support our inference that generalized estimates of interaction frequency tend to be inaccurate.

A similar study with questionnaire data conducted by Conrath, Higgins, and McClean (1983) in three independent organizational settings found that, when subjects were asked to estimate how much they had interacted with particular others, only about 27% of their recollections were reciprocal (i.e., cited by both partners). There is also evidence that recall accuracy decreases linearly over time (Skowronski, Betz, Thompson, & Shannon, 1990). The implication of this work is that people often find it difficult to remember spontaneously just which interactions have actually happened. As we shall describe later, the RIR, like other daily self-reporting methods, greatly lessens such inaccuracy by obtaining subjects' reports soon after the event itself, before the event has been forgotten and precluding (or at least minimizing) retrieval-related biases.

2. Recall of Content

As for accuracy in recalling the content of social interactions, the literature in human social cognition is replete with demonstrations of biases in recollections of past occurrences, some due to heuristic, schematic, and other systematic memorial processes, some attributable to random forgetting, and still others based on motivated distortions such as selective perception, defense mechanisms, or dissonance reduction. [For extensive reviews of this evidence, see Fiske and Taylor (1984), Haan (1977), Markus and Zajonc (1985), Nisbett and Ross (1981), and Ross (1989).] Note we speak here not of individual differences in the interpretation of given social events, but rather of the manner in which those interpretations might differ at a later assessment from their standing at the time of occurrence.

Transitory factors such as mood can significantly alter the impressions a subject "remembers." For example, Schwarz and Clore (1983) found that subjects induced to experience positive moods at the time of appraisal reported higher life satisfaction and happiness than subjects induced to experience negative moods. And Forgas, Bower, and Krantz (1984) demonstrated that both the evaluation and recall of social interaction activity are influenced by mood at the time of recall. Moreover, even methodological details, such as the format of a questionnaire, can affect remembrances. For example, Schwarz and colleagues have shown in several studies that response scales requiring subjects to place themselves among low-frequency alternatives (i.e., "never" to "several times a week") produce significantly lower estimates of event occurrence than scales using high-frequency response alternatives (i.e., "less than once a week" to "several times a day"). Thus, even reports of discrete, easily defined, and distinguishable events (among other examples, their subjects were asked to recall the frequency of sexual intercourse) are subject to considerable potential for systematically biased recollection.

This is not to deny the essential importance of the individual in giving meaning to her or his social experiences (Duck & Pond, 1989). Individuals possess motives, traits, fears, and desires that affect impressions of interactions with others. Because many of the most interesting and consequential features of social life intrinsically involve deeply personal construals—for example, intimacy, joy, hurt, security, control—independent objective appraisals, even if they were possible to obtain, would be unlikely to capture fully the individual's experience of a given event. (Although, to be sure, the discrepancies between personal and independent assessments represent an important source of information about the person and relationship.) The problem with retrospective questionnaires is that they involve yet further reinterpretations over time, thereby obscuring *in vivo* interactional experience. Reconstructions of this sort are important in their own right, but because they are based on derivative processes that operate subsequent to, and independent of, the event itself, they first require understanding of interactional experience as it occurs.

Sometimes, interpretational biases in the recollection of prior personal history can obscure the meaning of empirical results. For example, the prototypical question "How many close friends do you see regularly?" requires subjects to decide just how close a close friend ought to be, and how often is regularly enough. Memory of past interactions must then be searched for events that either correspond with or contradict these standards, and these events must then be evaluated in the light of present circumstances. This process offers considerable potential for distortion, compared to what contemporaneous records might reveal. Such distortion is not necessarily random, however. Ross (1989) has demonstrated that people's reconstructions of their personal history are guided by implicit theories of the self, such that the content of remembrances is more likely to resemble current views about the self than actual past events. For example, McFarland, Ross, and DeCourville (1989) had women keep daily records about their menstrual symptoms for 4 to 6 weeks. Two weeks later, they were asked to recall their symptoms on a day they were menstruating. These ratings resembled their personal theories about their menstrual symptoms (assessed via questionnaire) better than their self-reported symptoms did. Ross (1989) interprets these results, as well as similar findings from other studies, as indicating that people invoke implicit theories of the self to "decide" what their past standing on any particular variable was.

Note that McFarland *et al.* (1989) used a daily diary to establish true accounts of subjects' symptoms against which retrospections were compared. Because global questionnaires almost universally require retrospection, it seems likely that they will verify subjects' self-conceptions, which may or may not yield accurate assessments of their ongoing activity. Returning to the prototypical question posed in the preceding paragraph, suppose a significant correlation were

obtained between this item and psychological well-being. It would be tempting to conclude that unhappy people are socially isolated. However, their view of themselves as unhappy might just as well have led some people to see their friends as distant and infrequent visitors, despite having socialized just as often and perhaps as intimately as happy persons do (Meehl, 1945). Obviously, it is most important in such research to distinguish these causal alternatives from one another, a task to which daily diary techniques are well suited.

3. Aggregation

Another set of difficulties inherent in global questionnaires concerns the aggregation process. Simply stated, we do not know how people combine data from multiple interactions to arrive at singular global impressions. In our studies, the average college student reports approximately seven interactions lasting 10 minutes or longer per day. Summarizing social activity over a typical month would therefore require consolidating data from 210 individual events. Many heuristics are possible: simple arithmetic averages (as, we suspect, researchers sometimes assume); averages weighted by factors such as relationship closeness, time duration, emotional intensity, historical noteworthiness, or temporal immediacy; selection of the most available or vivid event; and so on. Of course, even given the existence of a systematic rule, it is unlikely that people will apply it with much precision. Thus, aggregate ratings are likely to diverge substantially from composites that are computed independently from individual-event data. (We later present data on this point.)

Support for the notion that the aggregation process may be skewed by atypical events is provided by Hedges, Jandorf, and Stone (1985). They had subjects report their momentary mood four times a day: 9 AM, 1 PM, 4 PM, and 7 PM. Then, around 10 PM, the same subjects were asked to report their overall mood for that day. Peak momentary mood reports resembled overall daily moods more than the daily average, computed over the four momentary reports, did. The implication is that, when trying to summarize their day, subjects were more swayed by extreme momentary moods than by true averages of ongoing moods. Less intense events are simply more likely to be forgotten or ignored, a conclusion consistent with research on the availability heuristic (Tversky & Kahneman, 1982).

Diary methods that use computer aggregation to summarize event-by-event records avoid these problems (Csikszentmihalyi & Larson, 1987; Wheeler & Reis, in press). These procedures have another related advantage, namely that molecular data may be less susceptible to bias than global ratings are. In a recent study by Ritter and Langlois (1988), women playing with babies were rated on traits such as relaxation, competence, sensitivity, and support, either with their

facial features visible or with these features occluded, thereby obscuring their attractiveness. The same videotapes were used in both conditions. When these traits were assessed on global rating scales, a strong attractiveness bias emerged. When molecular codes for specific holding, kinesthetic, caregiving, and play activities (codes that in the literature have been related closely to these general traits) were examined, no such bias appeared. Thus, molecular codes were less susceptible to bias than global ratings were, presumably because these categories concern concrete behaviors and therefore require minimal integration and judgment by raters. This conclusion is similar to one offered by Shrauger and Osberg (1981) in a different domain. To facilitate accuracy in self-assessment, they suggest phrasing questions in terms of specific, well-defined behaviors and absolute criteria.

Event-by-event records are similar to molecular codes in that they require subjects to evaluate a specific, concrete circumstance, rather than to infer general trends across a series of events. They should therefore be less subject to biases and distortions. This is true for both objective (e.g., how many interactions with what sex persons took place) and subjective (e.g., how pleasant and supportive were one's interactions) variables. If dispositional and motivational factors affect the manner in which social memory is processed (as has been demonstrated repeatedly; see Ross, 1989; Snyder & Ickes, 1985; Taylor & Brown, 1988, for reviews), responses to global questionnaires are likely to represent biased reports of subjects' experiences. Of course the process of interpreting social experience is important to investigate in its own right (Duck & Pond, 1989) and is often the researcher's primary target. However, this process cannot be fully identified without comparison of the filtered, retrospective recollection against an objective, contemporaneous account. Thus, as a molecular method, the RIR embodies an ideal tool for evaluating the role of dispositional and motivational factors in the process of digesting everyday experiences into global impressions.

B. BEHAVIORAL OBSERVATION

Another approach traditionally used in investigations of interaction and relationship phenomena involves direct behavioral scrutiny. These methods have been described in detail by Weick (1985) and Ickes and Tooke (1988). Typically, subjects are observed, often in a laboratory but sometimes elsewhere (e.g., at home or in schools), and their interaction is recorded, either obtrusively or surreptitiously, by live coders or on videotape, a method that facilitates detailed coding and analysis. Two paradigms predominate: (1) observation of particular relationship types, such as marital partners, parents and their children, or friendship pairs (e.g., Gottman, 1979; Gottman & Parker, 1986) or (2) observation of a

single individual's activity in a fixed and conceptually interesting setting, such as work or school (Homans, 1950; Josephson, 1987). These techniques are undoubtedly useful, as evidenced by the rich body of knowledge they have produced. Nevertheless, three issues compromise their utility for characterizing fully the nature and extent of everyday social life.

1. It is likely that the behavior of subjects represents optimal rather than typical performance, especially when they are aware of being observed. Impression management, social desirability, and politeness rules all impel behaviors that, away from the inspecting eyes of presumably insightful researchers, might take very different forms. In such settings people often assume that their social or personal adequacy is being evaluated and, consequently, seek to do their best. For example, shy college students participating in a study of conversations might try to assert themselves more forcefully so as to avoid being perceived negatively. Similarly, domineering husbands or fathers might repress angry and avoidant responses in problem-solving interactions, knowing that an expert in family relations was watching. [Procedures in which subjects are unaware of being observed, such as the Dyadic Interaction Paradigm (Ickes & Tooke, 1988), preclude this problem.]

Another, more subtle way in which laboratory observations differ from spontaneous social activity is in the mandated existence of that interaction in the first place. In everyday life, people must decide whether or not to interact, weighing the anticipated rewards and costs against other alternatives (solitude, work, study, etc.). Furthermore, schedules, distance, fatigue, and other mundane details often inhibit socializing. Participation in a laboratory study precludes noninteraction as an alternative; subjects are present, usually to receive an extrinsic reward, such as experimental credit or money. Data about the frequency of socializing and the choice of interaction over substitute activities, which can highlight important predilections in real-life social participation, are by definition unattainable from this sort of research. For example, Larson, Raffaelli, Richards, Ham, and Jewell (1990) found that although depressed fifth to ninth graders experienced other people as less friendly and wanted to be alone more often, they did not actually spend more time alone than nondepressed youths.

2. Unless observations are conducted unobtrusively in the setting in which those behaviors naturally occur, it is likely that the research milieu will influence the behaviors that are displayed (Weick, 1985). The psychological laboratory, for example, even when comfortably outfitted, is replete with cues that elicit formal, polite, and perhaps introspective behavior rather than casual, unbounded informality (Ickes, 1983). Settings generally affect the nature of social interaction, of course (Altman, 1975; Barker, 1968); barrooms, fraternity houses, family dinners, departmental meetings, and encounter groups evoke varied moods, goals, scripts, and expectations that affect social interaction.

It is not generally acknowledged by interaction researchers that the setting in which an observation is conducted might be responsible, at least as a moderator variable, for results that are obtained, even though treatises on observational methodology often assign paramount importance to this factor. Weick (1985, p. 569), for example, includes the phrase "in relation to their naturally occurring contexts" as one of seven criteria for defining systematic observation, arguing that all such research must "specify contexts where people do and do not perform this activity" (p. 569). Although the patterns of interaction and social interdependence that have emerged from laboratory observations unquestionably provide useful information, comparable data generated from naturalistic settings are needed to fill out the picture of human interaction that emerges. Further discussion of the impact of the laboratory on spontaneous social behavior is provided by Ickes (1983).

An incidental finding by Snyder, Berscheid, and Glick (1985) supports this logic. Male subjects were asked to select one of two potential partners for a date: an attractive woman with an undesirable personality or an unattractive woman with a desirable personality. When the meeting was scheduled to take place in a local bar/restaurant, high self-monitors chose attractive partners, whereas low self-monitors preferred dates with desirable personalities. When the date was planned for a laboratory room, however, no differences occurred, apparently because the laboratory setting involves scrutiny by an experimenter and therefore invokes different sorts of concerns.

3. In that most observational studies focus on particular relationship types (e.g., spouses, strangers, playmates, or co-workers), they tend not to be informative about the breadth of interaction, nor about the generalizability of interaction processes and components across different relationships. Many important questions are included in this omission. Are an individual's interaction styles consistent in a traitlike fashion, or do they vary across partners? Does the receipt of social support in one relationship lessen its impact in other relationships? Are different needs satisfied by different relationships? Questions that extend beyond a given situation or a particular relationship require multiple observations in multiple settings, a costly, time-consuming, and largely impractical research strategy. On the other hand, self-reported event records can be adapted readily to provide such information.

II. A Brief Taxonomy of Event-Recording Methods

The RIR is one of several methods for the self-recording of daily life events. Although these methods are relatively new to social-personality researchers, they

have a long history within two separate subdisciplines, behaviorism and industrial/organizational (I/O) psychology. Beginning with Lindsley (1968), behaviorists have used such devices as portable wrist counters and paper-and-pencil logs to record the frequency of various events in everyday life. These events could include positively valued behaviors, such as smiling, and negatively valued behaviors, such as cigarette smoking. The general purpose of these records was to provide an objective and salient account of the frequency with which target events occur, so that behavior modification techniques might be used to alter their frequency. Within I/O psychology, observation and recording of workers' activities within fixed time periods is a long-established tradition (Weick, 1979), which was extended to self-reporting by Hinrichs (1964). Wheeler and Reis (in press) offer a somewhat more extensive history of these methods.

Self-recording of daily events became more widely popularized in the 1970s, in large part through the independent development of the Experience Sampling Method (ESM) (Csikszentmihalyi, Larson, & Prescott, 1977) and the RIR (Wheeler & Nezlek, 1977). In the ESM, subjects carry electronic pagers or portable, preprogrammed beepers, and are signaled at several randomly selected points during the day. When cued, subjects complete a brief questionnaire describing their current activities, thoughts, and impressions. [Interested readers are referred to Csikszentmihalyi and Larson (1987), Hormuth (1986), and Larson and Csikszentmihalyi (1983) for more detailed descriptions.] The RIR, in contrast, requires subjects to complete a record form whenever social interactions lasting 10 minutes or longer have occurred.

These methods, along with several other daily event-recording techniques (see, in particular, Robinson, 1987), led to a profusion of different procedures, each of them sharing the general goal of assessing daily life events through ongoing, contemporaneous self-reports, but differing in procedural details, research design, and specific content. Wheeler and Reis (in press) have recently suggested a taxonomy for classifying these methods based primarily on sampling units. This taxonomy highlights not only the advantages and disadvantages of each particular strategy but also the general range of phenomena to which such methods can be applied.

1. *Interval-contingent recording*: Participants report their experiences at some regular, predetermined interval. Typically, these intervals are chosen to demarcate theoretically or logically meaningful units of time or activity (e.g., at the end of each day or after every meal). This is the oldest and most widely used method of daily event self-recording. Examples include daily accounts of stressful experiences (Bolger, DeLongis, Kessler, & Schilling, 1989), descriptions of mood at four (Hedges *et al.*, 1985) and five fixed points each day (Campbell, Chew, & Scratchley, in press), and daily reports of headaches (Blanchard *et al.*, 1990).

2. *Signal-contingent recording*: In this paradigm, subjects are instructed to describe their activities whenever signaled by the researcher (e.g., through

beepers or telephone calls). Signal intervals can be fixed, random, or a combination of both (in which signals are randomly generated within fixed blocks of time). The ESM, described above, is a prototypical example of signal-contingent recording. Most of these studies use between six and nine signals per day, each randomly and unpredictably spaced within a predetermined interval. This technique has been used to study adolescent experience (Csikszentmihalyi & Larson, 1984), the daily life of ambulatory chronic mental patients (Delespaul & deVries, 1987), motivational effects on academic achievement (Wong & Csikszentmihalyi, in press), and intimacy motivation (McAdams & Constantian, 1983).

3. *Event-contingent recording*: This method requires a report from participants every time an event meeting some predetermined definition has occurred. The frequency of the relevant events, and hence subjects' reports, is usually variable. The key here is in the unambiguous definition of events requiring a report, so that *all* such events are described, as well as timeliness in completing the record as soon after the event as possible. This paradigm has been used to study various features of social interaction (in the RIR studies described subsequently), conversations (Duck, Rutt, Hurst, & Strejc, in press), and fluctuations in self-esteem (Hoyle, 1990). Event sampling might also be applied to other discrete events, such as by requiring reports after every use of drugs or alcohol; every marital conflict or fight between siblings; every headache or meal; or every sexual episode.

COMPARISON OF THE THREE PARADIGMS

Interval-contingent methods are usually chosen when researchers wish to examine the prevalence of certain events in daily life (e.g., stressors, headaches), or when they want to characterize everyday experience across some time period (e.g., daily mood). The longer the interval, and the more changeable and ephemeral the behavior in question, however, the more likely it is that retrospection biases will influence the data. Diary methods are expressly designed to minimize such distortion, so that interval-contingent methods should be used only when the time between the event and its description is short, or when the phenomenon itself is easily remembered. A major advantage of this method, on the other hand, is its simplicity. Subjects need only complete the instrument at the appointed time [which experimenters might even control, as by telephoning subjects once a day (Stone, Kessler, & Haythornthwaite, in press)]. Also, especially when equal time intervals are used, interval-contingent methods readily lend themselves to spectral analysis.

Signal-contingent and event-contingent recording reduce the likelihood of forgetting or reappraisal by requiring reports that are close in time to the event. Furthermore, if the signaling schedule is random, signal-contingent methods

have the considerable advantage of avoiding systematic bias introduced by assessing behavior or feelings at fixed times. (People may always feel lethargic after dinner, for example.) This makes the method most desirable for assessing the prevalence of different sorts of daily events—for example, socializing versus studying or alert versus lethargic states—or for comparing the nature of relatively common events. On the other hand, the rarer the event in question, the less useful this method is, since the chance of the signal and event coinciding are diminished. As a consequence, signal-contingent recording renders infeasible the study of variation within a class of even moderately rare events. If one wanted to compare interactions with best friends and romantic partners, it is unlikely that more than a few episodes within a week would be obtained from random signals. Alternatively, data would have to be collected for a prohibitively long time before an acceptable database was achieved. Moreover, because the psychometric advantages of event diaries stem from the assessment of many events within a category, it seems unlikely that signal-contingent sampling will produce a sufficient number of episodes to yield high reliability and confidence regarding generalizability. With even rarer events—for example, feelings and practices regarding sexual activity or alcohol use—the necessity of focusing directly on the events of interest becomes clear. Also, by including all relevant events, there is little chance that significant episodes will be omitted, either because of the respondent's own deliberations or because of signaling happenstance.

Hormuth (1986) has criticized event-contingent sampling on the grounds that it "permits subjects to anticipate many of the behaviors that will be measured, giving rise to a greater possible problem with behavioral reactivity" (p. 263). Subjects in our studies with the event-contingent RIR report minimal interference, however (see below). It seems unlikely that subjects would modify their social behavior for the sake of our ratings, since it would be far simpler merely to alter their ratings (a form of behavioral reactivity equally feasible with both methods). Although participants in a signal-contingent study may not be able to predict the exact moment of notification, the relative frequency of signals per day, as well as their dispersion, facilitate awareness of the assessment process and anticipation of the behaviors to be described. This awareness is also coupled with heightened chances for public self-consciousness. Although both paradigms are intrusive, event-contingent recording is less intrusive than signal-contingent recording because subjects are typically required to complete the questionnaire after an event occurs, and no one has to know about this but themselves. (Although beeper signals are often audible, some ESM studies allow subjects to switch them to silent vibrate mode.) Signal-contingent methods have also been criticized for sacrificing control over and information about the specific activities that are being described (Davison, Robins, & Johnson, 1983; Singer & Kolligian, 1987).

We therefore believe that the choice between signal-contingent and event-

contingent sampling ought to rest with the researcher's goals. In general, event-contingent sampling is preferable when (1) researchers are interested only in a limited domain of human activities, such as eating, socializing, or studying; (2) those events can be defined clearly for subjects; and (3) it is important to obtain a large number of events, so that variation within the category may be studied. On the other hand, signal-contingent sampling is preferable when (1) researchers are interested in the relative distribution of human behavior across different activities; and (2) when comparison of different domains is of prime interest.

III. The Rochester Interaction Record

The RIR was designed to allow researchers to examine in detail the nature and extent of an individual's participation in everyday social life. Because its intent is to permit discrimination among, and characterization of, the many types of social events that people encounter, it relies on event-contingent sampling. For a specified interval, typically 1 to 2 weeks, respondents are asked to complete a brief, fixed format record after every social encounter lasting 10 minutes or longer. A standard set of questions is used in each study, but the format is intended to be flexible enough to allow researchers to assess whichever dimensions interest them. From these records, summary indices are computed, aggregated, and subdivided according to theoretical and psychometric concerns. In our most recent studies, we have focused on two sets of variables. The first set includes five quantitative variables—number of interactions per day, average interaction length, time per day, number of different others, and dispersion across different partners. The second set consists of seven qualitative variables—perceived intimacy, self-disclosure, other-disclosure, pleasantness, satisfaction, initiation, and influence. Each of these variables is averaged across all interactions, as well as within categories based on composition: same sex, opposite sex, mixed sex, and group (see subsequent section for definitions of these terms). Indices can also be calculated for different types of relationships (e.g., close friends vs acquaintances, dyads), or for specific significant others, such as spouses, best friends, or co-workers.

Our procedures alleviate many of the problems described earlier. Selection bias is not relevant, because subjects are asked to describe all social encounters. Recall bias is minimized by having subjects complete the records shortly after the interaction. Aggregation occurs by computer according to the researcher's criteria, eliminating distortion inherent in subjective, imprecise appraisals. In that the database is composed entirely of interactions within people's natural everyday settings, encompassing all of the constraints and facilitators typical in social life, the obtained records are likely to be representative of that person's usual social

activity (at least to the extent that any 2-week slice can be representative of a longer interval). Finally, because all interactions are assessed, the findings are not limited to particular relationships.

An additional advantage of the RIR stems from its ability to provide detailed, accurate, and differentiated information. Accuracy is enhanced over other available methods because the contemporaneous diary-like format of the RIR minimizes many biases common to questionnaire research, as described earlier. This is not to suggest that all data gathered via the RIR are "objective" (in the sense that a team of well-trained observers would, if capable of following subjects throughout their daily lives, produce identical ratings). Some constructs, such as intimacy and satisfaction, are properly conceptualized in subjective terms. That is, they depend on the unique perceptions of the person doing the interacting, as she or he personally experiences that interaction (Duck & Pond, 1989; Markus & Zajonc, 1985; Reis & Shaver, 1988). Even so, subjective ratings are likely to be estimated more precisely with the RIR than with global questionnaires. This is because the RIR records subjective interpretations and evaluations at or near the time of interaction, one interaction at a time, thereby minimizing additional distortion and subjectivity brought on by selection, recall, and aggregation of many interactions over an extended period of time. For those variables that can be assessed objectively, such as the amount of social time, RIR-based ratings are likely to be more accurate than methods requiring greater cognitive activity from subjects.

The ability of the RIR to discriminate among the various features of social participation is also an important part of its rationale. Discriminability is an important yet often unaddressed issue in self-report methods. People often have difficulty distinguishing interaction parameters from one another, especially when their assessments are retrospective summaries. For example, perceptions of closeness and enjoyment might be hard to separate in the aggregate. Moreover, hedonic tone is by far the dominant dimension characterizing emotional experience in relationships (Attridge & Berscheid, 1990), so that ratings of positivity versus negativity in lay accounts might swamp other descriptors. Recording events separately not only provides the psychometric advantages of a large database of repeated measurements, it also increases researcher's ability to determine which facets of social participation are related to a given outcome, and, with equal importance, which factors are not related. That is, it allows researchers to establish both convergent and discriminant validity (Campbell & Fiske, 1959).

In its methodological format, the RIR is essentially a microanalytic approach. That is, it is designed to permit the study of patterns of social interaction by focusing in detail on their constituent elements. This strategy has been used increasingly in observational studies of marital and friendship dyads (Gottman, 1989), but is less common with self-report data. RIR data are not limited,

however, to examination of "micro" acts, as the examples we later provide will show. In fact, the RIR is well suited for crossing the bridge between microacts and macromotives. Holmes (1981) has argued that higher order (i.e., general) attitudes and dispositions over time control behavior in relationships. But, as Holmes and Gottman both point out, we know little about how these general macromotives are operationalized in everyday interpersonal behaviors. By aggregating over many such events, the RIR provides portraits of daily social activity that investigators can then relate to measures of higher order attitudinal and dispositional factors. For example, one might discover that people high in passionate love for their partners have a greater frequency of highly intimate interactions with them. Studies of this sort have the potential to answer important questions about the processes by which global motives, feelings, and traits come to affect social behavior and relationships.

A. PROCEDURES

Although the hallmark feature of the RIR is its use of standardized, fixed format records, its content is intended to be flexible and responsive to the researcher's theoretical interests. Figure 1 presents a sample RIR that we have used in several studies. Its components and scales were chosen to assess constructs relevant to particular processes and hypotheses in that research. Thus, for example, keeping track of partners' initials allowed us to determine how many different interaction partners subjects had, an important question in our physical attractiveness research (Reis, Nezlek, & Wheeler, 1980; Reis *et al.*, 1982). The social integration scale was included in a recent study of adults to test hypotheses

Date _____ Time _____ a.m. _____ p.m. _____ Length: _____ hrs. _____ mins.

Initials: _____ If more than 3 others: _____

Sex: _____ No. of females _____ No. of males _____

Intimacy:superficial 1 2 3 4 5 6 7 meaningful

I disclosed:very little 1 2 3 4 5 6 7 a great deal

Other disclosed:very little 1 2 3 4 5 6 7 a great deal

Social integration: did not feel like 1 2 3 4 5 6 7 felt like part of part of a group a group

Quality:unpleasant 1 2 3 4 5 6 7 very pleasant

Satisfaction:less than expected 1 2 3 4 5 6 7 more than expected

Initiation:I initiated 1 2 3 4 5 6 7 other initiated

Influence:I influenced more 1 2 3 4 5 6 7 other influenced more

Nature: Job Task Pastime Conversation Date

Fig. 1. Rochester Interaction Record.

comparing the relative impact of social networks and primary close relationships (Reis, 1989).

Other researchers have modified the RIR more substantially. Hays (1989), for example, added scales to assess specific benefits and costs received in social interaction, so that social exchange predictions regarding differences between close and casual friendships could be tested. Cutrona (1986) had subjects identify whether their interactions were help oriented and, if so, what sort of helpful activity took place (e.g., expressed caring or concern, gave advice). DePaulo, Kirkendol, Epstein, Wyer, and Hairfield (1990) had subjects complete a Deception Record every time they told a lie, rating its spontaneity, seriousness, and the target's reaction, as well as their reason for telling the lie. Sometimes, the basic record format has been modified so extensively that all that remains is the common strategy of using standardized, objective records for all interactions of a given sort. One such example is the Iowa Communication Record, developed by Duck *et al.* (in press) to examine the content, focus, and format of conversations. Such elaborations and metamorphoses are entirely consistent with our belief in the value of event-contingent sampling for studying social events.

In our studies, we have found that 1 to 2 weeks is the optimal record-keeping duration. Shorter periods can be prejudiced by atypical days, especially because at least among college students, each day of the week has a characteristic structure (e.g., particular classes, jobs, Saturday night dates) affecting social activity. Intervals longer than 2 weeks would probably tax subjects too greatly, lessening the quality of their data. In another context, Huston and Robins (1982) concluded that 9 days gave a satisfactory and representative sampling of day-to-day marital functioning. It is important to choose time periods that do not include important special events, such as major holidays or examination periods. Although these events might be constant across subjects, individual reactions may differ (for example, some students go home for holidays, others don't), compromising the assumption that the underlying social opportunities are reasonably equivalent for all participants.

In this type of research, subjects must be cooperative, motivated, and at least somewhat interested in the research itself. Because the process at times can be tedious and intrusive, they must see some purpose, not only to their own participation but to the research project as well. (We have found that the stated need to establish scientifically valid parameter estimates regarding basic facets of social life—"How much do people socialize?"—often strikes a resonant chord.) Thus, our solicitations typically focus on two features: the inherent appeal of more closely examining one's social life, and a minimal but nontrivial extrinsic reward (e.g., \$20 or a semester's worth of experimental credit). The aim is to provide enough reward to make the exchange feel equitable to subjects, but not so much that unmotivated subjects will enroll solely to receive the reward.

It is also important to maintain a collaborative, trusting relationship with

subjects. Indeed, for this reason, we refer to our subjects as "co-investigators." One can easily imagine the fears and anxieties that diary keepers might have about sharing very personal records; without any objective check on the accuracy of their diaries, they might alter their records in response to those fears. It is therefore particularly critical that subjects be given strong assurances regarding the complete confidentiality of their data. We give all subjects the option of withdrawing any time and taking their diaries with them (an option that no subjects have yet exercised). Furthermore, it is also productive to answer subjects' questions as fully as possible without jeopardizing specific hypotheses. (Most participants are sufficiently naive about interaction concepts that broad generalizations usually suffice.) The openness and candor of the investigators provide a good model for participants. Methods for establishing such relationships are discussed in greater length by Nezelek, Wheeler, and Reis (1983).

Two additional steps are taken to ensure the accuracy of the database. First, in both written and oral instructions, subjects are instructed to complete each RIR as soon as possible after the interaction in question, but certainly no less than once or twice a day. Scratch sheets are provided as memory aids. To encourage reliability, subjects are asked to hand in completed records and pick up blank forms every 2 or 3 days (although this requirement is not feasible if subjects are not on site daily). Second, at the conclusion of the record-keeping period, subjects are interviewed by the researcher or an assistant. They are encouraged to voice their reactions to the study, and, especially, to note inaccuracies in their records (without penalty). Most subjects report that they enjoy maintaining the records, and that they have been reasonably accurate (mean ratings approximate 2.5 on 7-point scales, with 7 representing "highly inaccurate"). Subjects generally report omitting between 5 and 10% of their interactions, but without systematic bias as to nature or content. Typically, about 3 to 5% of respondents indicate that they have been substantially inaccurate. They are thanked for their honesty, and their data are eliminated.

Subjects are asked to complete one record for every interaction that lasts 10 minutes or longer. The 10-minute time limit is imposed for two reasons, one theoretical, the other practical. First, we intend the database to incorporate the more meaningful social events that occur in a person's life, and we believe (supported by pilot data) that, for the most part, very brief social contacts rarely meet this criterion. Second, requiring subjects to describe every encounter would pose too burdensome a task. Indeed, it could lead to substantial inaccuracy in the recording process. The 10-minute cutoff is therefore a compromise between the ideal and reality.

Interactions are defined as

any situation involving two or more people in which the behavior of each person is in response to the behavior of the other person.

A conversation is the most obvious example of an interaction, but there are many other

sorts of interactions as well. Merely being in the presence of another person is not enough by itself. For example, watching television and not talking to the person next to you is not an interaction. In order to count as an interaction, you must be responding to each other, such as by talking about what you are watching. Any social activities that involve mutual responding count: work, hanging out, conversing, doing things together, etc.

Keep the records for every interaction that lasts 10 minutes or longer. It does not matter where the interaction occurs, be it at home, at work, on the street, etc. It is vital that you keep the record every day, all the time. Record job activities to the extent that you and your co-workers are responding to one another for 10 minutes or longer. Record phone calls, if they last for at least 10 minutes.

The various components of the record are defined only to the extent necessary to guarantee clarity. Subjects are not told how specific interactions should be represented, and, in fact, our interest in their personal interpretations is emphasized. They are told that intimacy is not necessarily equivalent to sexual activity. The difference between pleasantness (reaction to an interaction) and satisfaction (expectations about an interaction) is explained. The distinction between jobs (regular work that requires interaction), tasks (doing something), pastime (shared, unfocused activity), conversations, and dates (any activity you would call a "date") is also discussed.

Subjects are asked to identify their interaction partners with a unique set of initials for each partner. We suggest using code initials if they are concerned about preserving anonymity and confidentiality (especially if their friends are also study participants). During the post-record-keeping interview, we inquire about their role relationship with each set of initials, depending on the aims of that study: best friends, romantic partners, confidants, parents, work supervisors, etc. These codes permit sorting according to particular types of relationships (e.g., best friends vs superficial acquaintances).

Once completed, the RIRs are entered into a computer file and aggregated into theoretically relevant categories. FORTRAN programs are available for this purpose (Nezlek & Wheeler, 1984), although most statistical software packages can readily perform the necessary sorting and summarizing (e.g., the SPSS-X Aggregate Program; Lin, 1990a). Typically, four categories have predominated in our analyses: same sex (up to three others of the subject's sex), opposite sex (up to three others of the opposite sex), mixed sex (two or three others, one of each sex), and group (more than three others). The cutoff of four to define a group is derived from group size research (e.g., Asch, 1956; Wilder, 1977), which has shown that the incremental effects of additional group members decrease greatly above three others. Role-based groupings, such as all interactions with romantic partners, best friends, and confidantes, are also useful. Of course, other content groupings (e.g., all dyadic interactions, all work-related interactions, all high self-disclosure interactions), specific role groupings (e.g., parent-child interactions, supervisor-supervisee interactions), and role-task combina-

tions (e.g., comparing interactions with one's romantic partner at work versus at home) are also feasible.

B. RELIABILITY AND VALIDITY

Because RIR composite variables average across events that inherently vary in the degree to which various characteristics are present, standard measures of internal consistency are not appropriate indicators of reliability. That is, in computing the reliability of trait or ability inventories, one assumes that items have been sampled randomly from the universe of all possible items, and that if each item were a perfect indicator of the trait in question, individuals ought to score equivalently on all items (correcting for mean and variance differences). In contrast, interaction data properly should vary. For example, some relationships are more intimate than others, and even within the same relationship some interactions are more intimate than others. Because there is no reason to expect or desire consistency across interactions (items), standard reliability indices are problematic.

Nonetheless, the 2-week record-keeping period is assumed to represent a stable and generalizable estimate of social life, so some degree of consistency ought to appear. Split-half correlations were computed for 2 weeks of interactions reported by 113 subjects (Reis, 1989). For each variable, separate composites were computed for even and odd days and then correlated with each other. Two standard quantitative indices, frequency and length, each yielded intraclass correlations of .85. Among the subjective RIR scales, correlations were as follow: intimacy, .89; self-disclosure, .92; other-disclosure, .88; social integration, .95; quality, .79; satisfaction, .76; initiation, .62; and influence, .75.²

Three studies allowed comparison of RIRs from interacting partners. The first (Wheeler & Nezlek, 1977) included several pairs of college roommates, permitting checks on reported interactions with each other. Intraclass correlations were computed on the number of interactions per day reported with each other, separating data for males and females, and for the fall and spring semesters of the academic year. These values ranged from .67 to .84. The Reis *et al.* (1982) data set contained 17 roommate pairs, for whom the comparable intraclass correlation was .81. In a third study (Hodgins & Zuckerman, 1990), the intraclass correla-

²These results hold theoretical interest aside from their psychometric implications. That is, they suggest that people's interaction patterns may exhibit traitlike stability over time. Although previous studies have shown stability in personality traits relevant to socializing—such as need affiliation, intimacy motivation, and sociability—evidence for continuities in the behavioral manifestations of these traits is much more sparse. Later we report a more extensive study relating to this possibility.

tion for 55 roommate pairs was .84 for the mean number of interactions with each other and .67 for the average length of those interactions. These figures indicate substantially high levels of mutual reporting, suggesting that errors of inclusion or exclusion were rare.

Another indication of accuracy stems from interviews. In the five most comprehensive studies we have conducted (Reis, 1989; Reis *et al.*, 1980; Reis, Senchak, & Solomon, 1985; Wheeler & Nezek, 1977; Wheeler, Reis, & Nezek, 1983), the following means (*M*) were obtained.

1. Degree of difficulty in recording interactions (1 = no difficulty, 7 = very much difficulty), *M* = 2.75, 3.21, 3.41, 3.13, 3.00
2. Perceived accuracy (1 = very accurate, 7 = very inaccurate), *M* = 2.62, 2.47, 2.46, 2.84, 2.47
3. Did such accuracy increase or decrease as the study progressed? (1 = decreased, 2 = no change, 3 = increased), *M* = 2.17, not available (na), 2.11, 2.16, na.
4. Subject's guess of the percentage of interactions not recorded, *M* = 9.7, 5.6, 5.9, 8.2, 6.5
5. Extent to which the record keeping interfered with interactions (1 = no interference, 7 = a great deal of interference), *M* = 1.36, 2.06, 1.41, 1.83, 1.64
6. Number of interactions recorded of less than 10 minutes, *M* = na, 0.37, 1.03, na, 0.99

Cutrona (1986), Hoyle (1990), Milardo, Johnson, and Huston (1983), and Sullivan, Nezek, and Jackson (1990) report similar interview data, as do Hodgins and Zuckerman (1990), who collected these data anonymously. These self-reports are not objective measures of accuracy. However, to the extent that one might reasonably expect them to reveal difficulties, they indicate that subjects experienced few problems with the records and believed them to be accurate.

Validity studies are difficult in that objective criteria against which to compare the various qualitative scales are not easily defined; features such as intimacy and satisfaction reside largely in the mind of the beholder. Nevertheless, to the extent that consensual agreement can be established, the generalizability of RIR data would be enhanced. Reis, Senchak, and Solomon (1985) videotaped 26 male and 28 female subjects conversing with their best friend about a meaningful topic. Immediately afterward, they completed an RIR form for that interaction. The videotapes were rated for intimacy by seven female graduate students in education and psychology who were unacquainted with the subjects or the purpose of this research. RIR self-ratings and the mean judge rating correlated .62 ($p < .001$) for female subjects, and .47 ($p < .02$) for male subjects. It is important to remember that subjects had been asked to discuss a meaningful topic, thereby

restricting the range of intimacy scores and, in all likelihood, attenuating the obtained correlations. Thus, the degree of correspondence between RIR ratings of intimacy and independent judges' assessments is considerable.

In another study (Whitbourne & Reis, 1982), subjects who had already completed the RIR were classified as to their intimacy status level, using an interview format developed by Tesch and Whitbourne (1982) based on Erikson's (1950) theorizing. As the theory predicts, those classified as Isolates had significantly fewer opposite-sex interactions for less time per day and reported significantly lower intimacy levels in both same- and opposite-sex interactions (all p values $< .05$) than those who had already achieved Intimacy status or who were further along in this process.

It may also be helpful to mention several psychometric studies examining different event-sampling methods. Conrath *et al.* (1983) had subjects keep diary records of 100 consecutive interactions, as well as complete a global questionnaire afterward. When the degree to which two individuals concurred was calculated, results showed that the diary method fared significantly better than the questionnaire ($p < .001$). Furthermore, diary records tended to be more accurate when interactions exceeded 90 seconds (Higgins, McClean, & Conrath, 1985). Csikszentmihalyi and Larson (1987) present extensive reliability and construct validity information regarding the Experience Sampling Method, including data revealing substantial stability over time for activity frequencies and psychological states (e.g., affect, arousal).

C. COMPARISON OF THE RIR WITH GLOBAL QUESTIONNAIRES

A guiding principle of our work has been the assertion that detailed diaries provide information different from global questionnaires. "Different" does not imply better; rather, different measures speak to different conceptual perspectives, each of which may be illuminating in its own right. The RIR (and related techniques) is intended to yield detailed, objective accounts of everyday social activity. Global questionnaires, in contrast, assess such activity as filtered through the various cognitive and motivational processes described earlier. Both types of information are needed, and, in fact, comparison of global impressions with RIR data is an appropriate and informative way of identifying and delineating this filtering process (see McFarland *et al.*, 1989, for a good example). What is most important is that the two types of information not be mistaken for each other (Meehl, 1945).

Because gathering data with the RIR is obviously more tedious and labor intensive than with global questionnaires, it must pass muster on three criteria: (1) It must in fact provide different information than global questionnaires do; (2)

the data must be more accurate, in the sense of faithfully characterizing ongoing social activity; and (3) this information must repay the researcher by supporting unique findings and theoretical insights. In order to address the first of these criteria, Reis (1989) asked subjects to answer a series of general questions about the quantity, quality, and distribution of their social activity immediately after they had completed a set of RIR diaries. These responses were then correlated with the RIR indices to which they might reasonably be expected to pertain. As shown in Table I, these correlations ranged from null to strongly significant, but even in the latter instances, more than three-quarters of the variance was left unaccounted. It is heartening that most of these correlations were significant; recollections and interpretations should, after all, be grounded substantially in

TABLE I
CORRELATIONS OF SELECTED RIR AND QUESTIONNAIRE ITEMS

1. How many close friends do you have at the university?		
With number of different male partners	$r =$	.17
With number of different female partners		.13
2. How much time have you spent alone?		
With time per day spent interacting	$r =$	-.26
3. How frequently have you done things alone as opposed to with a friend?		
With total interaction frequency	$r =$	-.24
With total time spent interacting	$r =$	-.23
4. How often have you done things with your friendship group?		
With frequency of all interactions	$r =$	.35
With frequency of same-sex interactions	$r =$	.33
With frequency of group interactions	$r =$	.38
5. How often have you participated in group activities?		
With frequency of group interactions	$r =$	.17
6. Satisfaction with quality of social friendship group:		
With overall pleasantness; satisfaction	$r =$	.25; .19
With same-sex pleasantness; satisfaction	$r =$	.24; .18
With opposite-sex pleasantness; satisfaction	$r =$	.20; .12
With best friend pleasantness; satisfaction	$r =$	.29; .24
7. Satisfaction with number of friends at the university:		
With number of male partners	$r =$	.08
With number of female partners	$r =$	.30
With same-sex pleasantness; satisfaction	$r =$	.16; .13
With opposite-sex pleasantness; satisfaction	$r =$	.15; .15
With best friend pleasantness; satisfaction	$r =$	.28; .28
With romantic partner pleasantness; satisfaction	$r =$	.07; .05
8. How often have you gone on a planned date?		
With frequency of romantic partner interactions	$r =$	.48
9. Satisfaction with quality of dating relationship:		
With romantic partner pleasantness; satisfaction	$r =$	.08; .04
10. Satisfaction with number of dates in the past 2 months:		
With romantic partner frequency	$r =$	.34
With romantic partner pleasantness; satisfaction	$r =$	-.09; -.15

actual events. The discrepancies nevertheless indicate that different information is provided by each sort of measure.

This brings us to the second criterion: accuracy. Which account better reflects the facts of social participation? Although this question cannot be answered absolutely without a truly independent, objective criterion (such as having observers surreptitiously keep track of subjects' social activity for 2 weeks), there are several reasons why the RIR should be preferred. For one, as described earlier, the vicissitudes of selection, recall, and aggregation will likely exert greater influence on retrospections that consolidate many exemplars over more time than on singular, contemporaneous ratings. For another, the recording conditions and instructional set of the RIR stress objectivity. Most global questionnaires, in contrast, ask subjects for "their own personal view" simply because personal experience is the intended construct. Thus, whatever their utility, RIR data would seem the more trustworthy representations of social activity. Several studies have already been cited in support of enhanced accuracy of diary methods over other techniques (for further discussion, see Duck, 1991; Ericsson & Simon, 1980; Huston & Robins, 1982; Singer & Kolligian, 1987).

The final criterion, uniqueness of findings, is perhaps the most contentious. Global questionnaire methods have always played, and doubtlessly will continue to play, a valuable role in the development of empirically based knowledge about social interaction. Yet, even in this context, RIR-type data can play an important role in providing new insights. Suppose a researcher was trying to establish the precise social deficiencies responsible for feelings of loneliness. One might administer simultaneously the UCLA Loneliness Scale (Russell, Peplau, & Cutrona, 1980), the RIR, and a series of general questions about social life. In all likelihood, questions like "How much time do you spend alone?" would probably correlate as well or better with Loneliness scores than RIR total time spent interacting would. After all, this question and the UCLA scale score share several sources of variance—including method factors and dispositional variables that lead to systematically biased recollections—that are not shared with RIR indices. But a significant correlation between the general item and loneliness should not be considered firm evidence that interaction quantity is deficient among lonely persons; alternative explanations deriving from their shared variance are also possible. It might be the case, for example, that loneliness predisposes people to see their social activity, regardless of its prevalence, as insufficient. On the other hand, a significant correlation between the amount of time per day spent interacting, as gauged by the RIR, and reports of loneliness reveals with greater certainty that lonely people do in fact interact less (for whatever reason).

This is indeed what our research has shown (Wheeler *et al.*, 1983). Prior research (Russell, 1982) found a correlation of .41 between the aforementioned "time alone" item and loneliness; our study found correlations of -.38 (females) and -.46 (males) between time per day with female partners and

loneliness. Further analyses revealed that this effect was likely due to the higher intimacy level of interactions involving at least one female, providing useful specification of the obtained time correlation. We do not believe it would be appropriate to draw such conclusions from global questionnaire ratings.

Two other brief illustrations taken from the results listed in Table I might help emphasize this point. First, although item 2 (How much time have you spent alone?) correlated reasonably well with total interaction time, it correlated best with time spent in group interaction ($r = -.32$) as opposed to the various other composition categories. In that the sample was mostly first and second year students, this result supports the salience and value placed on large group interactions in the mind of younger college students (Astin, 1987; Wheeler & Nezlek, 1977). Second, item 9, concerning perceived satisfaction with dating relationships, correlated better with romantic partner intimacy (.32), self-disclosure (.34), and other-disclosure (.43) than it did with pleasantness (.08) or satisfaction (.04). This would seem to indicate that global perceptions of satisfaction are more closely tied to intimacy than to ongoing levels of satisfaction, a point related to a theoretical model we have proposed elsewhere (Reis, 1990).

In conclusion, the advantages of the RIR stem from its ability to provide data that are more accurate and better specified than global self-report questionnaires are. By portraying social participation more precisely, the RIR permits researchers to rule out many alternative explanations, thereby pinpointing the correlates of social interactions with considerably greater theoretical precision. Ultimately, it is this factor that justifies the extra effort that RIR data collection and tabulation require.

IV. Research Overview: Findings Generated by the RIR and Related Techniques

The conceptual and methodological justifications for the RIR discussed so far tell only half the story. The RIR is advantageous for researchers only to the extent that it speaks to theoretically interesting issues in a novel, unique, or empirically superior fashion. To illustrate the RIR's effectiveness in this regard, we next provide a brief synopsis of several studies that have used the RIR to good conceptual account.

A. ADAPTATION TO A NEW SOCIAL ENVIRONMENT

In a series of well-known experiments, Schachter (1959) showed that fear may increase people's desire to affiliate with others. This finding has been replicated

many times, in both laboratory and natural (e.g., during blackouts) experiments (although, to be sure, certain situational or dispositional variables may attenuate or even reverse this tendency). These studies generally use fear-arousing situations that are one-shot, involuntary, temporary, or otherwise detached from the stream of ongoing, voluntarily chosen daily interactions. Thus, the question remains whether people would show similarly heightened desires for affiliation when the source of anxiety is pervasive, continuous, and embedded in real-life activity.

Wheeler and Nezlek (1977) obtained relevant data by examining changes in social interaction during the transition to college. For students who attend a university away from home, this transition can be quite stressful, since their comfortable, secure, home social environment is exchanged for a new academic and social life, new friends, and a new domicile. Therefore, one would expect an increase in socializing early in the year, followed by a decrease once the new environment becomes familiar. Wheeler and Nezlek had 58 first year students complete an early version of the RIR (see Fig. 1) at the end of their first month at college (fall) and 1 month before the end of their first year (spring). They found clear evidence of the expected decrease in socializing, but only for females: They dropped from 389 to 323 minutes per day, whereas males remained steady at 338 and 337 minutes per day. [Recall that Schachter's (1959) original subjects were females.] Further analyses indicated that the drop for females was most evident in interactions with subjects' same-sex best friend. The authors interpret these (and related) data as indicating females' greater reliance on their same-sex best friends as coping resources during a stressful transition. In part, this may be due to the higher intimacy level of women's same-sex interaction when compared with men's, a robust finding that has emerged in all of our RIR studies. Males apparently relied on other, less socially involved means of coping with the transition to college, consistent with other research showing that women both receive and give higher levels of emotional support (Vaux, 1985). As a result, males showed few significant changes in their interaction patterns from fall to spring.

B. LONELINESS

Our research on loneliness (Wheeler *et al.*, 1983) is a good example of a study in which the RIR provides higher quality evidence and better differentiated results than alternative methods. Validation studies for the well-known UCLA scale reported significant correlations between this scale and global self-report items such as "How often have you done something with a friend?" ($r = -.28$) and "How many close friends do you have?" ($r = -.44$; see Russell, 1982; note that similar results have been reported for other loneliness scales).

There are several problems with interpreting these correlations as evidence for the specific social deficits inherent in the experience of loneliness. First, the loneliness scale itself is made of similar items, and one is almost bound to find some correlation for purely methodological reasons. Second, some aspects of social activity are probably more closely related to loneliness than others, but it is not clear that general impressionistic questions can distinguish them. Although loneliness is typically characterized as a discrepancy between desired and actual social activity (Peplau & Perlman, 1982), it is important to identify the specific deficiencies that are most likely to be problematic. Third, because loneliness as a psychological state might motivate subjects to underestimate their social contacts and the meaningfulness of those contacts, a significant correlation might not mean that lonely people in fact socialize less or less meaningfully. Cognitive distortion of this sort would be important to document, but this can be done only by having objective accounts of social participation against which to compare. And barring constant observation by independent observers, event-contingent self-recording is probably as objective as we can get.

To identify the specific interaction correlates of loneliness, Wheeler *et al.* (1983) had 96 college seniors keep the RIR for 2 weeks. Immediately afterward, they filled out the UCLA Loneliness Scale. Two general results were obtained. First, for both sexes, the amount of interaction with female, but not male, partners was strongly related to loneliness. For example, as noted previously in Section III,C, time per day spent socializing with women correlated $-.38$ ($p < .05$) for female subjects and $-.46$ ($p < .01$) for male subjects; the comparable correlates for interaction with male partners were $-.06$ and $.15$ (both *ns*), respectively. Second, levels of intimacy were significantly related to loneliness in both sexes, for partners of both sexes (r values range from $-.33$ to $-.48$, all p values $< .05$). Because interactions involving at least one female tend to be significantly more intimate than interactions involving males alone (a finding that has been replicated in all of our studies), these results were interpreted as indicating that the lack of intimacy in social interaction is the fundamental deficiency related to loneliness.

These differential results are an important part of the rationale for the RIR. It would be difficult to argue that method or motivationally based biases were responsible for finding significant correlations for interaction with women partners but not men partners. Differentiability on the criterion variable side is also useful to note. That is, different outcomes should, and do, relate to different interaction variables. In that vein, Reis, Wheeler, Kernis, Spiegel, and Nezek (1985) found that although total visits to the University Health Service were predicted by poor interaction quality, visits for socially communicated illnesses, such as flus and viruses, were more prevalent among subjects who interacted more often.

C. THE IMPACT OF PHYSICAL ATTRACTIVENESS ON SOCIAL PARTICIPATION

Two early studies in our research program were concerned with the impact of physical attractiveness on social participation (Reis *et al.*, 1980, 1982). Although much research to that point had demonstrated that attractive persons are perceived to enjoy better social lives, nearly all of this evidence derived from studies in which subjects (1) gave first impressions of strangers about whom little information was available, (2) described the social characteristics of someone whose attractiveness was known, which might therefore bias their ratings, or (3) evaluated their own experiences on global questionnaires. Because attractiveness is known to have strong effects on self- and other-perception (Berscheid & Walster, 1974; Hatfield & Sprecher, 1986), we felt that it would be important to determine how the social life of attractive and unattractive individuals actually differs (as opposed to how people *think* they might differ).

In the first study (Reis *et al.*, 1980), 35 male and 36 female first-year college students kept the RIR for four 10-day periods spread across the academic year. We obtained consensual attractiveness ratings by having their photographs rated by a large number of students at another university. Among males, the average correlations across the four periods between attractiveness and social behavior were impressive: With number of different females interacted with, $r = .50$; with number of opposite-sex interactions per day, $r = .54$; with percentage of opposite-sex interactions, $r = .56$; with average length of opposite-sex interactions, $r = .44$; with total opposite-sex time per day, $r = .57$. For females, none of these correlations approached significance (nor were curvilinear trends evident). The greater time that attractive males spent with females came at the expense of socializing with other males. That is, attractive males were not just heavy socializers in general—they simply interacted more with females.

Had we conducted this study with standard methods, such as by asking subjects how popular they were with the opposite sex or how many dates they had, we probably would not have obtained these results, but rather would likely have found a stronger relationship for females than for males between attractiveness and opposite-sex contact (cf. Feingold, 1990). There is a cultural belief that attractiveness is a more important asset for females, and subjects, having at least some idea how attractive they are, would probably respond in line with the cultural belief. Some support for the cultural belief was obtained, however, from the RIR measure of interaction quality. For both sexes, but especially for females, attractiveness was associated with significantly high levels of rated pleasantness.

The mundane task of recording interactions bypasses the cultural belief. This belief is, in fact, so strong that we felt compelled to replicate the study using

seniors rather than first year students. Our reasoning was that, from an evolutionary perspective, attractiveness ought to be a more important asset for whatever sex is in a more competitive "mating and dating" situation (Buss, 1988). Among freshmen, males are in a more competitive situation because age-dating norms dictate that they compete for a smaller group of first year females with all other undergraduate males and perhaps graduate students. (This university also enrolled 60% male students at that time.) Freshman females are in a relatively less competitive situation. Among seniors, however, the situation is reversed. Given that females are less likely to date younger males than the reverse, senior females have an unfavorable sex ratio, whereas senior males have a larger pool of eligibles.

In the senior study (Reis *et al.*, 1982), data were collected for one 2-week period during the first semester. And, once again, we found that physical attractiveness predicted the social behavior of males but not of females. Male correlations with attractiveness were $r = .49$ for number of different females interacted with, $r = .45$ for number of opposite-sex interactions per day, and $r = .48$ for percentage of interactions that were opposite sex. Unlike the freshman study, however, average length of opposite-sex interaction was not related to males' attractiveness. Correlations for females again did not approach significance. Thus, we replicated in a quite different group a result that contradicts cultural beliefs, thereby discounting the sex-ratio explanation. We also replicated the significant correlation between attractiveness and interaction pleasantness among females ($r = .41$), although the comparable effect for males was not significant.

In this study, we also sought to identify mediating variables by giving subjects several questionnaires of interaction-relevant traits. As might be expected, attractive males were more assertive (on the Dating and Assertiveness Questionnaire) and lower in fear of rejection by the opposite sex. Both of these characteristics related to opposite-sex interaction in the expected way, and partialing them from the correlation between attractiveness and opposite-sex social contact reduced the size of these correlations but did not eliminate them. Attractive females were *lower* on assertiveness and *lower* on trust in the opposite sex, suggesting that this trait difference might counteract any advantage based on appearance.

These results suggest that the impact of attractiveness on everyday social experience is different—and more complex—than cultural beliefs, as well as research from other paradigms, indicate. Of course, the RIR assesses all social contact, and it is possible that the cultural belief applies more circumspectly to romantic attraction. That would be an important qualification to identify, since it suggests a person \times situation interaction in the impact of physical attractiveness.

D. DEVELOPMENTAL TRENDS IN SOCIAL PARTICIPATION

Although most theories of life-span development posit changes in the nature and goals of social participation at different stages of life (Whitbourne & Weinstock, 1979), there has been little empirical work directly examining these changes. One reason for the absence of such studies concerns the inherent difficulty of interpreting age-related changes in self-reported descriptions of social activity. People evaluate their social behavior according to age-related norms and personal desires. For example, loneliness in a 10-year-old person is likely linked to different circumstances than in a 40-year-old person. Another reason is that questionnaires that ask people to retrospect over long periods in their lifetimes often yield responses that are affected by the various recall biases discussed earlier.

In a recent study (Reis, 1989), we used the RIR to examine changes in social interaction from the college years to age 30. Early adulthood is a period in which establishing intimate adult relationships is thought to represent a critical developmental goal (e.g., Erikson, 1950; Levinson, 1978). This interval is also of interest from the perspective of coping, since the move away from a residential college to adult life includes one of life's most abrupt and complete transitions: at graduation, social networks, work and financial responsibilities, and physical locations change dramatically, necessitating new adaptations. Further, the impact of the situational environment also changes markedly. In residential colleges, physical settings and tasks all facilitate spontaneous interaction; privacy, if desired, must be sought out. In adulthood, living arrangements are typically more private, so that social contact must be sought actively and usually scheduled. These factors make the comparison between college and adult social life intrinsically interesting.

The RIR is well suited to this comparison, since it requires participants to report all of their interactions in a concrete, standard fashion. One hundred thirteen subjects, all between the ages of 26 and 31, kept the RIR for 2 weeks. All had participated in a prior RIR study as college students, so that their college-age interaction data were already available for longitudinal comparisons. Three results were most striking. First, looking at interaction quantity, the amount of daily interaction decreased significantly, from an average of 341 to 278 minutes. Significant and substantial decreases were evident in same-sex and group interactions (same sex: from 130 to 76 minutes per day; group: from 86 to 36 minutes per day). On the other hand, opposite-sex interactions, and especially interactions with opposite-sex best friends (usually romantic partners), *increased* significantly, from 92 to 116 minutes per day. These results are consistent with theorizing about the importance of groups and same-sex friends in late adolescence (Sullivan, 1953), as well as common sense assumptions about the heightened role of male-female dyads in adulthood.

Second, interaction intimacy increased significantly in all categories: for example, on the RIR 1–7 scale, in same-sex interaction from 3.68 to 4.00; and in opposite-sex interaction from 4.10 to 4.35. The fact that this increase appeared in all categories suggests that the trend reflects a developmental shift in social preferences or abilities. Although this shift is consistent with Erikson's (1950) theorizing, its breadth implies that the shift is not merely limited to the union with a heterosexual partner, but rather pertains to wider patterns of social engagement. It is important to note that this increase was *not* due to generalized increases in positivity over time. Ratings of interaction satisfaction *decreased* from college to adulthood, especially so in opposite-sex interactions. Thus, while socializing became more intimate in adulthood, it was also less enjoyable. The implication may be that, compared to social life in college, adult socializing emphasizes closeness and commitment (e.g., conflict, "serious" conversations, relationship maintenance), and is focused to a lesser extent on recreation and other pleasurable activities. Further longitudinal research is needed to see if this divergence continues into middle adulthood.

Third, we were also interested in whether individuals' interaction patterns demonstrated relative stability from college to early adulthood. For these analyses, correlations were computed separately for those individuals who had participated in their college RIR study as first year students or as seniors. For the senior group, strong continuity was shown. For example, the correlations between their college and young adult data were $r = .32$ ($p < .05$) for the total number of interactions, $r = .59$ ($p < .001$) for mean intimacy, and $r = .52$ ($p < .001$) for mean satisfaction. For the first year group, the comparable correlations were $r = .42$ ($p < .001$) for the total number of interactions, $r = .16$ (*ns*) for mean intimacy, and $r = .27$ ($p < .05$) for mean satisfaction. Given that these correlations span interaction records collected between 6 and 11 years apart, they present strong evidence for viewing interaction patterns as a stable characteristic of an individual's adaptation to his or her social environment.

E. NONVERBAL DECODING ABILITY AND DYADIC INTERACTION

Hodgins and Zuckerman (1990) used the RIR to test the hypothesis that nonverbal decoding ability increases emotional sharing between friends. Prior studies had shown correlations between several measures of nonverbal decoding sensitivity and self-reports of relationship quality. However, Hodgins and Zuckerman preferred to examine RIR reports about specific, concrete interactions, since global ratings might be affected by variables external to the interaction exchange itself. On the basis of the Interpersonal Perception Task (Constanzo & Archer, 1989), 31 female and 24 male roommate pairs were classified into dyads who were both high on decoding ability (HH), dyads who were both

low (LL), and dyads who were mixed (HL). For 2 weeks, they kept the RIR, which was modified somewhat by the addition of scales on involvement, support given, and support received; these, combined with the usual scales of self- and other-disclosure, produced a factor of "emotional sharing."

As predicted, females had more emotional sharing than males, and HH pairs had more emotional sharing than HL or LL pairs. However, this latter effect was due entirely to males. Females had high levels of emotional sharing regardless of the decoding ability composition (on a 1–7 scale, the female means were as follow: HH, 4.38; HL, 4.24; LL, 4.49). Among males, only HH roommate pairs had high levels of emotional sharing (the corresponding means were 4.60, 3.73, and 3.43). Importantly, the other RIR-based scales they reported did not differ as a function of nonverbal skill matching, suggesting that decoding effects in social interaction may be limited to emotional sharing.

Hodgins and Zuckerman (1990) interpret this result in terms of sex-role orientations. The traditional female role emphasizes emotional sharing, whereas the male role does not, so that only dyads involving females or two nonverbally sensitive males enjoyed relatively high levels of emotional sharing. In other words, roommate pairs with at least one male *low* in decoding ability were lower in emotional sharing, suggesting that this quality of interaction depends partly on reciprocated decoding skills. This result is reminiscent of the Wheeler *et al.* (1983) loneliness findings, described above, in which meaningfulness of interactions with males and time spent with females predicted a lack of loneliness for both sexes. We interpreted those results as indicating that females generally inject meaningfulness into interactions, but only some males, namely those high in expressive (feminine) skills and interests, do. The Hodgins and Zuckerman findings are entirely consistent with that interpretation.

F. INTERDEPENDENCE IN CLOSE AND CASUAL FRIENDSHIPS

An elusive question for researchers studying relationships concerns the manner in which individual and independent interactions contribute to the development of relationships (Duck & Sants, 1983; Reis & Shaver, 1988). Retrospections about this process might differ importantly from contemporaneous accounts, suggesting the value of a diary approach. Hays (1989) modified the RIR to test several hypotheses derived from interdependence theory postulates about the maintenance and growth of friendships. To do so, Hays had 65 college students use the modified RIR to describe all interactions (regardless of length) with two particular partners—a close friend and a casual friend—within a 1-week interval. Rating scales were added to the RIR to assess benefits/rewards received (fun, task help, emotional support, intellectual stimulation, and useful information/advice), costs incurred (wasting time, irritation,

boredom), and the perceived impact of the interaction on this relationship (i.e., feeling closer/more positively versus less close/more negatively).

Three tenets of interdependence theory were considered in this research. First, Clark and Mills (1979; Clark, 1985) have argued that exchange processes are more strongly operative in casual relationships than in close relationships. Consistent with this notion, Hays found that rewards and costs accounted for 46% of the variance in perceived impact on the relationship for casual friends, but only 27% for close friends. Hays's second set of analyses asked whether rewards and costs were equally relevant in both types of relationships. In a study of married and regularly dating adults, Rusbult, Johnson, and Morrow (1986) found that rewards but not costs were associated with relationship satisfaction and commitment. However, they had no available contrast group of casual relationships, nor did they look at individual interactions. Hays found that benefits received were strongly correlated with perceived impact in close friendships ($r = .49, p < .001$), but costs experienced were not ($r = -.23, ns$). On the other hand, with casual friends, both benefits received ($r = .39, p < .01$) and costs incurred ($r = -.55, p < .001$) were related to perceived impact. Thus, it would appear that cost notions are more important in less close relationships, an important theoretical qualification to interdependence theory.

Finally, Hays (1989) wanted to determine which particular classes of benefit and cost best distinguished between close and casual friends. For benefits, the results indicated that emotional support and information/advice were more common in close than casual friend interactions, whereas fun, task help, and intellectual stimulation did not significantly differentiate these relationships. In terms of costs, there were no significant differences. Thus, it seems that emotional support and information/advice are the hallmark of interaction with close versus casual friends.

G. DIFFERENCES IN SOCIAL PARTICIPATION ACROSS CULTURES

Cross-cultural psychologists have recently become interested in studying how the value differences between cultures are reflected concretely in the manner of social interaction characteristic of these cultures. Global questionnaires are a useful means of assessing cultural values, but given the difficulties described earlier, they are not optimal for providing independent accounts of social activity. Because of its emphasis on everyday social interaction and event-by-event records, the RIR is well suited to this task. As a result, we have recently conducted cross-cultural comparisons of interaction data collected via translations of the RIR (see Fig. 2) from individuals in the United States, Hong Kong, and Jordan (Haddad, Reis, & Lin, 1990; Wheeler, Reis, & Bond, 1989). In each

Your name _____

Date _____ Beginning Time _____ Length: _____ hours _____ minutes

Initials and sex: (1) _____ M, F (2) _____ M, F (3) _____ M, F

If more than 3 others: # of Males _____ # of Females _____

Compatibility: Very compatible 1 2 3 4 5 6 7 Very incompatible
 “爽” 十分“爽” 十分不“爽”

I disclosed: Very little 1 2 3 4 5 6 7 Very much
 我傾吐了 十分少 十分多

Other disclosed: Very little 1 2 3 4 5 6 7 Very much
 其他人傾吐了 十分少 十分多

Quality: Unpleasant 1 2 3 4 5 6 7 Pleasant
 質素 不愉快 愉快

Satisfaction: Less than 1 2 3 4 5 6 7 More than expected
 滿意 比預期為低 比預期為高

Initiation: I initiated 1 2 3 4 5 6 7 Other initiated
 發起 我發起 其他人發起

Influence: I influenced 1 2 3 4 5 6 7 Other influenced
 影響 我作出影響 其他人作出影響

Nature: Paid work Task Recreation Chatting
 性質 有新工作 事務 娛樂 閒談

التاريخ : _____ الوقت : قبل الظهر _____ الورد : ساعة _____
 بعد الظهر _____ دقيقة _____

العدد : ذكور _____ اناث : _____

ذو معنى	٧	٦	٥	٤	٣	٢	١	التعبه العنصريه : سطحي
بقدر كبير جدا	٧	٦	٥	٤	٣	٢	١	اغفبت عن نفسي : بقدر قليل جدا "
بقدر كبير جدا	٧	٦	٥	٤	٣	٢	١	اغنى الاخر عن نفسه : بقدر قليل جدا "
متنع جدا	٧	٦	٥	٤	٣	٢	١	الاستمتاع : غير صمتع
اكبر صانع متوتير	٧	٦	٥	٤	٣	٢	١	الرضى : اقل مما هو متوقع
بادر الاخر	٧	٦	٥	٤	٣	٢	١	المبادره : بادره انا
اثر الاخر اكثر	٧	٦	٥	٤	٣	٢	١	التاثير : اتت انا اكثر
حديث								طبيعة التفاعل : وظيفه مهمه تمضية وقت

Fig. 2. Chinese and Arabic versions of the RIR.

culture, a sample of college students kept the RIR for 2 weeks. Although cross-cultural samples can never be equivalent, the samples were chosen to be as comparable as possible along dimensions such as age, academic level, and educational goals.

These studies focused on two cultural value variables. The first, collectivism-individualism, is discussed by Hofstede (1980) and Triandis, Bontempo, Villareal, Asai, and Lucca (1988). In collective cultures, behavior is determined by

goals and attitudes shared with one's group (typically family). Attachment to the group is strong, conformity and loyalty to the group are stressed, and socializing tends to be limited to one's group. In individualistic cultures, on the other hand, behavior is influenced mostly by personal goals and beliefs, and strong emphasis is placed on autonomy, sociability, and individual rights. Moreover, individualists move freely and easily from one social contact to another. Jordan and Hong Kong are collective cultures, whereas the United States is an individualistic culture. This led to the prediction that Americans will have more interactions, but proportionately fewer group interactions, than the other two cultures. This hypothesis was supported. Americans averaged 6.9 interactions lasting approximately 346 minutes per day, whereas the corresponding figures for the Chinese were 3.7 interactions lasting 214 minutes per day, and 4.7 interactions lasting 216 minutes per day for Jordanians (culture p values $< .0001$). Furthermore, the percentage of group interaction was 29% in Hong Kong and 26% in Jordan, compared to only 17% in the United States.

The second cultural variable addressed in this research, namely attitudes toward heterosexual social contact, modified these trends. In traditional Arabic cultures, opposite-sex contact is discouraged; whereas in Western cultures, particularly among young adults, it is prized. Thus, we expected and found that opposite-sex interaction was significantly more prevalent in the United States (averaging 1.87 interactions for 103 minutes per day) than in Jordan (averaging 0.55 interactions for 25 minutes per day). Even when the overall base rate of interaction was controlled, opposite-sex contact was more frequent in the United States than in Jordan: 27% versus 12% of all interactions. Hong Kong fell in between these extremes (0.90 interactions for 55 minutes per day).

Collectivism-individualism and heterosexual attitudes also led to interesting subjective differences among the cultures. Because persons in collectivist cultures focus on close relationships more than on superficial acquaintanceships (Triandis *et al.*, 1988), we expected higher interaction intimacy in Hong Kong and Jordan than in the United States. This trend should be qualified, however, by the gender composition of the interaction. In all of our studies of American subjects, males' same-sex interaction has been significantly less intimate than that of females (Reis, 1989; Reis *et al.*, 1980; Wheeler & Nezlek, 1977; Wheeler *et al.*, 1983) because both sexes rely on females for expressive interaction and intimacy. In a culture such as Jordan, which restricts access between the sexes and which places greater reliance on same-sex relationships for psychological closeness, this sex difference ought to disappear. Table II displays the relevant means, summed over the two RIR disclosure scales. There was a significant culture difference, such that over all interactions, intimacy was highest in Hong Kong ($M = 8.24$), followed by Jordan ($M = 8.18$) and the United States ($M = 7.25$; $p < .001$). This effect was qualified by culture \times sex interactions in the same-sex, mixed sex, and group categories (p values $< .005$). It can be seen in

TABLE II
INTERACTION INTIMACY RATINGS^a

	United States		Hong Kong		Jordan	
	Male	Female	Male	Female	Male	Female
Same sex	6.57	8.22	8.20	8.63	8.40	8.20
Opposite sex	7.69	8.03	8.77	8.54	8.55	8.41
Mixed sex	6.07	7.19	7.78	8.02	8.56	7.94
Group	5.36	6.48	7.54	7.27	8.37	7.42

^aValues expressed are means summed over two RIR disclosure scales.

Table II that whereas among Americans, females' intimacy exceeded that of males, among Jordanians the pattern was reversed. The conceptual importance of this reversal is in demonstrating that gender differences in interaction intimacy are a function of culture norms and socialization practices, rather than biologically or evolutionarily based imperatives (cf. Reis, Senchak, & Solomon, 1985).

One other finding from this research bears note. Overall interaction quality (the sum of pleasantness and satisfaction) was highest in the United States ($M = 9.42$), followed by Hong Kong ($M = 9.20$) and Jordan ($M = 8.75$; the three culture means differ at $p < .001$). This is consistent with the Triandis *et al.* (1988) notions about the importance of hedonic tone in individualistic cultures. The appreciably lower Jordanian mean might denote the impact of political and economic tension on individual socializing. Gender effects were similar to those for intimacy, but weaker.

These results demonstrate that the RIR can be used to quantify and test hypotheses about theoretically interesting differences between cultures, a potentially productive research direction that has heretofore received little attention (Wheeler & Reis, 1988).

H. THE DYADIC WITHDRAWAL HYPOTHESIS

Several theorists in the marriage and family area have argued that as dating partners become more involved with each other their outside social contacts diminish (e.g., Boissevain, 1974; Huston & Burgess, 1979). Presumably, this is due to limitations in the amount of time and energy available for social interaction, as well as normative sanctions against relationships that compete with the primary monogamous bond. Milardo *et al.* (1983) decided to examine this issue in a short-term longitudinal study. They argued that reports based on global questionnaires might be misleading, since members of developing relationships

might perceive that others are becoming less significant because of their decreased psychological reliance on them, rather than due to any drop in actual interaction with them. Event-based diary records bypass this alternative explanation.

Milardo *et al.* (1983), had 89 college students keep a modified version of the RIR for two 10-day periods, separated by 95 days. In cross-sectional analyses, people involved in the later stages of courtship interacted with outsiders less often for less time than people in early courtship stages. The only exception was interaction with kin, which showed no correlation with courtship stage. Longitudinal analyses were partly consistent with this trend. Over time, for those couples whose courtship progressed, interaction with intermediate friends and acquaintances decreased, whereas interaction with kin and best friends remained stable. Conversely, interaction with all types of partners increased for those couples whose courtship regressed or ended.

Lin (1990b) replicated and extended these results using data from the sample described in Section IV,D. Lin's subjects also completed the Relationship Closeness Inventory (Berscheid, Snyder, & Omoto, 1989), a measure that operationalizes the Kelley *et al.* (1983) conceptualization of closeness and interdependence. As predicted, the study showed that the more interdependent couples were, the less they interacted with others. This trend was somewhat stronger for interaction with casual friends ($r = -.43$ between closeness and time per day) than for interaction with best friends ($r = -.29$). Moreover, couple closeness predicted decreases in interaction intimacy ($r = -.39$) and quality ($r = -.29$) with casual friends, but not at all with best friends ($r = -.03$ and $-.05$, respectively).

The implication of these results is that social withdrawal by members of close heterosexual relationships emphasizes reduction in relatively superficial contacts with others, supporting the interpretation that "the dyadic withdrawal hypothesis" represents selective use of limited social time and energy rather than relatively nonselective, broad-based decreases in all sorts of social activity. Together, the Milardo *et al.* (1983) and Lin (1990b) studies provide clear evidence that the progression of dating and marital relationships to deeper, more interdependent stages involves simultaneous withdrawal from the outside social network. Moreover, the degree of withdrawal is itself a function of how close the individual and those outsiders are.

V. Other Applications of the RIR and Related Approaches

As we have tried to document above, we believe that the RIR is a powerful tool for assessing the quantity and quality of people's social activity in everyday life. Its benefits stem directly from the event-contingent, self-recording ap-

proach, which eliminates many of the sources of distortion that plague other self-report methods. As such, the data that are obtained provide a more accurate and more detailed characterization of ongoing social interaction than other methods do. Given these advantages, it is appropriate to note that there are many other problems in psychology to which the RIR methodology might profitably be applied. Below we briefly describe some of these applications, in the hope that they will facilitate the work of others.

Modifications of the RIR may take either of two directions: changing the rating scales and dimensions, or recording different event types (or both). The RIR was designed to be flexible enough to allow researchers to ask varied questions, and the particular scales that we have used were chosen to meet specific theoretical goals. To address different sorts of theoretical questions, different scales should be used. For example, researchers interested in social support might include scales of support given and received (cf. Cutrona, 1986; Sullivan *et al.*, 1990), perhaps detailed further corresponding to the support subtypes commonly discussed in that literature (e.g., instrumental, emotional, group belonging). Investigators studying the affective consequences of social interaction might use scales representing different emotions. Those interested in conflict and conflict resolution might include scales addressing the nature of everyday disagreements and how people cope with them. And environmentally oriented researchers might record the specific locations in which interactions take place so as to examine territory and place effects (as some already have; see, for example, Duck & Miell, 1986; Hays, 1989; Wheeler & Nezelek, 1977).

The event-contingent basis of the RIR might also be adapted to events other than social interaction. Duck *et al.* (in press) have developed the Iowa Communication Record, which subjects use to describe in detail their conversations. Wheeler and Miyake (1990) have recently begun work with the Rochester Social Comparison Record, a diary procedure in which subjects provide basic data every time they are aware of comparing themselves with someone else. The information on each record includes the dimension of comparison (e.g., appearance, academic performance), the direction of comparison (upward, with similar others, or downward), the subject's relationship with the target of comparison (close friend, stranger, etc.), and mood before and after comparison. The purpose is, of course, to test hypotheses about social comparison processes using data derived from spontaneous, naturally occurring events.³

³For example, 30% of comparisons were upward, 43% were downward, and 27% were at the same level. This varied, however, with the comparison dimension and the relationship to the comparison target. For example, same-level comparisons were relatively more frequent with close friends; downward comparisons were relatively more frequent with ordinary friends; and upward comparisons were relatively more frequent with acquaintances and strangers. In addition, preexisting negative mood led more often to upward comparison than to downward comparison, supporting a selective affect-cognition priming model in which dysphoria primes negative thoughts about the self (Forgas, Bower, & Moylan, 1990) rather than a motivational self-enhancement model.

It is relatively easy to imagine other research areas that might benefit from the RIR paradigm. Some concern events that are intrinsically engaging in their own right. For example, one might have subjects complete an event record after every sexual encounter, both to examine affective correlates of sexual activity, and to obtain information about sexual practices such as "safe sex" and alcohol use.⁴ Or, in a more clinical vein, event ratings might be obtained after every headache, after every encounter with a phobia object, or after every "binge and purge" episode. The RIR can also be used with special populations. Buunk (1988), for example, used a variant of the RIR to examine interactions of police officers with their peers and superiors.

The RIR might also be adapted to events and processes more common in the social psychological literature. Subjects might, for example, categorize their interaction partners as in group or out group, so that naturally occurring interactions within each of these categories could be compared. Another example comes from the attribution for success and failure literature, which has been limited to laboratory tasks, one-time real-life events, or global questionnaires. Instead, subjects might complete an event record after every receipt of performance-evaluative feedback. Similarly, to complement the existing literature on attitude change, an event record might be completed after every attempt to change someone's attitude (or otherwise influence them). In this instance, the scales might conceivably assess the familiar three factors (source, message, and audience characteristics), as well as other dimensions tied to particular theoretical frameworks.

⁴These two examples suggest potential new advantages to the RIR and related techniques. In many studies of states (e.g., mood, sexual arousal) and substances (e.g., alcohol) that alter mental processes, people are asked to describe their past behavior, or to predict how they would behave in a given situation. Often in such work the person is in a different state of mind when answering questions about their behavior than when the behavior itself is enacted. For example, subjects are sometimes asked to describe their behavior while intoxicated, or how they would respond to a sexually arousing situation. Accounts and predictions provided while in a neutral, baseline state (as is typical in surveys and interviews) may be inaccurate because social perception and cognition in the situations being studied are influenced markedly by thought-altering agents, such as alcohol, strong emotions, and sexual arousal. On the other hand, if subjects' accounts and predictions were obtained while in the relevant mental state, their reports would reflect some of the same influences that affect the target behaviors. In other words, if an agent such as alcohol affects social thought (as it does; see Steele & Josephs, 1990), it is possible that the most accurate self-reports and self-predictions would be obtained when the person was intoxicated. If this line of reasoning is correct, there would be considerable advantages to collecting data before the person's mental state had changed. This might be accomplished by having subjects complete event-records during or shortly after whatever events are of interest (e.g., moderate drinking, sexual excitement, drug use). Of course, it would be impractical to expect subjects to complete an event-record in some of these instances. Still, many of these situations may prove more tractable to such research procedures than seems apparent, and the potential advantages of this approach over traditional alternatives suggests that they be attempted.

As one example of these possibilities, we would offer the recent work by Hoyle (1990). Hoyle was interested in the manner in which the self-focusing characteristics of social interaction affect momentary self-esteem. After every 10-minute or longer social interaction, Hoyle's subjects rated their feelings about themselves in four domains: task competence, appearance, social confidence, and "stage presence." They also described the situational context along several dimensions (e.g., whether the interaction was public or private). Among the findings were the following: Interactions that subjects initiated themselves left them feeling more task competent, but not more positive in other ways; interactions with some degree of conflict also enhanced feelings of task competence but not the other domains; interactions that took place in public tended to enhance self-esteem along all dimensions except task competence.

The RIR also shows promise for investigating social interaction effects at different levels of analysis. As Kashy (1990) has noted, each RIR rating derives from four sources of variance: person, partner, day, and interaction. Nearly all of the studies we have discussed are confined to examining person effects (e.g., how does one person's pattern of interaction differ from another's?). There are important questions awaiting empirical attention at other levels of analysis, however, and the RIR seems potentially useful in this regard. For example, how does interaction with different types of partners differ? How much consistency in interaction patterns exists from one day to the next? Within a single interaction, how does one partner's self-disclosure relate to the other's self-disclosure, and is this relation moderated by closeness? Kashy (1990) has recently proposed a set of procedures for decomposing RIR data into the four sources of variance noted above, and we believe these procedures open an important new direction for researchers using self-reported event diaries and logs.

In none of this do we wish to imply that the RIR, or other naturalistic procedures for self-recording daily events, should substitute for laboratory-based studies, especially those that feature manipulation of independent variables. Standard laboratory practices are admirably powerful tools for testing hypotheses under controlled, and usually well-circumscribed, conditions. Many questions are appropriately addressed with these methods, and we do not believe it would be desirable for social psychologists to adopt the RIR approach in their stead. Nevertheless, the generalizability and external validity of many laboratory manipulations have been questioned, and it is important for the field to begin testing hypotheses about the nature and prevalence of its favored constructs in everyday life. Thus, the RIR adds a method to our research armamentarium for precisely testing hypotheses with data collected from the ongoing stream of everyday social behavior. True, naturalistic research of this sort sacrifices much of the internal validity for which experimental methods are properly celebrated. But the enhanced generalizability of a relatively nonreactive "in-stream" approach

gives the RIR and other daily event-recording strategies unique and powerful advantages, so much so that the two strategies are best considered to be complementary, and perhaps even a necessity in programmatic research.

A FEW OTHER APPLICATIONS

Aside from its use in theoretically oriented research, three other possible applications of the RIR bear note. First, the RIR might be used as an outcome measure in intervention and other clinically oriented studies (e.g., Christensen, Arkowitz, & Anderson, 1975; Johnson, Christensen, & Bellamy, 1976). For example, before and after RIR data sets might be used to see if social skills training can ameliorate the experience of loneliness or shyness, or to determine whether intercultural training groups can enhance spontaneous social contact between different ethnic or cultural groups. Kirchler (1988) has used the RIR to describe differences between happily and unhappily married couples in their interaction with each other. As one indicator of therapeutic change, such data might be compared to similar records collected after marital counseling. For that matter, the RIR might provide useful fodder for therapy, as the ESM has (Maksimini, Csikszentmihalyi, & Carli, 1987). As we argued earlier, retrospective accounts of social experience are often the product of considerable reinterpretations. By having accurate records available, patients might become more aware of these processes, which can serve as a stimulus for evaluating, and potentially changing, relationships with others.

Second, in that the RIR (and similar techniques) is the best available method for obtaining accurate information about social interaction, it might be used to provide validity standards against which other techniques can be evaluated. The McFarland *et al.* (1989) study mentioned earlier is a good example of the use of daily event records to provide objective behavior accounts, although they did not seek to establish the validity of another method. However, Lippa and Donaldson (1990) did, in order to establish the validity of a computer-based measure of behavioral consistency. Lin (1990b) is also using the RIR to assess the accuracy of the quantitative components of the Closeness Scale recently developed by Berscheid *et al.* (1989).

Third, by its very nature, the RIR is well suited to supplying detailed descriptive information about social interaction. In our studies of Rochester college students, for example, we have consistently found that the average student socializes about 6 hours per day, that same-sex interactions are about twice as frequent as opposite-sex interactions, and that most interactions are relatively pleasant and satisfying (see Nezelek *et al.*, 1983, for a summary). Descriptive comparisons can be used inductively to suggest explanations and generate hy-

potheses for further research. Moreover, descriptive research is important in its own right (Ossorio, 1981). As Deaux (1978) noted, full conceptual understanding of human social behavior requires knowing not only which antecedents produce which consequences, but also how frequently these circumstances occur. Descriptive studies are especially valuable in the early stages of research (Gottman, 1989), particularly when the area is phenomenon centered, as opposed to theory or paradigm centered. In other words, researchers need to know what the key parameters are before they can be comprehensively accounted for.

VI. Conclusion

The vast array of new research technologies that has become available in the past two decades has given researchers extensive new opportunities for operationalizing the multimethod approach to behavioral science first advocated by Campbell and Fiske (1959). Event-contingent self-recording methods such as the RIR fill a unique niche in our repertoire of research tools, offering a potent and flexible strategy for studying social behavior as it naturally and spontaneously occurs in everyday life. Wider adoption of these methods, especially in concert with existing, complementary procedures, has the potential to add an important new perspective to social psychology's bank of empirical data and theoretical constructs. With this aim in mind, we hope that other researchers will find ways of adapting these methods to their own problems. Such an approach can only enrich our understanding of human social behavior.

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SUBJECTIVE CONSTRUAL, SOCIAL INFERENCE, AND HUMAN MISUNDERSTANDING

Dale W. Griffin

Lee Ross

To construe an action, person, situation, or event, according to the *Shorter Oxford Dictionary*, is "to interpret or put a construction on" it, and a prototypical use of the term is "to construe silence as an affront." The example is well-chosen, for silence itself has no unique meaning. It could be construed as an indication of another person's deliberate attempt at insult; but it alternatively could be construed as an indication of the other's great sorrow, or great respect, or great embarrassment. Thus although silence itself exists as an objective phenomenon, construal by the perceiver is required to bridge the gulf between the objective world of stimuli and the subjective world of experience.

I. Construal Processes and Psychological Inquiry

The process of subjective construal is fundamental to psychological inquiry at all levels of analysis. Even at the most molecular level of analysis, we find that the study of sensory perception is the study of how the organism, faced with the blooming, buzzing confusion of sensory input, constructs one particular coherent reality from the set of possible alternatives. Neisser (1976, p. 76) makes the point clearly when noting that "Stimuli themselves cannot possibly have meaning because they are merely patterns of light or sound or pressure. The meaning must be supplied by the perceiver after the stimuli have been registered." At more intermediate level of analysis, we find the study of concept formation and categorization to be an investigation of the conscious and unconscious strategies that people use in discerning, systematizing, and utilizing regularities in the experience. As Barsalou (1987, p. 101) explains, "Rather than being retrieved