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HELDREF PUBLICATIONS

The Difference Between Strict Analogue and Interpersonal Psychodramatic Simulation (IPS) Methods in Research on Human Dynamical Systems

RORY REMER
GORDON R. BETTS

ABSTRACT. The authors compared interpersonal psychodramatic simulation (IPS) methods and analogue methods in a study of paradoxical and nonparadoxical family therapy interventions, delivered from the therapist in letter form. IPS consisted of extended interaction of 97 participants grouped into families of 3 (mother–father–daughter) over 5 weekly phases, including meeting with the therapist; the analogue method, presenting the same family situation, was standard for 98 participants. From the results of multivariate analysis (Method x Intervention x Role) and subsequent univariate tests on the 11 dependent variables, the authors concluded there are highly significant differences in realism, favoring IPS. The authors explore the implications for the use of IPS methods in research with human dynamical systems.

RESEARCHING ASPECTS OF INTERPERSONAL INTERACTION (involving one type of dynamical system—humans) under controlled circumstances is challenging. Often researchers are faced with a choice between controlled, experimental manipulation or generalizability and realism. Although achieving both goals may be possible in certain circumstances, as the number of participants in the research unit of interest or the unit of analysis increases (e.g., looking at family rather than couple interactions) and the situation of interest becomes potentially more provocative (e.g., exploring reactions to homosexuality as opposed to responses to anger venting), an ade-

quate compromise is difficult, if not impossible, to attain. Researchers have been left to choose either an analogue approach, losing generalizability (e.g., Goldman, 1976), or a naturalistic and descriptive approach, forfeiting experimental control of many independent variables.

"Analogue research is laboratory research that attempts to mimic real life and controls as many extraneous variables as possible, sometimes manipulating the independent variable" (Hill & Corbett, 1993, p. 14). Strict analogue research methods have been an essential tool for the study of complex interpersonal interaction (Strong, Welsh, Corcoran, & Hoyt, 1992). The advantages and disadvantages of its application have been well delineated and hotly debated (e.g., Goldman, 1976, 1979; Hill & Corbett, 1993; Munley, 1974). Many suggestions have been made for attempting to overcome the inherent limitations (Strong, 1971). However, the status of its use has remained fairly constant since Munley's classic exposition of the strengths and weakness of analogue methods.

Interpersonal psychodramatic simulation (IPS) is an approach to engendering "real, life-like" interactions on the basis of psychodramatic concepts of role playing and role creating (Blatner & Blatner, 1988; Moreno, 1985) rather than role taking that has been incorporated into analogue methods from time to time in an attempt to induce a greater degree of generalizability (e.g., Gelso & Fretz, 1992). The idea is not new although it has more often been used in training or therapy contexts (Finger, Elliott, & Remer, 1993; Kipper, 1986, 1988a, 1988c, 1990, 1992a). Hill and Corbett (1993) termed this type of approach *quasi-naturalistic*, when comparing it to and including it with analogue methods. However, simulation of the type we are discussing here has rarely, if ever, been used as a research method in and of itself, and certainly not purposely. (Haney, Banks, & Zimbardo 1973, for example, actually used this type of simulation all too effectively in their classic study of prisoner–guard relationships, using students as participants.)

IPS resembles strict analogue methods in its attempt to influence and to recognize sources of extraneous variation; it differs from strict analogue and even "quasi-naturalistic" analogue approaches in capitalizing on participants' spontaneity (Moreno, 1985)—"sources of extraneous variation"—to enhance realism, and, consequently, generalizability. Thus, despite the degree of similarity, lumping IPS with analogue methods tends to create the impression that the two are the same.

Because of the resemblance of certain types of simulation to strict analogue methods in many ways, IPS is arguably nothing more than a variation (Hill & Corbett, 1993). However, this moot point can be addressed empirically. In this article, we demonstrate that IPS, as a specific type of simulation that has much in common with the strict analogue approach, is distinct from it. We also suggest that those differences provide a degree of realism and generalizability not

possible to attain with strict analogue or even quasi-naturalistic analogue approaches.

The Distinction Between IPS and Role Playing

Although the emphasis of the present study is not on role playing, some confusion exists between what constitutes certain simulations and what is role playing (e.g., Kipper, 1988b). The use of role playing for research purposes has been discussed and debated extensively in the past, including the use of the term *interpersonal simulation* (Greenberg & Folger, 1988). Central to the exchange was the unexpected realism engendered by the Haney et al. (1973) study. In this article, we make three significant distinctions between what we have done and the previous emphases.

First, previous research and discussion have been focused on the differences between role playing and deception for research use. We are only interested in inducing a realistic interaction. In the simulations, we have taken significant steps, through instructions, development of relationships, and extended contact time, to meet the boundary conditions for involvement (the fourth and fifth conditions) mentioned by Strong (1971) and Munley (1974), before we attempted any manipulation of independent variables.

Second, we made every effort to go beyond what has usually been termed *role play* (what J. Moreno, 1985, and J. Moreno & Z. Moreno, 1975, have termed *role-taking*), which is why we chose the term *interpersonal psychodramatic simulation* (IPS) to describe the outcome and the process. Although a more appropriate label might be interpersonal sociodramatic simulation, because no protagonist is identified per se, we decided on the word *psychodramatic* because it is a term more familiar to most people. This more complete label encompasses both Morenean role playing and the extension of the process, role creating. We have capitalized on the individuals' natural inclination to bring in personal history, experience, and reactions to others to create a realistic interaction within a particular context—similar to one type of behavioral simulation discussed by Kipper (1988b, 1992b) in the context of group therapy training.

Third, we did not try to create a specific family (what Greenberg & Folger, 1988, had called "playing at" a role). Instead, we developed a family-like interaction, like a sociodrama (similar but more in depth than what Greenberg & Folger reported had been called "one's own" role). In doing so, we take a somewhat different view of "control." We looked at the interactions from a dynamical systems (nonlinear–nonindependent systems theory and chaos theory) perspective (Goerner, 1994). We tried to induce patterns of interaction consistent with those found in families (or other types of dynamical, interpersonal, interactive systems). Once the patterns have been established, ways of effecting change in

them can be examined. As Goerner (1994) pointed out, this approached is a change from that of the traditional, linear, logical positivist methods.

Examples: Clarifying the Distinctions

We wish our distinction among the three types of methods—strict analogue, quasi-naturalistic analogue, and IPS—to be as clear as possible. The following examples depict the differences and clarify our contentions.

Example of Strict Analogue

"An unmotivated nonclient participant who receives a transcripted therapist interpretation outside the context of an ongoing therapeutic relationship . . . will probably not respond in the same manner in which actual clients respond to an interpretation" (Spiegel & Hill, 1989, from Hill & Corbett, 1993, p. 9).

Example of Quasi-naturalistic Analogue

An unmotivated nonclient participant, who receives a transcripted therapist interpretation delivered by a "therapist" in a role-played counseling context, reacts similar to a client because the situational demands influence the interaction and reaction.

Example of IPS

A participant who has been motivated and engrossed in a role (e.g., Haney et al., 1973) over a brief time period (yet more extended than is usually employed in analogue research) and who receives a structured interpretation from a therapist with whom she or he had previously interacted within a therapeutic context interacts and reacts much like some or many clients under similar circumstances.

Method

We present the complete description of the methods used in the study so that others may replicate the results. The focus in this article is on the use of IPS methods so only the findings germane to that method are examined.

Participants

The initial sample consisted of 195 (136 women and 59 men) college students enrolled in two undergraduate classes—a psychology of education class

and a family studies class—at the University of Kentucky. The students elected to participate in a research study in lieu of other required course credit options. Although no detailed demographic information was gathered, the majority of the group was in the 18- to 22-year-old age bracket.

Participants were assigned to groups of three, consisting of one male student and two female students, using stratified random assignment procedures. The groups of three made up 67 "families" (34 simulated and 33 analogue), with each family composed of a father, a mother, and an adolescent daughter. Six participants were eventually excluded from the analysis because of various attrition factors (e.g., incomplete protocols).

Instrumentation

Because this research project was conducted in conjunction with a dissertation whose author was exploring the effects of paradoxical interventions on client perceptions of therapists, the same instrumentation was used in both instances. The paradoxical directive conditions also lent themselves well to both strict analogue and simulation approaches. All instruments administered, even those not directly germane to the focus of this study, are presented here so that the study may be replicated and readers have a more complete sense of the circumstances of the entire exploration.

Primary measures. At selected intervals during the project, we administered two questionnaires designed specifically to measure dimensions pertinent to the continuing simulation methods development—one concerning the decision-making processes manifested by the simulated families and one concerning the perceived realism of the simulated interactions—to the simulated families. The realism data reported are from the latter questionnaire, which has an internal consistency alpha of .86 and content validity based on asking directly about the participants' perceptions of the realism of their interactions. Of particular interest are the five questions developed to ascertain the participants' evaluations of the global realism of each of the five phases, using both their own past experiences and those of others they had known as a reference point (scored from *entirely realistic* = 5 to *entirely unrealistic* = 1). Participants also indicated the variety and extent of their emotional involvement by rating their emotional reactions—nine listed emotions and space to list others—on a scale from *none* (0) to *strong* (3). In the provided spaces, participants noted any reactions or observations regarding their experiences with the simulations. They were encouraged to furnish such subjective impressions.

Realism, per se, was not evaluated for the strict analogue condition. Asked whether the described situation seemed real to the analogue condition, the participants seemed not to focus on the same information that was collected from

the simulation group by the realism questions. They also did not make much sense of the analogue context. The same questions could have been asked during the "therapy" phase in which both groups did engage, but a question about the degree of emotional involvement, for example, seemed to lack meaning for the analogue group. To approach collecting parallel data from the analogue group, the participants completed a manipulation check (Munley, 1974) to determine whether they were able to imagine themselves in the role or situation presented.

Counselor Rating Form—Short Version. The Counselor Rating Form—Short Version (CRF–S), devised by Corrigan and Schmidt (1983), was used to measure the participants' perceptions of the therapist's attractiveness, expertness, and trustworthiness. The CRF–S consists of 12 adjectives (four items per dimension) scored on a 7-point Likert-type scale, anchored by the words *not very* (1) and *very* (7). The CRF–S is a shortened and revised version of Barak and LaCrosse's (1975) Counselor Rating Form (CRF), which has been reported as the most frequently used measure of client perceptions of the counselor (Heppner & Claiborn, 1989). The CRF–S has reported interim reliabilities, ranging from .82 to .94, for its three subscales: counselor Attractiveness, Expertness, and Trustworthiness (Corrigan & Schmidt).

Treatment Evaluation Inventory—Short Form. We used a slightly modified version of the Treatment Evaluation Inventory—Short Form (TEI–SF), devised by Kelley, Heffer, Gresham, and Elliot (1989), to measure participants' perceptions of treatment acceptability. The TEI–SF is a shortened version of the original Treatment Evaluation Inventory (TEI) of Kazdin (1980) and consists of nine items scored on a 5-point Likert-type scale ranging from *strongly disagree* (1) to *strongly agree* (5). When they compared TEI–SF to the original TEI, Kelley et al. (1989) reported that the TEI–SF is more readable, quicker to complete, and better liked by respondents. The researchers were able to differentiate among the alternative treatments, which lends support to its construct validity. Coefficient alpha estimates of internal consistency are comparable to the TEI (Kelley et al., 1989). Because both the TEI and the TEI–SF were developed originally to measure differential treatment acceptability among children's behavioral treatments, the wording of three items on the TEI–SF was modified to match the family therapy paradigm of this study. Specifically, the word *child* was replaced by *family member*. One item was omitted because it was not applicable for adults in treatment. Five items remained unchanged. The Cronbach-alpha reliability for the modified, 8-item TEI–SF used in the study was .81.

Other Measures. Willingness to comply with the therapist's suggestion, the appropriateness of the suggestion, willingness to see that particular therapist

and to continue the therapy, the perception of manipulativeness of the treatment intervention, and expectation for a positive outcome were also assessed, using 5–point Likert-type scales.

Procedures

Students in two undergraduate courses were approached to participate in a research study of family interactions. First, the requirements for participation were described in writing as part of the class syllabi. Further explanation was provided verbally during an early class period, when volunteers for the study were solicited. As part of the verbal introduction to the project, students received some basic information, including estimates of the time commitment and work load involved. They were told that the general focus of the study would be certain family interactions and relationships within a family that had a particular problem (i.e., excessive family arguing associated with a rebellious teenage daughter). Although the specifics of each experimental condition were not provided initially (to preserve spontaneity), the experiences were described as nonthreatening and even enjoyable.

Experimental Manipulations. The first independent variable was research mode, either the strict analogue approach (AN) or the simulation methods (SIM). Participants within each treatment condition were randomly assigned in a stratified fashion to each. (The quasi-naturalistic condition was not included in the present instance because of restricted resources. We believe, however, that the extreme conditions provide an adequate initial test of the hypothesized difference. Certainly, if no significant differences were obtained, differences between less extreme conditions would be less probable.)

As stated previously, this study was done in conjunction with another research project exploring paradoxical interventions. To keep the simulation and strict analogue conditions parallel, the second independent variable was the type of therapy intervention received, resulting in two experimental conditions: the paradoxical directive (PD) condition and the nonparadoxical directive (NPD) condition. Participants in both groups were exposed to the intervention in the form of a typewritten, signed letter from their therapist that they received after the initial therapy session. Within each therapist's pair of families for the simulation condition, half the randomly assigned participants received each directive.

The PD letter and NPD letter contained identical opening and closing statements. The body of the PD letter contained a positive reframe of family arguing (i.e., fighting can be a way of expressing care and concern for one another and serves to maintain familial cohesion and communication) and a homework assignment recommending that the family purposefully argue with

each other every day at a specified time during the upcoming week. The combined use of reframing and symptom-prescribing techniques is recommended by many practitioners of therapeutic paradox (e.g., Papp, 1983; Selvini Palazzoli, Cecchin, Prata, & Boscolo, 1978; Weeks & L'Abate, 1982). The body of the NPD letter contained a similarly scheduled family homework assignment designed to minimize arguing and enhance communication. Participants in both conditions were instructed to read their letters carefully and then answer the enclosed questionnaire (containing the dependent measures) independently, without discussing the questions or their responses with their partners in the project.

Description of Analogue Procedure. To accommodate scheduling problems, the students assigned to the analogue condition were assembled in four groups. They were told the experience would take about 3 hr and would deal with aspects of family dynamics. After each group was assembled and seated, packets with instructions, the treatment manipulation, and the outcome measures were randomly distributed as described previously. In each packet were a description of the family and of the role the participant played in it, a brief history of the problem and what had occurred "to date" in the family (including a description of the first session with the therapist consistent with that conducted under the simulated condition), the letter from the therapist (treatment manipulation, either PD or NPD), and the outcome measure questionnaire. The instructions were read to the group, and any questions were answered by reiterating or clarifying the written text (to maintain consistency). The students were told to imagine they were the persons described in the family situation presented and to respond to the questionnaire as they would if they were actually in the situation. Students then read the materials and answered the questionnaire without further discussion or consultation. The administration took approximately 20 min. After the materials were collected, a lecture and discussion about the research project, family systems, and paradoxical interventions followed and that served as a debriefing procedure and a way of equalizing the time commitment involved.

Overview of Simulated Family Phases. The simulation consisted of four semistructured role-playing exercises and one simulated family therapy session, each spaced 1 week apart, before the experimental manipulation contained in the letter from the therapist. Packets of materials for each phase, including instructions and the appropriate questionnaires, were distributed in class when materials from the previous phase were completed and submitted. Three types of checks were made to ensure that the groups carried out the simulated family interactions: (a) participants submitted logs and brief documentation (e.g., ticket stubs, dinner receipts); (b) they submitted their completed

questionnaires and brief written descriptions of their activities; and (c) the therapists validated the therapy session (recorded attendance) and the previous interactions (through their accounts of the families' presenting problems).

In Phase 1, participants were provided with initial instructions and a brief description of the family—father, mother, and daughter—to be simulated. After choosing a specific family role to adopt, the participants were told to expand the information already given by creating a more detailed "family history" (e.g., deciding where the wife or husband worked, what kinds of things they liked to do). Next, participants practiced role playing by interacting in their new family roles, culminating in a family decision about where to eat dinner together in the next phase. Phase 2 consisted of their going out to dinner and discussing a family problem (i.e., daughter's skipping school). Phase 3 involved planning a family vacation. In Phase 4, the family discussed the idea of attending family therapy and related issues. In Phase 5, the family contacted their assigned therapist and attended a simulated therapy session. Phase 6 was the experimental manipulation phase previously described, in which the independent treatment variable was presented to participants individually. The administration of the experimental questionnaire containing the dependent measures followed.

Therapist Pool. From a pool of current and previous students enrolled in a graduate level marriage and family therapy class at the University of Kentucky, we recruited 4 male and 13 female therapists to conduct the simulated family therapy sessions. All the therapists were enrolled in graduate programs in either counseling psychology (9), school psychology (1), or family studies (7). Levels of actual, nonacademic clinical experience varied: 9 therapists had less than 1 year; 1 had 1 to 2 years; 2 had 2 to 5 years; and 5 had over 5 years experience. All the therapists were White and ranged in age from 25 to 49 years, with 37 years as the average age.

To control for therapist differences, we randomly assigned families to therapists, with each therapist having two families, one family in each treatment condition. Although the present research design did not require the therapist's delivery of the treatment interventions, each therapist had received training in family therapy, including at least an overview of paradoxical interventions, as part of his or her marriage and family therapy class instruction before participating in the study.

Therapist Instructions. To increase consistency among the initial therapy sessions, therapists received written instructions beforehand. Specifically, they were told to focus on gathering information, getting to know family members, establishing rapport, and assessing the family's presenting problem. They also were told not to intervene with advice, assignments, or recommen-

dations to the family. The sessions were held in counseling offices on campus and lasted between 40 min and 1 hr. In addition to the general guidelines, we emphasized the importance of spontaneity and relaxation in carrying out the role play. To prevent students' breaking out of role during the simulated session, we encouraged the therapists to stay in role in handling such situations. For example, if a student said, "This is really stupid," the therapist was to respond, "It sounds as if being here in therapy is uncomfortable for you." Finally, as an added control for potentially confounding variables, therapists were blind to the treatment condition assigned to their simulated families.

Results and Discussion

Summary statistics were produced in a 2 × 2 array, Method (SIM v. AN) Treatment × Paradoxical Condition (PD v. NPD), the two independent variables of primary interest. Because of the large amount of information, the means, standard deviations, and cell sizes for all dependent variables are not provided here. That information can be obtained from the authors.

Because 11 dependent variables were under investigation, multivariate analysis of variance (MANOVA) was used as a first step. As can be ascertained from examination of Table 1, highly significant results were obtained for Method (Wilks's $\lambda = 0.635$, $p < .0001$) and Paradoxical Condition (Wilks's $\lambda = 0.819$, $p < .0001$). Significant results were also obtained for Role—mother, father, daughter—(Wilks's $\lambda = 0.825$, $p < .02$) and Method × Paradoxical Condition (Wilk's $\lambda = 0.884$, $p < .02$). The results for paradoxical v. nonparadoxical comparisons, although statistically significant, are not of immediate

TABLE 1
Fixed Effects (2 × 2 × 3) Method × Paradoxical Condition × Role Multivariate Analysis of Variance

Source	*df*	*Wilks's λ*	*F*	*p*
Method	10, 173	0.635	9.94	.00**
Paradoxical condition	10, 173	0.819	3.82	.00**
Role	20, 346	0.825	1.75	.02*
Method × Paradoxical Condition	10, 173	0.884	2.28	.02*
Method × Role	20, 346	0.861	1.35	.15
Paradoxical Condition × Role	20, 346	0.865	1.30	.17
Method × Paradoxical Condition × Role	20, 346	0.920	0.74	.79

*$p < .05$. **$p < .001$.

interest here and are not pursued further. They are presented elsewhere, with the emphasis on implications for the use of those interventions.

The MANOVA was followed by separate univariate analyses of variance (ANOVAs; 2 × 2 × 3, Method × Paradoxical Condition × Role, completely crossed, fixed effects ANOVAs) for each dependent variable. In each instance, highly significant results ($p < .01$ or better) were obtained for Method, with more positive assessments under the simulation condition. Significant ($p < .05$) results were also obtained for paradoxical condition on all outcome variables but two. Significant interactions ($p < .05$), Method × Paradoxical Condition, were also obtained for four variables—counselor attractiveness, counselor expertness, counselor trustworthiness, and manipulativeness of intervention. Those interactions, coupled with the realism results for the simulation phases, provide a possible, encouraging explanation for the results. The results are numerous, and their lengthy presentation can be obtained from the authors. Because the MANOVA captures the essence of the findings, a discussion of those results serves our purpose.

The interaction effects are germane to the conclusions we draw. To provide a sense of the interaction effects, we plotted the effects. We present the Method × Paradoxical Condition graphs of the four significant dependent variables in Figure 1. All four prove to be ordinal interactions, with simulation consistently attaining more positive scores (or in the case of the NP condition on MAN, equal scores) in each instance and those differences being consistently more pronounced under the paradoxical condition. Just the existence of interaction effects indicates that a more complete model than a simple additive one is required to explain the differences observed. However, that the IPS condition produced markedly different results and was rated as more realistic suggests that the IPS condition may capture a dynamical, interactive dimension essential to a fair appraisal of intervention effectiveness that is not possible with the strict analogue method.

Consider the implications of these findings, not just for the use of simulation, but more for the use of paradoxical interventions. As we have thoroughly discussed elsewhere (Betts & Remer, 1998), marked discrepancies were noted in "clients'" ratings of their "therapists'" expertise, attractiveness, trustworthiness, and manipulativeness between the simulation and the analogue conditions. The differences are significantly more pronounced for the paradoxical condition (see Figure 1). Thus, the conclusions drawn for the acceptability of paradoxical interventions are altered as a result of the different approaches to researching the comparisons.

To help provide a possible explanation for those marked differences between the simulation and analogue conditions, we subjected realism scores for each phase of the simulation, obtained from the Final Evaluation Questionnaire administered to the simulated families, to a repeated measures ANOVA

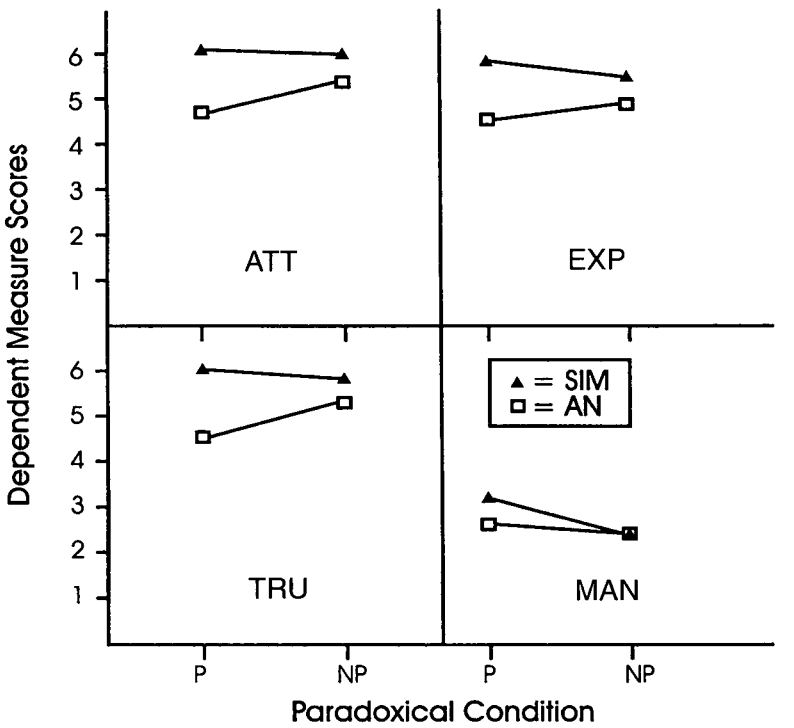

FIGURE 1. Two-way interaction plots: Method (simulation [SIM], analogue [AN]) × Paradoxical Conditon (paradoxical directive [P], nonparadoxical directive [NP]) methods for counselor attractiveness (ATT), counselor expertise (EXP), counselor trustworthiness (TRU), and manipulativeness (MAN).

followed by a Tukey multiple comparisons procedure. No comparable realism data were available (nor possible to produce) on the analogue families because they had not actually interacted.

As readers can see from Tables 2 and 3, in which the repeated measures ANOVA and pairwise contrasts for the stages of the simulation are displayed, all phases of the simulation were deemed at least somewhat realistic (1 = *entirely unrealistic,* 5 = *entirely realistic*), having means of 3.0 or above. Over time, the phases generally increase significantly in realism. The last phase measured, the therapy session, was experienced as significantly more realistic than any of the others.

Two measures indicate the degree of success in attaining the involvement (fourth and fifth) boundary conditions (Munley, 1974; Strong, 1971). First,

TABLE 2
Multiple Comparison of Means for Realism Measure on Simulation Phases

	Phase				
	1 (Role)	2 (Dinner)	3 (Vacation)	4 (Discussion)	5 (Therapy)
M	3.03	3.47_{ab}	3.38_{a}	3.57_{b}	4.28
SD	.90	.87	.92	.77	.85

Note: Means sharing a subscript are not significantly different ($\alpha = .05$).

TABLE 3
Repeated Measures Analysis of Variance for Realism on Simulation Phases

Variable	*SS*	*df*	*MS*	*F*	*p*
Phase	126.10	4	3.52	53.50	.000**
Participants	206.29	151	1.37		
Error	355.90	604			

**$p < .001$.

the degree of emotional reaction generated—participants report the variety and strength of emotions engendered consistently high after the initial phases of the simulation. No such measure was available for the analogue group. Second, "therapists" rating the family interactions for realism and raters of taped segments of the "therapy" interactions deem the interactions realistic (Elliott, 1994). The findings are consistent with other studies reported by Greenberg and Folger (1988) that demonstrated that role-playing experiments can be made very realistic and engrossing for participants.

Unfortunately, no comparable measure is available or possible for the strict analogue condition. The most that can be said is that all of those in the analogue condition reported being able to place or to imagine themselves in the situation described.

The significant differences between roles might have shed some light on the realism question. The existence of the differences is of little value without an

idea of why they occurred. Unfortunately, those differences were neither anticipated nor thought to be of interest or useful at the time the study was planned, so those data were not collected.

A Perspective on a Limitation

Our having only the phenomenological reports (participants' self-reports and external ratings), rather than a direct measure of the patterns produced, is a limitation. Phase diagrams are far preferable. Phase diagrams (detailed pictures of the interaction patterns over time), however, take many more data points than we have been able to produce at present. Most work with phase diagrams in this type of context are produced from physiological data based on near continuous monitoring (e.g., Tom, 1994). The reports that participants are experiencing interactions that seem realistic to them can be interpreted as their judging that interactions produced patterns similar to those that they have experienced in the past in such situations. Certainly more "objective" data are desirable, at least as an adjunct to the outcome measures now used. The benefits and detriments of our approach, however, are moot and have been discussed extensively before (Greenberg & Folger, 1988).

How can we explain the differences observed between the IPS and the analogue methods? On the basis of the sense of realism experienced in the simulation phases, particularly in the therapy session, evidenced by the empirical results reported and by the anecdotal accounts supplied by the "family" members and the therapists, we concluded that the realism of the simulation (e.g., having an actual "therapist" with whom to associate the letter and its directives) may have had an extremely significant impact. This conclusion is consistent with the contention of Kolko and Milan (1986) that contextual effects framing treatment procedures exert a powerful impact on perceptions and should, therefore, be included in any experimental design involving human dynamical systems research. The results are also consistent with the findings of Finger, Elliott, and Remer (1993) supporting the effectiveness of simulation in both training and research.

To be fair, we recognize a possible alternative explanation—having more interaction or in-depth interaction of any kind could produce the same results. Although the extent or intensity of interaction contributes to the outcome, we suspect that explanation is too simplistic. This question is one that might be addressed empirically. Doing so would be a challenge because of the difficulty of producing a situation that provides distinct conditions of in-depth small group interactions not similar in some ways to those found in families. If length of exposure is ruled out, perhaps some "placebo"-type condition could be compared to a simulation. Extending a strict analogue

condition neither seems possible nor desirable, however, because the "beauty" of a strict analogue approach lies in its brevity and the concomitant decreased experimental mortality. Even if such conditions could be arranged, the linear, reductionistic aspect required to do so would probably leave the results in question when dealing with human, nonlinear dynamical systems.

Historical, Qualitative, and Anecdotal Evidence of Realism

The present study was conducted as part of an ongoing research program exploring IPS. So far, seven studies have been conducted—one dealing with couples' interactions, the other six focused on families. Because the goal is to support the use of IPS as a research tool, we addressed other research questions in five studies, including the present one. In Betts (1993) and Betts and Remer (1993, 1998), we considered paradoxical interventions, whereas Elliott (1994) explored teaching family therapists and Finger (1994) investigated the "coming out" process. In each instance, the effectiveness of IPS for research purposes was incorporated.

As part of the assessment of outcomes, the participants' perceptions of the realism of their "family" interactions were obtained through ratings that compared the simulated interaction to those experienced and expected in real families. In addition, participants were encouraged to provide comments about their experiences. Many participants commented on their surprise at how real the interactions seemed to them. For example, one participant said, "We really got into it. It reminded me of my own family." Another offered, "I didn't expect to get so caught up. It was only like play. We were really pissed at each other." Similarly, Elliott (1994) found that the therapists for the simulated families in his study expressed consistent surprise at how the simulated families' interactions were like the interactions of the real families with which they dealt every day. One minority participant in a racially mixed simulated family said his "family" was not like families he knew. He did not come from a racially mixed family. Because participants were assigned at random to a "family," no all-minority family occurred.

Two anecdotes may provide further support for the realism of the simulations and some insight into why we believe IPS is significantly different from other types of analogue situations. The first occurred in the lecture portion of the class from which participants were drawn; the second in how one "family" handled the inevitable problems that arise when research participants are involved over extended periods.

During a lecture, the instructor wanted to demonstrate a particular technique for the class. He asked for volunteers to be a couple. One of the participants in the simulation (the couples' simulation study was in progress at the

time) came up. After a time, her partner ("spouse") decided he would accede to the pressure he felt and joined her. Before the instructor could even structure the role play, as he had done in the past, the couple engaged in their typical interaction, a rather heated exchange. When the instructor recovered and shifted his warm-up, he completed the demonstration of the intervention. In the meantime, the rest of the class and even passers-by in the hall were taken aback by the exchange, thinking a real couple was having an argument. Subsequently, the instructor, who had been very skeptical of the validity of the simulation, reported how real the interaction had been to him, so much so that, for a moment, he was not sure that the couple was not, in fact, married—and in a great deal of trouble.

In the second instance, a few of the "families" were coping with members not meeting the simulation commitments. One member was tardy or inconsistent about attending required simulation interactions. Rather than either drop out of the simulation and lose the extra credit or seek guidance from the teaching assistant, researcher, or monitor, two members invented scenarios to fit the problems within the context of the simulated family. Both assigned the recalcitrant family members the roles of alcoholics. Obviously, past experience was being brought in to "flesh out" the simulation.

The question remains: How like a real family is a simulated one? The question can be divided into four segments.

How like a real family is a simulated one? Because even defining what a family is is a moot point and because the definition is multidimensional and complex, an answer is elusive. Families are groups; families interact; families share a genealogy, if not a history. In many ways, simulated families are very much like real ones.

How *like* a real family is a simulated one? From our findings and those of others, participants involved in the simulations experience and bring in a sense of realism to the situation. To a "fair" degree, simulated families are very much like real ones.

How like *a* real family is a simulated one?—Probably very unlike a real family. But then how like one family is another? Or, for that matter, the same family from one period in its existence to another? Simulated families may be as similar to any specific real family as one real family is to any other real family.

How like a *real* family is a simulated one? Again, what is a real family? Is it an intact family? With how many members? Of what ages? Of how many generations? What about racially mixed or blended or single-parent constellations? Are those not "real" families?

We have raised more questions than we have answered or can possibly answer. However, as a research tool, IPS seems to produce an entity enough like a real family to be worth examining further.

Possibilities

Possible applications of IPS are myriad. The uses for exploration of family dynamics alone are numerous. Different types of families could be produced, varying the number of members in the family, the ages of the members, the gender distribution, the birth order of members, and more. Different patterns of family dysfunction, developmental challenges, or family crises could be produced in sufficient numbers to allow experimentation with and comparison of various interventions. Where difficulties finding, recruiting, and retaining a sufficient number of families of any particular composition or constellation exist, the possibility of forming a sufficient number needed to study by "traditional" methods is intriguing. Tracking the development of a family system in a condensed time period may also be illuminating.

Research on other types of human dynamical systems—businesses, prisons, or couples—for which the limitations on research participants mentioned also exist could be made possible through the use of IPS. If participants involved in simulations interact and react as people in actual situations do, then research with innovative systems and structures may be productive. Aspects of interactions that might prove risky or detrimental could be explored under safer conditions, provided participants were informed and willing to be involved.

Because IPS is based on dynamical systems theory (DST), the benefits for the applications of both may be reciprocal. IPS may be useful in furthering the needed development of DST theory and practice (Butz, 1997; Butz, Chamberlain, & McCown, 1997; Remer, 1997). IPS itself might prove to be an integral tool for research, training, and intervention from the DST perspective.

The present focus is on the use of IPS for research. The potential uses in training still should not be forgotten or ignored (Elliott, 1994).

Conclusion

IPS is distinct from the strict analogue method. Although each may have its uses, the methods are quantitatively and qualitatively different. Whether and how IPS differs from "quasi-naturalistic" analogue approaches still remains to be established. The rationale behind its development and use (Remer, 1990) is at odds in many ways with traditional views of analogue research (Goldman, 1976). It is not that strict analogue research does not have its place, but rather that attempting to isolate and "control" variables when studying human dynamical systems may very well be counterproductive and self-defeating. Strict analogue research, like all logical positivism, is static, linear, and reductionistic. Thus it is extremely limited in approximating fluid, nonlinear, interactive dynamical systems.

IPS, as a research method, holds great promise wherever participant groups that vary as much within themselves as among themselves, such as families, are of interest. Researchers will not only be able to produce units of analysis with certain characteristics of interest in common (e.g., families of size four with two teenage children [Finger, 1994] or couples at odds over cross-gender friendships [Elliott, 1994]), but they will be able to do so in sufficient number to produce data making standard statistical analyses feasible.

Although results of the present study are very encouraging, much is yet to be done. Researchers are skeptical, and rightly so. As with any method, limitations exist. Unanswered questions abound: How much and what types of structure are optimal? How does one define a *typical* or *realistic* interaction? How long does it take to induce typical interactions in any group? Does a typical interaction vary by what the focus or problem of interest is? What are the limitations to "getting in role" adequately? Can anyone do it?

If, as has been supported here and in other studies, the superior realism of simulation methods over analogue methods has been recognized, why has simulation not been used more often? True, the simulation method is more time consuming than the analogue, but when the latter risks drawing incorrect or misleading conclusions, the extra effort involved seems warranted. Perhaps, one part of the answer is that those who believe in simulation have not been vehement enough in promoting its use.

The present study is only a small part of an ongoing research project that was conceived seven years ago and has been implemented effectively for only four. Each step has not only generated useful information but also more questions and, fortunately, creative and exciting approaches to answering them. We find the results obtained to date very encouraging. We urge others to join us in exploring an area that we believe offers great promise to the social sciences in general and psychology in particular.

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Sociometry: Tools for Research and Practice

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ABSTRACT. This article reviews basic sociometric tools and their analysis, provides information on computer programs to analyze sociometric data, and briefly examines consideration in conducting sociometric investigations.

THE APRIL 3, 1933, SUNDAY ISSUE of the *New York Times* announced the unveiling, by Jacob Moreno, of a "new science, named psychological geography, which aims to chart the emotional currents, cross-currents, and undercurrents of human relationships in a community . . . at the scientific exhibit of the Medical Society of the State of New York" ("Emotions Mapped," p. 17). The *New York Times* further described that "[t]he maps represent studies of attraction and repulsion of individuals within a group toward one another and toward the group, as well as the attitude of the group as a whole towards its individual members, and of one group toward another group" (p. 17). J. Moreno reportedly claimed at the Medical Society meeting, "If we get to the point of charting a whole city or a whole nation . . . we would have an intricate maze of psychological reactions which would present a picture of a vast solar system of intangible structures, powerfully influencing conduct, as gravitation does bodies in space" (p. 17).

There is little doubt that Moreno's sociometry is one of the most significant contributions to social and behavioral sciences given its widespread

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applications in a variety of fields (e.g., developmental psychology, industrial psychology, individual and group psychotherapy, sport psychology, sociology, agricultural extension, education, government, health) to advance both research and practice (see, for example, Anshel, 1994; Breen, 1994; Buchanan, 1982; Gazda, 1982; Hinshaw & Melnick, 1995; Lee, 1991; Mouton, Blake, & Fruchter, 1960; Pareek & Singh, 1968). Scholars have viewed sociometry simultaneously as (a) a tool to gather data about relationships, (b) a tool to affect relational changes within therapeutic and work settings, and (c) a philosophy of life and living (see Mendelson, 1989).

Sociometry, in its most basic sense, can be best characterized as a collection of methods to investigate and evaluate networks of existing and preferred relationships. Specifically, sociometry is the study of interpersonal choices regarding criteria of interest to the investigator (Kumar & Treadwell, 1985). Sociometry is not a study of formal group structure (e.g., official hierarchies), rather it is a phenomenological study of people's interpersonal choices.

This article describes some of the basic sociometric tools for gathering information and analyzing data. Sociometric data may be obtained in writing or in action, as shown by a person placing his or her hand on the shoulder of a group member to display choices. The latter technique is referred to as "action sociometry" because interpersonal choices are displayed in action. The action technique is mostly used in applied settings when immediate feedback is needed.

Sociometry Tools

The basic approach in sociometric methodology is to ask participants to select individuals who, in their view, could accomplish certain tasks with (or for) them or who have specific behavioral characteristics (e.g., shyness, cooperativeness, sensation seeking, introversion, ability to lead). This method may also be used to inquire about significant others, events, pets, and objects in an individual's life (present, past, or anticipated) who make that individual's life either meaningful or miserable.

Bjerstedt (1956) differentiated between group-directed and individual-directed sociometry; Kumar and Treadwell (1985) used the terms *group-centered* and *individual-centered sociometry.* The former approach requires individuals to restrict their choices within an ongoing group; the latter allows choices from the larger community (deceased or living) to which they belong.

A third approach, "wishful sociometry," may also be used whereby individuals indicate their preference about wished-for relationships (individuals, groups, pets), objects (artwork, gifts), and activities (visit historical and cultural markers, experiment with novel ideas); (see Kumar & Treadwell, 1985; Carlson-Sabelli, Sabelli, Patel, & Holm, 1992; J. Moreno, 1953; Treadwell,

Leach, & Stein, 1993; Treadwell, Stein, & Leach, 1989). Self-selection may be allowed if needed; for example, a participant might wish to develop a better relationship with himself or herself (see Sywensky, Litsinger, & Treadwell, 1996). Wishful sociometry seems to be more commonly used in clinical practice than in research.

Method of Nomination Without Ranking

This method involves asking a respondent to nominate one or more individuals (a) to perform a specific task, (b) who best reflect particular behavioral characteristics, and (c) who he or she likes, dislikes, or feels indifferent toward (Ben-David, 1992; Bukowski, Hoza, & Newcomb, 1994). The nomination without ranking procedure does not require members to rank order their choices (e.g., first, second, third). Depending on the purposes of the investigation, self-nomination may or may not be appropriate. The respondents may be allowed to choose nominees from their community at large (individual-centered) or only the present group (group-centered).

Nomination data can be gathered in writing or by action within the context of a group. By action, group members may be asked to place their left hand on the shoulder of one person and right hand on the shoulder of another person to display their choices. Self-selection may be demonstrated by placing a hand on one's own chest or forehead. Because some members are shy about being touched and touching others, it is important that action sociometry be used only after obtaining consent. The action method may be cumbersome to use when the members are asked to display more than two choices simultaneously.

Method of Nomination With Ranking

This technique requires respondents to select more than one individual (usually between three and five) for a particular task, and also to rank order their preference. Nomination with ranking can be easily used as an action method by asking members to place their left hand on a member's shoulder to indicate their first choice and place their right hand on another member's shoulder to indicate their second choice. Responses are best collected in writing if three or more choices are to be ranked. Written responses are best if the data are to be subjected to statistical analysis.

Kumar and Treadwell (1985) pointed out that "there is no simple answer to [the] question" of how many choices are to be allowed in a sociometric study (p. 10). They recommended that in small groups of 5 to 10 individuals, members may be invited to rank order all their preferences. In larger groups, allowing only three to five choices makes data handling and analysis easier, particularly if the data are to be used immediately in group work. J. Moreno (1953)

observed that either allowing unlimited choices or restricting the number of choices makes no difference in terms of who will receive the highest first choice. The unlimited choice method is useful if one wishes to assess an individual's degree of social expansiveness or social isolation.

Peer Rating Procedure

Asher, Singleton, Tinsley, and Hymel (as cited in Johnson, Ironsmith, & Poteat, 1994) had children rate how likely they would be to play with a particular peer, using a 3-point scale showing sad, happy, and neutral faces. Johnson et al. pointed out that such visual "ratings may be less objectionable to parents, teachers, and human-subjects review committees concerned about the effects of asking children to make negative verbal nominations of their peers" (p. 38).

Hayvren and Hymel (1984; see also Barclay, 1992) indicated that practitioners and researchers are "unwilling to administer negative sociometric measures . . . [that ask] . . . children to name peers whom they do not like or with whom they like to play . . . [because they] . . . would implicitly sanction the saying of negative things about others, and in fact, may cause children to view the disliked peers even more negatively" (p. 844). However, Bell-Dolan and Wessler's (1994) review of studies showed that the risk posed by participating in a sociometric study was no greater than "those encountered in everyday life. Children did not increase their negative interactions with unpopular peers, were not more socially withdrawn, and did not express feelings of unhappiness or loneliness following participation in studies that used sociometric measures" (p. 24). Nevertheless, Bell-Dolan and Wessler cautioned that because studies vary greatly with regard to various investigative procedures (e.g., consent procedures, confidentiality instructions, individual versus group administrations) "it is impossible to determine, across the board, whether sociometric procedures currently in use are ethically sound" (p. 24). Readers are referred to Bell-Dolan and Wessler's article for greater details on how risk may be minimized in sociometric investigations.

Social Atom

One of J. Moreno's (1947) most significant contributions in sociometry is the conceptualization and measurement of the social atom. The social atom signifies the smallest number of significant others (including pets, objects, groups, events) an individual needs to feel a sense of well-being, completeness, sociostasis, or social equilibrium (Hollander, 1974; Kumar & Treadwell, 1985; J. Moreno, 1947, 1953). The social atom construction can be either individual-centered or group-centered, and responses can be obtained either in written or action form.

Hollander (1974, cf. Kumar & Treadwell, 1985) differentiated among three types of social atoms: psychological, collective, and individual. According to Hollander, the psychological atom identifies those significant individuals (e.g., family members, friends, teachers, psychologists, social workers) who contribute to a person's sense of wholeness or completeness. The collective atom includes significant groups to which a person belongs (e.g., church, temple, YMCA, school, neighborhood club, gang). The individual atom includes those individuals who help the respondent maintain membership in the various groups mentioned in the collective atom. J. Moreno (1947) described a particular type of individual-centered social atom for which the respondents are asked to list their significant objects (money, clothes, books, cars) and pets; for lack of an existing term, Kumar and Treadwell (1985) designated this type of social atom as the *object atom.*

The traditional method of measuring an individual's social atom is to provide a series of concentric circles (see J. Moreno, 1960). A dot is placed in the center of a circle to represent the respondent, and several concentric circles are provided at increasing distances from the center dot. The respondent is asked to place his or her choices, using distance from the center dot as a measure of closeness. The method of concentric circles works well in ongoing groups. Even a glance at a group member's social atom can reveal conflicts with significant others that may provide themes for action in group therapy (see Kumar & Treadwell, 1986). However, such graphic displays of social atoms are not easy to analyze for research purposes. Furthermore, there are no known scoring systems for graphically represented social atoms. Consequently, their use has been limited to clinical work.

Treadwell and associates (Treadwell et al., 1989; Treadwell et al., 1993) developed the Social Network Inventory (SNI), which allows a comprehensive quantitative assessment of four social atoms: psychological, collective, individual, and ideal dream (wished-for). This instrument is designed to plot choices as well as ratings (closeness-distant) in four quadrants corresponding to each of the social atoms. The psychological quadrant allows for the inclusion of pets and objects. The inventory is formatted in four columns and allows for an unlimited number of choices.

For the psychological quadrant, respondents are asked to list the names of significant others (including objects, pets, and deceased persons) in Column 1; indicate their relationship to the person, pets, or objects in Column 2; rate their closeness on a bipolar 7-point scale (1 = *close*, 7 = *distant*) in Column 3; and rate how close they think the persons and pets are toward them on a 7-point bipolar scale in Column 4 (a role reversal assessment). The instructions to complete the bipolar scale are appropriately modified for the collective and the wished-for quadrants (for example, the instruction for the collective quad-

rant is "How close are you to the group?" and for the wished-for quadrant, "How close do you wish to be to this person?").

In contrast to the traditional measurement of the social atom, the SNI provides not only qualitative but also quantitative self-report data. Furthermore, it provides for standardized administration, scoring, and mapping procedures. Treadwell et al. (1993) reported that the SNI is easily understood by the respondents.

Sociodynamic Sociometry

Carlson-Sabelli et al. (1992) and Carlson-Sabelli, Sabelli, and Hale (1994) have criticized the traditional sociometric measurement for (a) focusing on choices and ignoring why choices are made, (b) treating opposites (choice versus rejection and indifference) as mutually exclusive categories or as the opposite ends of a continuum (i.e., love and hate toward the same person can coexist resulting in push and pull processes operating simultaneously), and (c) using a linear scale whereby choices are rank ordered from least to most. Carlson-Sabelli et al. (1994) described a sociodynamic approach that uses the traditional nomination procedure (with or without ranking) along with the measurement of opposite processes of attraction and repulsion via the "plane phase of opposites"—or less technically "the diamond of opposites"—toward a person, activity, or opinion (p. 162). The diamond of opposites can be used to gather data in writing or in action. To use it in action, draw a large diamond in the center of a room and ask group members to place themselves within the marked areas of the diamond in a location that best reflects the intensity of their combined positive and negative feelings toward a significant other.

In Carlson-Sabelli et al.'s (1994) scheme, the bottom vertex of the diamond represents indifferent, neutral, or zero feelings, and the top vertex represents contradictory, ambiguous feeling characterized by intense but opposite (equally positive and negative) feeling. Thus, the area within the diamond of opposites is divided into four quadrants: (a) bottom (weak feelings of both attraction and repulsion), (b) top (strong contradictory feelings of both attraction and repulsion), (c) left (attraction), and (d) right (repulsion) (see Figure 1).

According to Carlson-Sabelli et al. (1994), the diamond can be used to prepare interpersonal profiles for a variety of criteria such as harmony-conflict, approach-avoidance, and attraction-repulsion represented as opposite axes of separate diamonds. Respondents are asked to rank order their significant others in terms of how much time the respondent (a) wishes to spend with their significant others (ideal rank order) and (b) actually spends with their significant others (actual rank order). Next, they locate their significant others by marking points in each of the diamonds (harmony-conflict, attraction-repul-

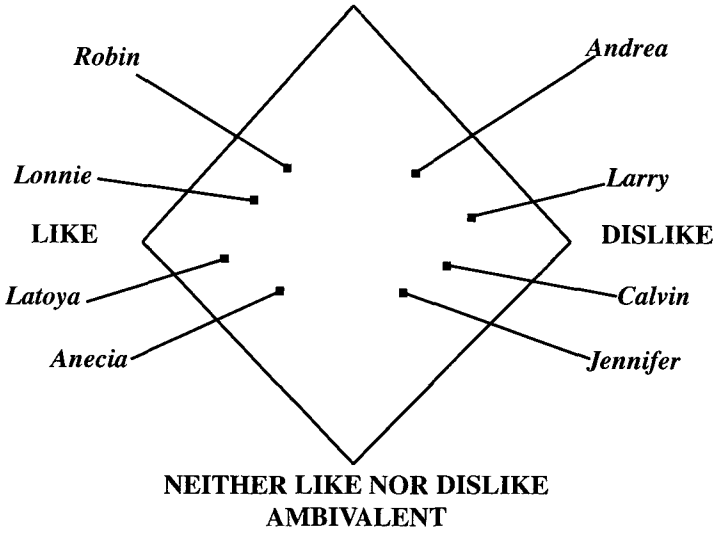

FIGURE 1: Diamond of Opposites

Note. From "Sociometry and Sociodynamics," by L. Carlson-Sabelli, H. Sabelli, and A. Hale, 1994, in *Innovations in Theory and Practice: Psychodrama Since Moreno*, by P. Holmes, M. Karp, and M. Watson (Eds.), 1994, New York, Routledge. Copyright 1994 by Routledge. Adapted with permission.

sion, and approach-avoidance) first to indicate the actual rank order and second to indicate the ideal rank order. Connecting the dots within each diamond provides interpersonal profiles (for criteria of interest) for significant relationships, which can then be compared. Carlson-Sabelli et al. mentioned that their approach can be used in conjunction with the SNI (Treadwell et al., 1993) to determine social distances. (See Carlson-Sabelli et al., 1992, 1994, for more information on the mathematics of the sociodynamic approach.)

Constructing Sociometry Questions

J. Moreno (1953) stressed the significance of using specific criteria in constructing sociometric questions. He defined a criterion as "*the common motive which draws individuals together spontaneously, for a certain end* [italics in original]" (p. 97). He also differentiated between diagnostic and action crite-

ria, although the former can be transformed to the latter. Questions using diagnostic criteria seek existing information, for example, "With whom do you go out to movies?" This question does not call for action, as in the case of the question, "Whom would you select to lead the group for the next hour?"

According to J. Moreno (1953), sociometric questions need to be differentiated from near-sociometric questions. Sociometric questions have the following four characteristics (Kumar & Treadwell, 1985, p. 3):

1. The questions attempt to determine interpersonal feelings (attraction, repulsion, indifference) in relation to an explicit criterion.
2. The criterion used is specific and action-oriented and not hypothetical, projective, or ambiguous.
3. When asked within the context of a group, the questions should serve an immediate group goal, such as for group warm-up or identifying roles (mother, father, brother, lover) for different individuals in the group or for subgroup structures, or a group theme for action (Treadwell, Stein, & Kumar, 1988).
4. The questions must specify whether or not choices can be made outside the group (J. Moreno, 1953; Z. Moreno, 1984, personal communication, cited in Kumar & Treadwell, 1985).

Near-sociometric questions use ambiguous, hypothetical, or projective criteria (e.g., "Who are you most comfortable with in the group?" or "Who in the group is most like yourself?" For additional examples, see Kumar & Treadwell, 1985).

Although the distinction between near-sociometric and sociometric questions is important, J. Moreno (1953) pointed out that the "sociometric procedure is not a rigid set of rules, but it has to be modified and adapted to any group situation as it arises" (pp. 101–102). Thus, both types of questions are helpful when leading groups. Near-sociometric questions may be particularly helpful in conducting warm-ups before moving to more specific task-oriented sociometric questions. The use of near-sociometric questions in research may lead to unreliable results because they are open to multiple interpretations by respondents in answering such questions.

In traditional sociometric investigations, certain key phrases are used to request nominations: "select a person," "choose a person," or "which person in the group . . ." Furthermore, the nomination requests may be worded to tap positive (select a person to work with) or negative (name the person that you do not wish to work with) feelings toward a person, activity, or belief. Kumar and Treadwell (1985) noted that phrasing questions to tap positive feelings may be preferred generally in action sociometry, because action makes the results obvious to the group members. A negative question requires deliberate rejection and may be threatening both to the choosers and to those chosen. In contrast, a positive question requires deliberate selection and, consequently, not being selected may not only reflect a lack of feeling rather than a well-

developed negative feeling. Feelings of deliberate rejection may cause unnecessary conflict within a group. On the other hand, negative questions may be helpful in locating problem situations to be resolved by the group (Bjerstedt, 1956; Kumar & Treadwell, 1985). In the context of action sociometry, Kumar and Treadwell also suggested avoiding broad ambiguous questions (e.g., "Who do you like most in the group?"), personality trait questions (e.g., "Who in this group is most androgynous?"), and ego-threatening questions (e.g., "Who is the most resistant member in the group?").

Whether one uses positive or negative questions in action sociometry, it is important to educate the group members before implementing sociometry regarding (a) different types of sociometric questions, (b) the four features of sociometric questions, and (c) the proper interpretation of selection decisions (i.e., inform participants that not being selected does not imply rejection, and that selections are criterion-specific, not generalizable to other criteria).

In summary, while constructing sociometric questions, either for research or for action purposes, it is important to ask the following questions (Kumar & Treadwell, 1985):

1. Is the question relevant to the goals (or stated hypothesis) of [the] investigation? What I am trying to measure, and why?
2. Is the question a sociometric question? Is the question open to multiple interpretations?
3. Does the question specify whether or not choices can be made to people outside of the group?
4. Is the question realistic?
5. Is the question timely? Are the data immediately usable for action purposes within the context of a group?
6. Is the question potentially threatening to any one in the group?

Administering the Sociometric Instrument

Sociometric questionnaires are relatively easy to construct and administer. A simple sociometric instrument contains (a) statements (or questions) requesting one or more nominations for a particular purpose, and (b) blank lines to indicate one or more nominations. If the nominations are to be ranked, the blank lines may be prefixed by the phrases Choice 1, Choice 2, Choice 3, and so forth. (See Appendix for an example of a sociometric form.)

Some general guidelines, which readers might find helpful, for implementing a sociometric study are the following:

1. Regardless of whether the sociometric investigation is for research or clinical work, it is important to prepare a clearly stated informed consent form. For research, the informed consent form should include (a) a clear state-

ment for why such data are being collected, (b) an assurance that data will be held in strict confidence, and (c) a request that participants not share their choices with others or to make them public (see Bell-Dolan & Wessler, 1994 for more information on consent-assent procedures, especially if participants are children and minors).

2. For group work, the informed consent form should (in addition to what was previously mentioned) require group members to treat sociometric data as privileged information not to be divulged to outsiders. If action sociometry is to be implemented, the consent form should state that certain exercises involve touching other group members. If group process is being videotaped, the informed consent form must also be signed by camera- and videotaping-technicians. Furthermore, if videotapes are sent home for evaluation by group members, the informed consent form should include an agreement that no one else, other than the group members, will view the tapes.

3. For research with small groups (15 to 20 individuals), data, if needed, can be collected anonymously by handing participants a sheet with names and identification (ID) numbers. If two people have the same name, nicknames may be assigned and made known to all participants along with the corresponding ID numbers. The participants are instructed to use only the ID numbers in reporting their nominations.

4. Completion of sociometric instruments at home is not recommended because members may compare answers or not complete the questionnaires in time.

5. In ongoing groups, it is important to recognize that sociometric data are highly personal, and being chosen or not chosen might be emotionally unsettling to some participants. Thus, the first one or more sessions should be spent educating group members about the nature of sociometry and how it will be used to facilitate group process to improve interactions among group members.

6. For general research guidelines, refer to the ethical guidelines published by the American Psychological Association (1992) and the Association for Specialists in Group Work (1990).

Analysis of Sociometric Data

Sociometric data provide a large amount of information about the nature of interactions within a group. Some of the basic sociometric indices commonly used by investigators to understand structural aspects of groups are reviewed here.

Analysis of Individual Status

Positive stars and isolates. The terms *positive stars* (described as stars of attraction in J. Moreno, 1953, p. 508) and *isolates* are used to identify the

most and least popular individuals within a group when participants are asked positive criterion questions (e.g., "With whom would you like to associate?"). A positive star is an individual who receives the largest number of selections on a specific criterion of interest when using the nomination procedure without ranking. When choices are rank ordered, then a positive star would be the most popular individual on the tabulation of the first choice. Of course, a different star may emerge on the second or the third choice.

An isolate is one who chooses, but receives no choices (see Figure 2, Subgroup A). A less commonly used term in the literature is a *true isolate*—an individual who refuses to choose and who is not chosen (see Figure 2, Subgroup A; Jennings, 1950). There is no appropriate term for a person who refuses to choose, but is chosen (e.g., a person is elected as a positive star, but this individual refuses to choose). Future research may evaluate the significance of such individuals in group processes.

Kumar and Treadwell (1985) suggested that isolates and stars are best conceptualized as characteristics that occur in degree. Thus a person is more or less an isolate or a star—zero isolation would mean star status (chosen by everyone), whereas 100% isolation would imply no one has selected the individual (the two extreme ends of a continuum). Conceptualizing the star–isolation characteristic as a continuum allows the investigator to classify more than one individual as popular or isolated within a group. This conceptualization is consistent with Bronfrenner and Carver's (cited by Criswell, 1960) methods of using cut-off points to select group members who are "considered to be overchosen, and the point below which an individual is underchosen or socially neglected" (p. 210).

Positive stars are pivotal individuals who can link group members to form coalitions to provide leadership on a particular task. Kumar and Treadwell (1985) suggested that the term *leader* be used for an individual who emerges as a star on many different criteria; such an individual may be elected by the group to be its representative or to serve as the main officer (e.g., president). For lack of a suitable term, a person not chosen on multiple criteria may be designated as a *general isolate.*

Brusa, Stone, Beck, Dugo, and Peters (1994) have defined four types of leaders in therapy groups: (a) task leader—one who "influences norm development, goal clarification, style of communication, and many other dimensions of group life," (b) emotional leader—"the best-liked person and the most important support person to other members," (c) scapegoat leader—"often the object of attack or nonverbal negative feelings from group members," and (d) defiant leader—"who openly expresses an ambivalence about participation in group" (pp. 82–83). (See Brusa et al., 1994 for a sociometric test to identify these different types of leaders.)

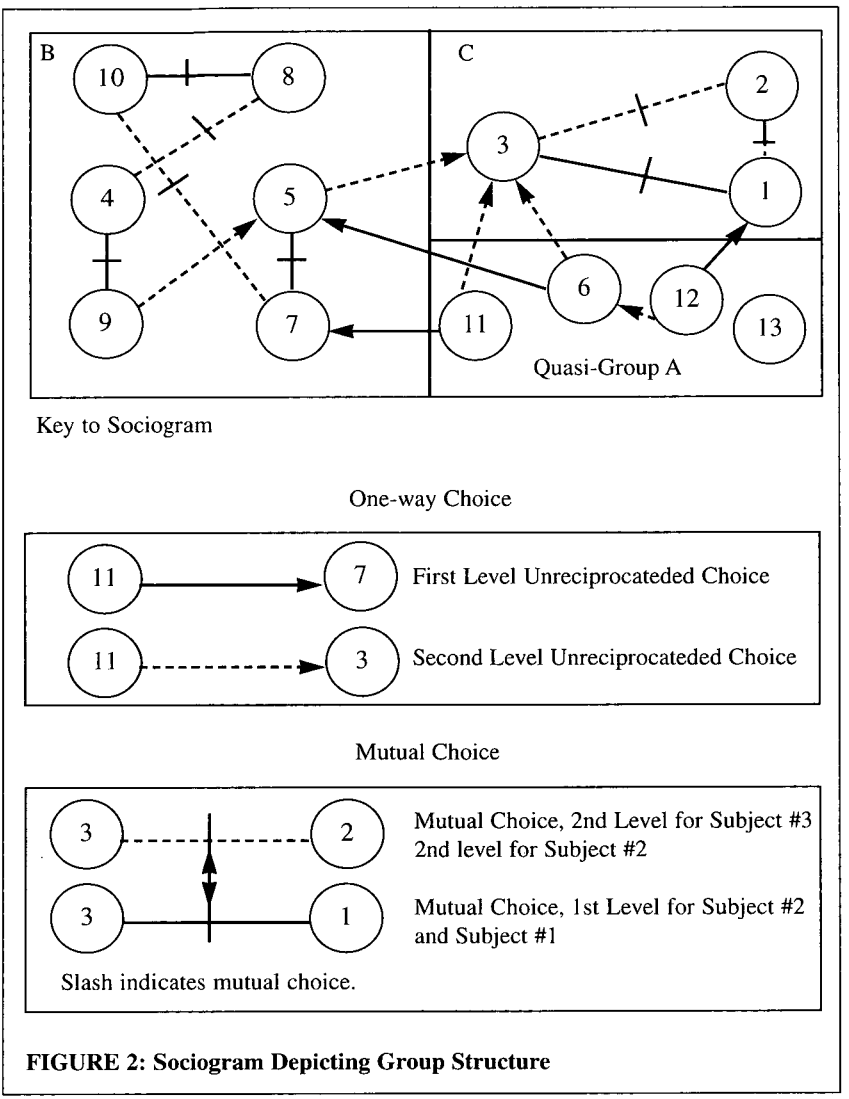

FIGURE 2: Sociogram Depicting Group Structure

Negative stars. The most frequently chosen individuals on a negative criterion question (e.g., "With whom you would not like to associate?") are called negative stars (J. Moreno, 1953, p. 508, described them as "stars of rejection"). However, there seems to be no appropriate term for the least chosen individuals on a negative criterion question. Such individuals are not isolates in the sense of being excluded from the group. If one defines isolation in terms of exclusion from a group, then by definition a star of rejection must be an iso-

late who will be excluded from an activity. Edwards (1960) defined an isolate "as one who receives only 'neutral' or 'dislike' choices" (p. 220).

Negative stars are equally as influential as positive ones, because they may affect the group's direction and cohesion. Negative stars should not necessarily be perceived as negative, because, like positive stars, they can exert their pressure to balance group functioning.

Other methods of classifying individual status. Peery (1979) developed a procedure for identifying from nomination data four types of individuals: popular, amiable, rejected, and isolated. His procedure requires the participants to make nominations on both positive (like most) and negative (like least) criteria. The total number of positive (p) and negative (n) votes are then used to compute two indices: social impact is the sum of p and n votes (p + n) and social preference is the difference between p and n votes (p – n). Using the mean scores on two variables as the point of intersection between the two variables, one can identify the four types suggested above: (a) popular–high social impact (above the mean on both p and n); (b) amiable–positive social preference, but low social impact (above the mean on p but below the mean on n); (c) rejected–negative social preference but high social impact (above the mean on n but below the mean on p), and (d) isolated (below the mean on both p and n).

Coie, Dodge, and Coppotelli (1982) used Peery's method of computing social impact and social preference scores to divide the individuals into six types: popular, rejected, neglected, controversial, average, and other. Their method of classification involves first tabulating frequencies of positive (p) and negative (n) nominations and converting them into standard (Z) scores. A social preference (SP) is then defined as the difference between standardized p and n scores. A social impact (SI) score is defined as sum of the standard p and n scores. Each person is then classified into one of six categories using the following cut-off points:

1. Popular: $SP > 1.0$, $p > 0$, and $n < 0$
2. Rejected: $SP < -1.0$, $p < 0$, and $n > 0$
3. Neglected: $SI < -1.0$, $p < 0$, $n < 0$
4. Controversial: $SI > 1.0$, $p > 0$, $n > 0$
5. Average: SP between –0.5 and 0.5, SI between –0.5 and 0.5
6. Other: all remaining individuals

Coie et al.'s (1982) method has been used in several studies (Asher & Dodge, 1986; Hinshaw & Melnick, 1995).

Analysis of Interactional Patterns

The previous section presented an analysis of status or relative position of an individual within a group. This section focuses on analyzing interactions

among members to discover mutuality or reciprocity of choices, nonreciprocity of choice, and subgroup formations (cleavages and cliques).

Mutuality of choice. A mutual (reciprocal) choice is one in which two people select each other on a given criterion. In an ongoing group, identification of mutual choices is often helpful in forming teams, making role assignments within the team (e.g., to serve as initiator, gatekeeper, provider of support). Mutual choices on positive and negative nominations may be called positive and negative mutuality reflecting mutual acceptance and rejection respectively.

In nomination procedures by which people rank order their choices, analysis, although cumbersome, may provide interesting insights. For example, one might find that person A gives his first choice to B, but on the second choice B selects A. This is an example of "different level reciprocity" (see Figure 2).

Kumar and Treadwell (1985) differentiated between different levels of mutuality; for example, first level mutuality (mutual first choices), second level mutuality (mutual second level choices), and so forth. Levels of mutuality reflect the intensity of attraction or repulsion, depending on whether positive or negative nominations are called for. However, the situation becomes complex when A gives first choice to B, but on the third choice B chooses A. In such cases there is mutual attraction between the two people, but the intensity of A's feeling toward B is greater than vice versa. Kumar and Treadwell have suggested a weighting scheme to investigate the degree of mutuality. If participants are allowed three choices, the mutual first, second, and third level choices are assigned the weights of 3, 2, and 1, respectively. A first level choice reciprocated at second level is assigned 2.5 points, and so on. The authors emphasized that this weighting scheme is arbitrary, and there may be other ways of assigning weights.

Nonreciprocity of choices. These choices reflect a one-way pattern of relationships within a group. Thus, in a four-member group, person A chooses B, B chooses C, C chooses D, and D chooses A. This may also be referred to as a chain, which is typically found in the initial stages of a group formation. The number of nonreciprocal choices is usually reduced as participants get to know one another.

Subgroup formations. Subgroups are groups within groups. A subgroup consists of a smaller set of individuals who are largely connected with each other on a particular criterion of interest. A simple example of a subgroup among six members would be three pairs of mutuals. One might also consider this as an instance of a cleavage. That is, the group is sharply divided on a major issue (or issues) with no selections made across groups (Sax, 1989). In

Figure 2, Subgroup B is characterized by three mutual first choices who are connected to each other by second level choices.

A clique is another example of a subgroup that is defined in terms of a group of people who only select each other (see Figure 2, Subgroup C). Cliques may result from cleavages (Sax, 1989). Cliques can be criterion-specific or exist as stable subgroups across a variety of criteria. Thus, it is important that investigators clearly specify their use of the term. Treadwell and Leach (1987) used the term *quasi-subgroup* to describe a subgroup that consists of members connected to each other by one-way choices. Thus, quasi-subgroups lack mutually interactive relationships (see Figure 2, Subgroup A).

Processing Sociometric Data

Computers have made the formerly laborious task of plotting sociograms by hand and computing various indices much easier. There are at least five computer programs:

1. The NARSOC (Naugher Sociometric), written by Naugher (1975)
2. CompSoc (a modified version of NARSOC), written by Treadwell and Leach (1987; Treadwell et al., 1993)
3. Netmap, designed by John Galloway (cited by Blake & McCanse, 1989)
4. Snyder, Mowgli, Assor, and Stellrecht's program for Macintosh 512 computer (cited by Hale, 1987)
5. Group, written by Muir (1994)

The Group and CompSoc programs (both compatible with IBM PC) are in the public domain and copies can be obtained by contacting the authors. A version of CompSoc for Windows 95, GraphPlot, has been released by Martin Saxton and Thomas Treadwell. GraphPlot may be accessed on and downloaded from the World Wide Web (http://www.voicenet.com/~msaxton/GraphPlot).

Conclusion

Sociometry, a phenomenological methodology for investigating interpersonal relationships, has been used in various research and applied settings. Although there are advances being made in sociometry (see Carlson-Sabelli et al., 1994), the basic methods of nomination with and without ranking remain popular with investigators. Computer technology has made it possible not only to expedite data analysis but also to use sophisticated statistical analysis. The computer programs should be particularly helpful in training students on sociometric procedures. It is possible that the availability of computer software will provide a fresh impetus to greater use of sociometric tools in research and practice.

APPENDIX

SAMPLE SOCIOMETRIC FORM

Your name _____

Assigned ID# _____

Item 1: Select a partner from within the group to work with on a research project for the next nine months.

Choice 1 (Name) _____

Assigned ID# _____

Choice 2 (Name) _____

Assigned ID# _____

Choice 3 (Name) _____

Assigned ID# _____

Item 2: Select a partner (etc.)

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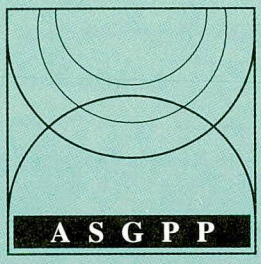

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