Journal of Group Psychotherapy Psychodrama & Sociometry

VOLUME 47, NO. 1
SPRING 1994

Published in Cooperation with the American Society of
Group Psychotherapy and Psychodrama

Founded by J. L. Moreno, 1947

Journal of Group Psychotherapy Psychodrama & Sociometry

Volume 47, No. 1 ISSN 0731-1273 Spring 1994

Contents

The **Journal of Group Psychotherapy, Psychodrama and Sociometry** (ISSN 0731-1273) is published quarterly by Heldref Publications, a division of the nonprofit Helen Dwight Reid Educational Foundation, Jeane J. Kirkpatrick, president, 1319 Eighteenth Street, NW, Washington, D.C. 20036-1802 (202-296-6267), in conjunction with the American Society of Group Psychotherapy and Psychodrama.

Second-class postage paid at Washington, DC, and additional post offices. POSTMASTER: Send address changes to the **Journal of Group Psychotherapy, Psychodrama and Sociometry**, Heldref Publications, 1319 Eighteenth Street, NW, Washington, DC 20036-1802.

The annual subscription rate is $64 for institutions and $40 for individuals. Single-copy price is $16.00. Add $9.00 for subscriptions outside the U.S. Allow six weeks for shipment of first copy. Foreign subscriptions must be paid in U.S. currency with checks drawn on U.S. banks. Payment can be charged to VISA/MasterCard. Supply account number, expiration date, and signature. For subscription orders and customer service inquiries **only**, call 1-800-365-9753. Claims for missing issues made within 6 months will be serviced free of charge.

The **Journal of Group Psychotherapy, Psychodrama and Sociometry** is indexed, scanned, or abstracted in *Applied Social Science Index & Abstracts, Child Development Abstracts & Bibliography, Family Resources Database, Health & Psychosocial Instruments, Innovation & Research, Linguistic & Language Behavior Abstracts, Mental Health Abstracts, Psychological Abstracts, PsycINFO Database, and Sociological Abstracts, Social Planning/Policy & Development,* and *Sociological Abstracts.*

Reprints (orders of 100 copies or more) of articles in this issue are available through Heldref's Reprint Division.

Microform editions of the *Journal of Group Psychodrama, Psychotherapy and Sociometry* are available from University Microfilms, Inc., Serials Acquisition Department, 300 N. Zeeb Rd., Ann Arbor, MI 48106. Reprints (orders of 100 or more) are available through Heldref Publications, Reprint Division.

Comments from the Guest Editors

This is one of a series of theme issues devoted to sociometry, a multipurpose quantitative methodology. Sociometry is defined as the measurement of social relationships. This broad definition implies enormous flexibility of application. Sociometric instruments can be used to measure numerous types of interpersonal relationships in a large variety of settings. Based on an analysis of the responses given to various sociometric questions, specific relational patterns within a group emerge.

Sociometry is a useful tool for gaining a clear understanding about the positive, negative, and neutral attributes of a group as well as those of its individual members. Such an understanding provides a framework within which group directonality can be encouraged or individual intervention can be implemented.

The articles in this issue provide a sampling of the various ways in which sociometric methodology can be used to clarify structural and process elements in educational settings. Winston Hagborg discusses the use of sociometry with hearing-impaired children. Adams and Roopnarine report on their studies with preschool and school-aged children. Johnson, Ironsmith, and Poteat present their findings on the uses and application of social network analysis to assess children's sociometric status.

THOMAS TREADWELL, EdD
Guest Editor
SUSAN KOSZALKA, MA
NORMAN RAHN, MA
Assistant Guest Editors

Sociometry and Educationally Handicapped Children

WINSTON J. HAGBORG

ABSTRACT. Sociometry is presented here as a useful method both for understanding peer relations and assisting in the development of intervention plans for educationally handicapped children. I provide descriptions of my previous research investigations with deaf and severely emotionally disturbed youth and then offer applied case examples drawn from my practice as a school psychologist. I conclude that sociometric assessments, given their advantages, are well suited to assist educators in meeting the challenges of school change.

HARTUP (1989) CONCEPTUALIZED close human relations as divided into two major groups: vertical or horizontal relationships. Vertical relationships are characterized by unequal power or position, such as parent and child or teacher and pupil. Horizontal relationships are those relations between people of roughly equivalent social power that most often include reciprocity and egalitarian expectations. Both forms of human relations are critical to healthy human development. My concern in this article is with horizontal relations, which provide a staging area for the development of companionship, close friendship, and love.

In my work as a school psychologist, I find that the children's most frequent complaints concern friendship difficulties. Specifically, these concerns may be described as too few friends—"I only have one friend in this school," the absence of friends—"nobody here likes me," peer rejection—"I am teased and bothered," or dissatisfaction with one's social position—"I'm not popular." My work with these children involves finding answers to these questions: How are we to understand these concerns, and, even more pertinent, how are we to help these children?

To understand the nature of these concerns and assist practitioners in offering helpful approaches for youngsters with problematic peer relations, Gresham and Elliot (1984) reviewed available social skills assess-

ment procedures. They concluded that only sociometric measures and ratings by others (teachers, parents, and peers) can provide reliable and valid assessments of a child's social position. Other widely used methods, such as child interviews, are of limited value. Indeed, I often find that children are quite confused about why "nobody likes" them or "people are always bothering" them. Classroom observation is generally of only limited value in these matters. Although an observation in a school's cafeteria or playground might provide some clues, the subtle nature of peer relations is not easily detected by behavioral observations. This is especially true for the youngsters who are ignored, not rejected, by their classmates.

The value of sociometric measures as predictor of future life-adjustment difficulties has been frequently noted in the literature. A comprehensive review performed by Parker and Asher (1987) concluded that socially rejected children are more likely to drop out of school, engage in criminal behavior, and exhibit adult psychopathology. In addition to its use as an indicator of social-emotional adjustment, sociometric measures have been used to assess the acceptability of minority children (Singleton & Asher, 1979) and handicapped children (Kennedy & Bruininks, 1977; Kistner & Gatlin, 1989; Morgan, 1977). Sociometric status has been viewed as an indicator of the possible success of mainstreaming and as a useful indicator of handicapped children in need of intervention (Ballard, Corman, Gottlieb, & Kaufman, 1977).

My interest in sociometric measures involves their use as methods of assisting us in understanding the social relations of groups of exclusively handicapped children, in particular the deaf and severely emotionally disturbed. I will discuss my recent use of sociometric assessment as part of conducted child evaluations of four youngsters within a second-grade classroom. In each case study, I believe sociometric assessment offers an effective means of understanding the social life of a group not easily studied by other methods.

Sociometric Methods

The two most widely used sociometric methods are peer nomination and a rating scale. The first method asks that students select three same-sex peers they would most like to associate with in a particular situation such as one at play, at work, or in a friendship (positive nomination). Then, students select least-liked peers, using the same situations (negative nomination). Coie, Dodge, and Coppotelli (1982) provided an excellent description of this method and explained the derivation of five

sociometric classifications: popular (numerous positive nominations), rejected (numerous negative nominations), neglected (few nominations), controversial (numerous positive and negative nominations), and average (remaining students). A second widely used method is that of a rating scale that presents students with a random listing of their classmates' names. They are first instructed to cross out their own name. Next, students are requested to rate each student, usually only same-sex children, based on their liking of that student, from 1 (low) to 5 (high) or some other range. These points on the rating scale may be anchored with a facial expression, for example, frown (1) to smiling (5), or with verbal descriptors.

In conducting my research, I selected the How I Feel Toward Others (HIFTO) sociometric device reported by Morrison (1981). This rating scale was developed for use with mentally retarded youngsters, and I found it was useful first in my work with deaf and later with severely emotionally disturbed youth. The HIFTO requires that students respond to a query about each of their classmates with one of four possible choices: not acquainted with the classmate (don't know), dislike the classmate (dislike), do not care one way or another about the classmate (neutral), and like the classmate (like). Each of the choices corresponds to a circular face with a either a question mark, a frown, a straight mouth, or a smile. With these collected peer ratings, one can derive percentage scores for each student on the four response categories, resulting in measures of acquaintance, rejection, tolerance, and acceptance. Also, each student may be assigned a weighted sociometric rating using the following point system: 3 = like, 2 = neutral, and 1 = dislike. The student's sociometric average is computed by dividing the number of points by the number of nominators minus one, excluding all don't know ratings from the computation.

One difficulty in using a sociometric device with the deaf is their very poor reading skills. Teachers at the site of my study were doubtful if their deaf students would be able to read the names of their classmates. Fortunately, the school where the study was conducted had available color photographs (3 cm × 5 cm) of each student left over from the school's yearbook photographs. I was able to place each photograph in a coin holder with the student's name typed underneath. Students were then presented with their classmates' pictures in a random order, their own photograph having been excluded, and instructed to sort the photos on a poster sheet into the four HIFTO categories. The HIFTO was administered to each student individually by a person skilled in sign language. Although administering this measure to over 200 students was a lengthy process, it did go very smoothly. I can recall very few difficulties, as

students seemed to grasp immediately the nature of the task and easily sorted their classmates photos into the four categories.

Later, I used the HIFTO with severely emotionally disturbed adolescents. In this case, students were asked to circle a particular response. I met the students in small groups of 6 to 10 and read aloud each of their classmates' names, while students followed along in silence, circling their choice. I carefully monitored student responses to ensure that they did not lose track of their places as they moved down the roster listing of 62 students. I found that heavy double lines between each rated student were very useful. Once again, despite its use with students who had substantial educational and emotional handicaps, I found that the sociometric measure was easily understood by the students and did not present any administration difficulties. Last, I administered both the HIFTO and a peer-nomination measure to a second-grade class, and again the administration went very smoothly. I must note that other typically used paper-and-pencil methods, such as questionnaires, would have presented a variety of problems and even been of questionable value for each of these groups of students.

Sociometry and Deaf Children

The site of my investigation was a school for the deaf serving youngsters from preschool age to 18 years. I was interested in the possible differences among accepted and rejected students, using this exclusive population of deaf students (Hagborg, 1987). I also wanted to explore possible differences in sociometric status with reference to placement (day vs. residential), gender, and race. The school's enrollment was approximately 50% day students, and 20% of the students were minority (Black and Hispanic).

Comparing sociometric extremes of accepted and rejected children identified by the HIFTO average scores, I found that accepted students more often were female and exhibited a superior social-emotional adjustment, based on teacher ratings using the Behavior Problem Checklist (Quay & Peterson, 1979). These groups did not differ on socioeconomic status, placement, intelligence, academic skills, and oral communications skills (intelligible speech/lip reading). Using correlational findings with the entire sample, I did find a pattern of correlations that is consistent with earlier sociometric research. Small but significant correlations were found between the HIFTO and socioeconomic status, placement (positively related to residential placement), intelligence, and academic skills. In subsequent analysis, using only upper school adolescent students, I examined sociometric ratings pertaining to gender and race

(Hagborg, 1989). Once again, the sociometric ratings were consistent with other findings with hearing samples (Singleton & Asher, 1979). Female students received higher ratings by both male and female students, a finding that I attributed to their superior social-emotional adjustment, as evidenced by teacher ratings on the Behavior Problem Checklist. Next, I found that White students exhibited a sociometric preference (higher scores) for same-race students when compared with cross-race (minority) students, whereas a significant racial preference was not found for minority students. This finding is consistent with earlier research with hearing children on racial preferences. Hartup (1970) reported that the racial group with the larger numbers, regardless of race, most often exhibits a same-race preference when compared with the racial group with fewer numbers.

Using a sociometric measure, I was able in this investigation to provide a global view of peer relations within a sample of deaf children. Consistent with previous research with hearing youth, social acceptance was found to be based largely on social-emotional adjustment, gender, and, to some extent, race. Characteristics such as socioeconomic status, placement, intelligence, and academic skills were of lesser importance, and a student's oral communication skills were unimportant.

Sociometry and Severely Emotionally Disturbed Adolescents

I conducted an investigation at a school serving severely emotionally disturbed youth because I was curious about youngsters who found themselves frequently in need of crisis intervention or, more specifically, were briefly removed from their classroom (Hagborg, 1988). Beyond their problematic behavioral adjustment, I was interested in the possible contribution of social rejection. Could it be that social rejection was exacerbating the behavioral adjustment of many of our students, thereby resulting in more frequent instances of crisis intervention?

Along with student background characteristics (e.g., IQ and standardized achievement scores), I collected the teachers' ratings from the Revised Behavior Problem Checklist (Quay & Peterson, 1987) as a measure of behavioral adjustment and administered the HIFTO. Using stepwise multiple regression analysis, with crisis intervention instances serving as the criterion or dependent variable, I found that sociometric status (rejection scores) did make a significant contribution to the explained variance of crisis intervention. Later, I investigated the relationship between teacher ratings on the RBPC and intelligence, academic achievement, and sociometric status (Hagborg, 1990). As I found previously with nonhandicapped children, students' conduct problems and imma-

turity were significant correlates of sociometric status. However, with this sample, I also found that children's psychotic-like behavior and excessive motor activity resulted in lower sociometric ratings.

With the use of the HIFTO, this investigation demonstrated the importance of peer rejection as a contributor to instances of acting-out behavior. This finding suggests that practitioners working with these youngsters should consider both the social circumstances of the acting-out youngster as well as the youth's behavioral needs. Typically, schools serving emotionally disturbed youth use behavior modification procedures that focus on individual behavior plans or contracts, with accompanying individual consequences, neglecting the possible role of peer relations. This investigation supports the examination of the role of a student's social milieu as a contributor to his or her acting-out behavior. My other findings indicate the importance of the wide range of psychopathology as it may relate to social acceptance among severely emotionally disturbed youth.

Sociometry and Public School Children

During the past academic school year, I was asked to provide the psychoeducational assessments of four different children from a single second-grade classroom. As part of these evaluations, I requested that the classroom teacher complete a Conners Teacher Rating Scale (Conners, 1989) on each evaluated child. Also, to further assist us in understanding their social–emotional needs, we performed both peer nomination and rating scale sociometric assessments for this class. The teacher's Conners scores and the sociometric assessments for these four children are listed by pseudonyms in Table 1.

Jane was described by her teacher as a perfectionist who demanded of herself a near-perfect performance on all academic tasks. Because Jane's parents were not placing excessive demands on her, Jane's difficulties were attributed to her personal style or temperament. Evidence of an educational handicap was not found. These covert difficulties did not appear to impair her overt social functioning because she was viewed by her classmates as a valued friend. The other three children were each socially rejected by their classmates. Although they were similar in this regard, other findings suggest three quite distinct patterns of school adjustment. Mary was found to be frequently off task during class, engaging her classmates in a wide range of attention-getting, socially immature behaviors. Mary's difficulties were quite evident during the classroom observation. The evaluation found that Mary was a slow learner (WISC—III Full Scale IQ of 78), and, although not educationally handi-

TABLE 1
Conners Teacher Ratings and Sociometric Status of Four Second Graders

	Conners Teacher Ratings Scales							Sociometric status	
Student	H	CD	AP	EO	A	DA	HI	Category[a]	Average[b]
Jane	46	45	81	68	55	43	42	Popular	2.78
Mary	92	100	57	77	81	73	90	Rejected	1.72
John	64	74	54	76	73	71	64	Rejected	2.11
Tom	80	75	46	74	70	56	75	Rejected	1.95

Note. Conners subscales' names: H—Hyperactivity, CD—Conduct Disorder, AP—Anxious/Passive, EO—Emotional Overindulgent, A—Asocial, DA—Daydream/Attendance, and HI—Hyperactivity Index. Scores shown are standard scores (M = 50, SD = 10). [a]These status category classifications are based on the Coie et al. (1982) system. [b]The mean sociometric rating scale score for this class was M = 2.27 (SD = .36).

capped, she was overwhelmed by the academic demands presented by her teacher.

John's difficulties were far less evident within the classroom. However, in the less structured playground or cafeteria, John would often become demanding, refusing to cooperate with peers, and at times even aggressive. Exploration of John's behavior revealed that he often misread social situations and was convinced that others were unfair to him. In general, he was not a classroom behavior problem, yet he was seen as an undesirable play or work partner by his classmates. John was found to have a reading disability and was classified as learning disabled. Tom was an extremely aggressive youngster. He was physically restrained on several occasions by the school's principal and was feared by most of his classmates. Tom was classified as emotionally disturbed and was eventually moved to a self-contained, special education placement.

These brief case illustrations demonstrate the possible value of sociometric measures as well as their limitations. Despite Jane's perfectionistic style, she displayed strong social skills and was accepted by her classmates. Our intervention for her focused on the development of more reasonable expectations, and we consulted and provided advice to her parents. Mary's social rejection came as somewhat of a surprise to her teacher. Based on the other evaluation findings, we concluded that her immature behaviors, which both distracted and annoyed her classmates, were in fact secondary to her academic difficulties. Essentially, Mary had

been asked to complete school work well beyond her skill levels, and she responded with avoidance and immature behaviors, resulting in peer rejection. In Mary's case, our intervention began with the making of several adjustments to her academic program. John's social rejection, which was most evident on the playground, appeared to be a part of that often-noted cluster of interpersonal characteristics of learning-disabled children (Swanson & Malone, 1992). Social skills training was recommended, focusing on these skill areas: listening, joining with others, and taking turns. Finally, Tom's social rejection was seen as part of a much larger picture of severe conduct problems. Tom had a long history of behavior problems that were recently intensified by acute family difficulties. Along with a change in educational placement, his family was to be seen in family therapy.

Although Tom's social rejection was quite obvious to his teacher, the social status of the other three students was far less evident. Thus, the sociometric assessment brought to our attention the problematic relations of two students and the strengths of another student. In order to work toward specific interventions for each student, I needed further assessments. The origins of the social rejection of each of these children were found to reside in three different sources, eventually leading to three quite different interventions.

Beyond the Sociometric Assessment to Intervention

Sociometric tools provide important methods of understanding global peer relations. They are far too global, however, to offer a practitioner more specific concerns for intervention. Youngsters may be socially rejected or neglected for a variety of reasons, as we saw in the case examples cited in this article. Interventions should be tailored to specific concerns of each child. Too often I have found that counselors and psychologists propose groups for social skills, development based on a manual of social skills, to clusters of readily identifiable participants, such as emotionally disturbed or learning-disabled children (Hagborg, 1991). These students soon find themselves grouped with several "undesirable" classmates, working on social skills that may be unrelated to their particular needs. In my experience, these social skills groups usually meet with little, if any, success.

I recommend that practitioners begin with a global assessment, using a sociometric measure, and then move to identifying specific social skills through other evaluations that include teacher ratings, observations in less structured settings (e.g., school cafeteria and playground), and interviews with peers. I, in fact, have found interviews with peers especially

enlightening. A socially competent peer can often provide a variety of examples of a classmate's problematic social behavior. With this information, a more fine-grained analysis would be derived that would include precise descriptions of the circumstances (e.g., school bus, by the lockers) and the particular behavior (e.g., talks too loud, makes embarrassing remarks, uses humor inappropriately, ignores comments of others, interrupts conversations of others). The practitioner is then ready to begin appropriate intervention.

In selecting an intervention program, practitioners can proceed in one of two directions, using either a "pull out of class" intervention or a "leave in class" intervention. One example of a pull-out intervention is provided by Bierman and Furman (1984). They began with a sociometric assessment to identify youngsters with low social acceptance. These children were then observed in peer-group interactions, and only those youngsters with weaknesses in conversational skills were selected for intervention. The intervention focused on conversational skills, with the therapist working in a small group with each targeted youngster and two randomly chosen same-sex classmates rather than other socially incompetent children. The crucial features of this successful social skills intervention were instruction, modeling, behavioral rehearsal, performance feedback, and generalization. A second approach provides an intervention within the child's class, using cooperative learning procedures. Ballard et al. (1977) suggested this form of intervention, using small cooperative groups to enhance the social acceptance of educable mentally retarded (EMR) children. The ingredients of successful cooperative learning are fivefold: positive interdependence, face-to-face promotive interaction, individual accountability, interpersonal skills training, and group processing (Johnson, Johnson, & Holubec, 1990). The advantage of using a leave-in intervention is the far greater likelihood of the child's generalization of behaviors to a wider range of peer relations.

As schools move to abandon tracking and increase mainstreaming for handicapped children, it is quite evident to me that school practices must be substantially altered. The more traditional instructional approaches that depend on large-group teaching methods, following a lockstep curriculum with rigid performance expectations, will only ensure failure for many youngsters who were previously confined to special education classes or low-track educational programs. Given the crucial place of social–emotional engagement (Wehlage, Rutter, Smith, Lesko, & Fernandez, 1990), successful educators need to be aware of the social contours of their class groupings. Sociometric assessments can be a place to begin to sort out and understand student relations, assisting teachers and counselors in the development of effective work groups. Then, with the

use of more varied instructional methods and evaluation procedures, schools can begin to develop communities of learning.

REFERENCES

Ballard, M., Corman, L., Gottlieb, J., & Kaufman, M. J. (1977). Improving the social status of mainstreamed retarded children. *Journal of Educational Psychology, 69*, 605–611.

Bierman, K. L., & Furman, W. (1984). The effects of social skills training and peer involvement on the social adjustment of preadolescents. *Child Development, 55*, 151–162.

Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology, 18*, 557–570.

Conners, C. K. (1989). *Manual for Conners' Rating Scales.* North Tonawanda, NY: Multi-Health Systems.

Gresham, F. M., & Elliot, S. N. (1984). Assessment and classification of children's social skills: A review of methods and issues. *School Psychology Review, 13*, 292–301.

Hagborg, W. J. (1987). Hearing-impaired students and sociometric ratings: An exploratory study. *Volta Review, 89*, 221–228.

Hagborg, W. J. (1988). A study of the intensity and frequency of crisis intervention for students enrolled in a school for the severely emotionally disturbed. *Adolescence, 92*, 825–836.

Hagborg, W. J. (1989). A sociometric investigation of sex and race preferences among deaf adolescents. *American Annals of the Deaf, 134*, 265–267.

Hagborg, W. J. (1990). The Revised Behavior Problem Checklist and severely emotionally disturbed adolescents: Relationship to intelligence, academic achievement, and sociometric ratings. *Journal of Abnormal Child Psychology, 18*, 47–53.

Hagborg, W. J. (1991). Group counseling with emotionally handicapped early adolescents: Challenges and useful procedures. *Adolescence, 26*, 557–563.

Hartup, W. W. (1970). Peer interaction and social organization. In P. H. Mussen (Ed.), *Carmichael's manual of child psychology* (pp. 35–98). New York: Wiley.

Hartup, W. W. (1989). Social relationships and their developmental significance. *American Psychologist, 44*, 120–126.

Johnson, D. W., Johnson, R. T., & Holubec, E. J. (1990). *Circles of learning: Cooperation in the classroom.* Edina, MN: Interaction Book.

Kennedy, P., & Bruininks, R. H. (1974). Social status of hearing impaired children in regular classrooms. *Exceptional Children, 40*, 336–342.

Kistner, J. A., & Gatlin, D. F. (1989). Sociometric differences between learning-disabled and nonhandicapped students: Effects of sex and race. *Journal of Educational Psychology, 81*, 118–120.

Morgan, S. R. (1977). A descriptive analysis of maladjusted behavior of socially rejected children. *Behavioral Disorders, 3*, 23–30.

Morrison, G. M. (1981). Sociometric measurement: Methodological considerations of its use with mildly learning handicapped and nonhandicapped children. *Journal of Educational Psychology, 73*, 193–201.

Parker, J. G., & Asher, S. R. (1987). Peer relations and later personal adjustment: Are low-accepted children at risk? *Psychological Bulletin, 102*, 357–389.

Quay, H. C., & Peterson, D. R. (1979). *Manual for the Behavior Problem Checklist.* New Brunswick, NJ: Rutgers State University.

Quay, H. C., & Peterson, D. R. (1987). *Manual for the Revised Behavior Problem Checklist.* Available from the senior author at P. O. Box 248074, University of Miami, Coral Gables, FL 33124.

Singleton, L. C., & Asher, S. R. (1979). Racial integration and children's peer preferences: An investigation of developmental and cohort differences. *Child Development, 50,* 936–941.

Swanson, H. L., & Malone, S. (1992). Social skills and learning disabilities: A meta-analysis of the literature. *School Psychology Review, 21,* 427–443.

Wehlage, G., Rutter, R., Smith, G., Lesko, N., & Fernandez, R. (1990). *Reducing the risk: Schools as communities of support.* Philadelphia: Falmer Press.

ACKNOWLEDGMENT

The author would like to thank Jane Conte for her assistance in collecting the necessary data for the public school portion of this article.

WINSTON J. HAGBORG, PhD, is a school psychologist for the Chatham Central School District in Chatham, New York. His research centers on handicapped youngsters, school motivation, self-concept, and school belonging. He is keenly interested in school reform and the improvement of the school climate.

Physical Attractiveness, Social Skills, and Same-Sex Peer Popularity

GERALD R. ADAMS
JAIPAUL L. ROOPNARINE

ABSTRACT. We completed three studies to assess the amount of variance contributed by facial attractiveness and social skills to the prediction of same-sex popularity. Study 1 was an observational investigation that examined the influence of facial attractiveness, visual attention, and dispensing and receiving positive, neutral, and negative behaviors for peer popularity. Study 2 was a replication–extension that added teacher assessments of social skills and competencies. Both investigations used preschool-aged children. Study 3 included kindergarten, fourth-, and seventh-grade children and extended the investigation to a larger age range. As we hypothesized, facial attractiveness, social competence, and antisocial behaviors predicted same-sex peer popularity. For both boys and girls, social competence most strongly predicted popularity. Although developmental age differences were anticipated, only two nonsignificant trends were observed. We discuss our findings in terms of the social power of attraction, expulsion, and action.

CONSIDERABLE EVIDENCE INDICATES that the degree to which one is liked or valued by peers has important ramifications for understanding social behavior and individual development (Asher, 1983; Coie & Dodge, 1983; Coie & Kupersmidt, 1983; Putallaz, 1983; Rubin, 1985). Long-term effects of a child's popularity are increasingly being documented (e.g., Cowen, Pederson, Babijian, Iszzo, & Trost, 1973). For example, one extensive review of the literature (Parker & Asher, 1987) concluded that unpopularity during childhood is predictive of later maladjustment.

Two separate lines of research have focused on the study of peer popularity in early childhood. Social psychologists have studied the role of physical appearance in influencing likability or desirability as a friend or playmate. Developmental psychologists have examined the role of social skills in predicting peer popularity. Numerous studies (e.g., Dion, 1973; Dion & Berscheid, 1974) have disclosed that a child's attractiveness plays

an influential role in determining popularity in peer-group settings. Evidence reported by developmental psychologists (Langlois & Stephan, 1977; Langlois & Styczynski, 1979), ethologists (Weisfeld, Muczenski, Weisfeld, & Omark, 1987), experimental social psychologists (Kleck, Richardson, & Ronald, 1974), developmental social psychologists (Adams & Crane, 1980), and educators (Byrnes, 1987), using self-rating, observer-rating, experimental, and observational-interactional techniques, consistently supports the hypothesis that attractive children and adolescents are more likely to be rated or perceived as being popular. Further, some evidence suggests that girls' popularity, more so than boys', may be influenced by attractiveness (e.g., Krantz, 1987; Vaughn & Langlois, 1983)—particularly as they get older (Weisfeld, Block, & Ivers, 1984).

From an interpersonal attraction hypothesis, physical attractiveness is thought to function as a highly valued social stimulus associated with perceived social desirability. Thus, physically attractive children are preferred as desirable playmates and friends. As Berscheid and Walster (1974) have suggested, attractive peers may be more innately reinforcing because of their appearance, whereas being associated with attractive peers may enhance one's prestige value. Perhaps the most parsimonious explanation may simply be that we attend to and look at those who are pleasing to look at (Dion, 1977) and are viewed as having more redeeming social worth (Adams & Crane, 1980; Dion & Berscheid, 1974; Kleck et al., 1974; Langlois & Stephan, 1977).

Peer relations literature (Hartup, 1983) also indicates that popular children manifest more effective social skills than unpopular children do. For example, Ladd (1983) reported, in an observational study of elementary-school-aged children, that average and popular children tend to have close social networks with mutual friends, but that unpopular children have social interactions in smaller groups that contain younger or unpopular peers. Further, unpopular children spend less time in prosocial interactions and are more agonistic in their behavior. In a short-term longitudinal study, La Freniere and Charlesworth (1983) concluded that popular children are rated by teachers as competitive and dominant on the one hand, but as warm, responsive, and capable of close relationships on the other. In contrast, unpopular children are viewed by teachers as being inhibited, anxious, shy, reserved, isolated, withdrawn, and submissive/dependent. These and other findings suggest a direct link between social skills and peer popularity, with popularity predicted by social competence. This proposed link may be referred to as the social skills hypothesis.

Although a direct link can be suggested between social skills and peer popularity, evidence suggesting a mediational association with physical attractiveness can also be found. Numerous studies with samples of children

(e.g.,m Dion & Stein, 1978) and adults (e.g., Chaiken, 1971; Goldman & Lewis, 1977) have shown that physical attractiveness is associated with interpersonal confidence and effective social skills. Dion and Stein (1978) have shown with elementary-school-aged children that attractive youths are more socially effective at influencing others than are their unattractive peers. In addition, Lerner and Lerner (1977) have found that physical attractiveness of fourth- and sixth-grade children is predictive of both positive peer relations and teachers' appraisals of social/emotional adjustment. Therefore, a mediational social skills hypothesis can be advanced. That is, physically attractive children may be more socially competent, wherein interpersonal confidence, socially desirable personality characteristics, and social skills associated with being attractive have mediational effects that influence popularity.

Nonetheless, little seems to be known yet about the unique role that attractiveness and social skills have for predicting peer popularity. Therefore, three investigations were undertaken to determine the individual variance contributed by physical attractiveness and social skills in predicting peer popularity. In each of the reports that follow, a series of hierarchical regressions were computed, entering physical attractiveness or social skill behaviors as the first predictive variable, followed by the reciprocal indicator. Interactions between physical attractiveness and social skill behaviors were also assessed.

Study 1

A series of studies (Vaughn & Waters, 1980, 1981; Waters, Garber, Gornal, & Vaughn, 1983) have demonstrated that visual attention from peers is significantly correlated with the children's degree of popularity. That is, more popular children are given greater behavioral attention. Likewise, Waters et al. (1983) report that visual attention by peers is correlated with adult assessments of social competence. Although Vaughn and Langlois (1983) reported only a minor association between physical attractiveness and visual attention, Dion (1977) demonstrated a substantial association between the two constructs. Nonetheless, Vaughn and Langlois reported a strong association between attractiveness and popularity. Further, Masters and Furman (1981) provided evidence indicating that a child's popularity is associated with overall rates of receiving and dispensing reinforcing and neutral acts, and Dion and Stein (1978) reported similar findings in their correlational analysis of physical attractiveness and interpersonal influence among young children. Finally, disruptive aggressive behavior has also been shown to be correlated with peer popularity and physical attractiveness. That is, disruptive aggressive behavior has been found to be

associated with physical unattractiveness and unpopularity (e.g., Adams & Read, 1983; Coie, Dodge & Coppotelli, 1982).

Therefore, in Study 1, the measures of social skills included assessments of visual attention, receiving and dispensing positive, neutral, and negative acts, and aggressive behaviors. Visual attention from peers was viewed as the behavioral byproduct of skillfulness and a reflection of a form of social power because those individuals in a social group who are attended to are likely to be the most influential with others. Popularity and attractiveness were expected to be associated with greater visual attention and higher frequencies of receiving and dispensing positive and neutral behaviors. Further, popularity and attractiveness were expected to be associated with lower rates of receiving and dispensing of negative acts and aggressive behaviors.

Method

Subjects

The sample included 80 children from four preschool classrooms. The children ranged in age from 48 to 59 months (M = 57 months). Each classroom had 10 boys and 10 girls. The four preschool classrooms were operating in university laboratory settings with student-teachers. All children but one were White and from middle-class two-parent homes. Children were randomly placed into classrooms from a single enrollment list. The same general curriculum was offered in all classes. All students entered the program at the same time and had been together for 6 weeks at the beginning of the study.

Procedure

Facial attractiveness ratings. Photographs were taken of each child from the shoulder up. Each photo featured a smiling face. Pictures were rated, one at a time, by 16 adult judges, who were unfamiliar with the children; the judges used a 9-point facial attractiveness scale (1 = unattractive; 5 = average; 9 = attractive). Averages of each child's ratings across the 16 judges ranged from 2.2 to 6.8. Judges were treated as items, and internal consistency of ratings was assessed using Cronbach's alpha (alpha = .89). A one-way analysis of variance (ANOVA) to assess for possible mean differences between raters was observed to be nonsignificant. Further, each child's picture was rated, one at a time, by children in other preschool classrooms (n = 30 boys and 30 girls) where the target children were also unfamiliar to the raters. These ratings included only same-sex peers. The

children used a 3-point attractiveness scale (1 = unattractive; 2 = average; 3 = attractive). Average attractiveness ratings ranged from 1.3 to 2.9, with a somewhat lower internal consistency than found for adult judges (alpha = .78). Averaged adult and children's ratings were significantly correlated ($r = .76$, $p < .05$). The findings indicate similar standards for judging attractiveness are applied by children and adults. However, it should be noted that La Freniere and Charlesworth (1983) demonstrated that familiar versus unfamiliar adult ratings may be associated with different predictive behavioral correlates. Given the local human ethics committee standards, only unfamiliar ratings were obtained. Averaged unfamiliar adult ratings were used in the analyses, given the higher internal consistency and similarity in means across judges.

Peer popularity rating. The senior investigator administered the Asher, Singleton, Tinsley, and Hymel (1979) sociometric rating task to each child. Given evidence of sex bias in ratings where opposite-sex raters are possibly more negative (e.g., Hayden-Thomson, Rubin, & Hymel, 1987), we used only same-sex ratings. Internal consistency of ratings was high for both the male and female subjects (alphas = .77 and .81, respectively). Inter-student agreement on the popularity ratings averaged .83 (Spearman's rho). Likewise, to establish an estimate of convergent validity, we asked each head teacher to rank-order perceived popularity for children in each class. Teacher rankings were significantly correlated with peer ratings for both the male ($r = .49$, $p < .05$) and female ($r = .61$, $p < .05$) subjects. A nonsignificant one-way ANOVA was observed in a comparison of the four teachers' average popularity rankings.

Social Skills. Based on the Furman and Masters (1978) study, we obtained overall rates of receiving and dispensing positive, negative, and neutral behaviors to same-sex peers. Each child was observed in a random order for three 6-second intervals for a total of 120 intervals of observation over a 5-week period (24 observations per week). (Pilot work that included a comparison between 120 and 480 intervals revealed acceptable correlations (r) of .79 or higher, ranging from .79 to .91 for the various behaviors; therefore, the lesser number of observations spread over 5 weeks was judged adequate for an estimate of behavior for this study.)

During each interval of 120 observations, two observers concomitantly recorded the behavior of the target and any form of interaction with another child. The researcher noted whether the target received or dispensed positive behaviors (e.g., help giving, guidance, gift giving, invitations to play, permission, praise, affection, reassurance and protection, giving status, warm greetings, smiling or laughter, compliance, acceptance of directions, cooperative play or promises of reward, negative behaviors (noncompliance, rejection of an activity, blaming, disapproval, insults, quar-

reling, yelling, ignoring, taking or damaging property, physical attacks or threats), and neutral behaviors (general conversation, associate play). The observers were blind to the intent of the study, including attractiveness and popularity ratings, and completed all observations. Overall proportional agreement between raters was 81%. Interobserver reliabilities were calculated, using Pearson's *r* and kappa coefficients with separate calculations for boys and girls. For the boys, interobserver reliabilities (Pearson's *r*s) ranged from .69 to .89 (dispensing positive = .78; dispensing negative = .81; dispensing neutral = .89; receiving positive = .71; receiving negative = .84; receiving neutral = .75). Kappa coefficients were only slightly smaller. Correlations between the first 60 and second 60 observations revealed consistent behavior for both boys and girls (*r*s ranged from .69 to .81).

Visual attention (or regard) from the same-sex peers was assessed, using a modification of the strategy defined by Vaughn and Langlois (1983). A *look* was defined as an orientation of the head and eyes toward the target child for 1 to 3 seconds during each time period. Separate observational intervals were used to assess visual attention. A total of 240 intervals over a 5-week (18 observations per week) period was used in this study. Two additional observers concomitantly completed all 240 observations for each subject. Three-second observation periods were followed by a 3-second scoring period. Interrater agreement between the two observers was acceptably high for both the male and female subjects (Pearson's $r = .92$, kappa = .89 for boys, and Pearson's $r = .89$, kappa = .86 for girls). Cor-

TABLE 1
Means and Standard Deviations for Boys' and Girls' Social Interaction Behavior

Behavior	Boys		Girls	
	M	*SD*	*M*	*SD*
Receiving				
Positive	5.2	3.4	6.1	4.0
Negative	8.3	4.9	6.9	2.7
Neutral	4.9	3.1	3.7	3.0
Dispensing				
Positive	5.9	2.7	6.3	3.9
Negative	8.1	5.1	7.3	2.5
Neutral	4.8	3.3	4.2	2.9
Aggression	6.4	4.3	4.1	2.2
Looking toward target	14.9	6.3	17.8	7.9

relation between the first 120 and the second 120 observations revealed a general consistency in looking behaviors (males, $r = .80$; females, $r = .88$; $ps < .05$).

Aggressive behavior was defined as engaging in teasing with intent to aggravate, hitting, kicking, pushing, hurting, or verbal assault with intent to dominate, threaten, or control. A separate 240 intervals of concomitant observations were completed to assess aggressive behavior. The observational and scoring periods were identical to those used to assess visual attention. The same observers who completed the visual regard observations also completed these observations. Pearson's r and kappa coefficients assessing interrater agreement between the two observers were approximately the same for male and female subjects (Pearson's $r = .83$, kappa $= .81$ for boys, and Pearson's $r = .91$, kappa $= .86$ for girls). Correlations between the first and second halves of the total observation period, for boys and girls, suggest relative consistency in behavior (males, $r = .78$; females, $r = .70$; $ps < .05$).

Results

The proportion of same-sex versus opposite-sex interactions was highly similar for boys and girls in each of the four classrooms. Boys (81%) and girls (77%) interacted mostly with same-sex peers. Girls were observed to interact slightly more than boys with opposite-sex classmates. A chi-square test of proportional differences between the four classrooms by boys and girls for same-sex interactions was nonsignificant. Given that the focus of these studies was on same-sex interaction behaviors and same-sex peer popularity, a similar comparison was completed for frequency of visual attention, aggression, and dispensing and receiving behaviors toward same-sex peers between the four classrooms. La Freniere and Sroufe (1985) have suggested that classroom ecologies may create differences that would confound collapsing of subjects across classrooms. Separate one-way ANOVAs between the four classrooms, computed separately for boys' and girls' behaviors, once again were found to be nonsignificant. These analyses suggest that boys and girls spend approximately the same proportion of time in same-sex interactions and that it is appropriate to collapse subjects across classrooms. The means and standard deviations for each of the four general categories of social behaviors, collapsed across classrooms, are provided for males and females (see Table 1).

Peer popularity was treated as the dependent variable. Facial attractiveness and social skill behaviors were entered as independent variables in regression analyses, using a hierarchical inclusion strategy. In one set of analyses, facial attractiveness was entered first, followed by the two com-

posite social skills scores that were derived from a correlation of the social behaviors. In a second set of analyses, the two composite social skills scores were entered first, followed by the facial attractiveness ratings. All possible interactions were included in the analyses. Separate regressions were computed for the boys and the girls. (In these and all remaining regression analyses, the reported F values are for the increment to R^2 afforded to that step, i.e., unique variance.)

Correlational analyses, computed separately for boys and girls, revealed that visual attention, receiving and dispensing neutral and positive acts correlated with each other at or above $r = .46$ (median correlation = .52) for each gender. Therefore, a composite score was derived that reflects the degree to which an individual maintains high visual attention, is positively reinforcing to others, and is the recipient of positive behaviors from others. This composite is referred to as the *social competence* score. In contrast, aggressive behavior and dispensing and receiving negative acts were correlated at or above $r = .52$ (median correlation = .61) for both genders. Therefore, these behaviors were summed to reflect a negative, aggressive social behavioral style. This composite is referred to as an *antisocial* score. All items within each composite score were standardized prior to summation.

Regression analyses are summarized in Table 2. For the boys, when facial attractiveness was entered first, all three independent variables made a significant contribution to popularity. The full model accounted for 28% of the variance. Facial attractiveness accounted for 17%, with increments of 5% for antisocial behavior and another 6% for social competence. Antisocial behavior was negatively associated with popularity, whereas facial attractiveness and social competence were positively correlated with peer popularity. However, when social competence was entered first, followed by the remaining variables, facial attractiveness was not found to account for significant variance beyond that accounted for by social competence (22%) and antisocial behavior (4%). No significant interactions were observed.

For the girls, when facial attractiveness was entered first, all main-effect variables also made a significant contribution to popularity. The full model accounted for 50% of the variance. Facial attractiveness (35%) accounted for most of the variance, with increments of 7% for antisocial behavior and 8% for social competence. However, when social competence was entered first, followed by the remaining variables, social competence accounted for 42% of the variance followed by a significant 5% increment by antisocial behavior. In this analysis, facial attractiveness failed to add a significant increment (3%). The same directional associations were observed for the girls as those found for the boys. Antisocial behavior was nega-

TABLE 2
Study 1 Regression Results: Incremental Contributions of Facial Attractiveness, Antisocial Behavior,and Social Competence as Predictors of Same-Sex Peer Popularity

Variable in equation	*Beta*	*F*	Multiple *R*	R^2
	Boys			
First regression				
Facial attractiveness	.41	6.62*	.41	.17
Antisocial behavior	.33	5.26*	.47	.22
Social competence	.23	4.41*	.53	.28
Second regression				
Social competence	.44	6.92*	.44	.22
Antisocial behavior	−.25	4.76*	.51	.26
Facial attractiveness	.07	2.07	.53	.28
	Girls			
First regression				
Facial attractiveness	.59	8.84*	.59	.35
Antisocial behavior	−.27	5.66*	.65	.42
Social competence	.26	4.64*	.71	.50
Second regression				
Social competence	.65	6.98*	.65	.42
Antisocial behavior	−.26	4.86*	.69	.47
Facial attractiveness	.10	2.35*	.71	.50

*$p < .05$.

tively associated with popularity, whereas facial attractiveness and social competence were positively associated with same-sex peer popularity. Again, no significant interactions were observed.

Study 2

The findings of Study 1 suggest that social skills and facial attractiveness can predict popularity. Socially skilled persons are likely also to be more attractive. Estimates of unique contributions by each factor suggest that social skills may be more influential for popularity.

To reassess the finding, we conducted Study 2 as a replication–extension of the first investigation. A combination of measures, including a Q-sort technique developed by Waters, Garber, Gornal, and Vaughn (1983) and observations of frequency of visual attention (Vaughn & Langlois, 1983), facial attractiveness, and sociometric ratings of popularity by same-sex

peers (Asher et al., 1979), were used. This investigation expanded our methodology to include not only ratings by children or peers and classroom observations of same-sex interactions but also teacher assessments.

Method

Sample

The sample included 80 children (39 boys, 41 girls) from four different preschools. The children ranged in age from 41 to 52 months (median = 48 months). Approximately an equal number of males and females were enrolled in each class. Socioeconomic status, parental characteristics, and classroom curriculum were comparable to those reported in Study 1.

Procedure

Attractiveness and popularity ratings. Facial attractiveness was assessed by same-sex peers in other school settings as described in Study 1. The Asher et al. (1979) sociometric rating was used to assess same-sex popularity. Similar estimates of internal consistency and reliability to those reported in Study 1 were found.

Social skills. Visual attention (looking) was assessed, using the same strategy and sampling procedure as detailed in Study 1. Estimates almost identical to those reported in Study 1 of reliability and proportions of same-sex to opposite-sex interactions for boys and girls across classrooms were observed. Further, a Q-sort technique described by Waters et al. (1983) was completed by head teachers at the end of a 6-week teaching period. Although the full 100 items were used, only 36 items measuring social skillfulness (n = 12), engagingness with peers (n = 10), purposiveness in social behavior (n = 5), and confidence versus anxiousness (n = 9) were used in this study. First, the items were sorted into three categories (characteristic, neither characteristic nor uncharacteristic, and uncharacteristic). Second, each category was subdivided into three to yield a total of nine categories. Finally, working from extremes to the center category, items were adjusted to conform to a standard distribution. Internal consistency of these items ranged from .79 to .92 (alpha coefficients).

Correlations between the four Q-sort dimensions and visual attention ranged from r = .44 to .73 (median r = .57) in separate computations for the boys and the girls. Similar correlations were observed for each grade level. Teachers' ratings were clearly corroborated by peers' visual attentiveness behavior. Given the moderately high intercorrelations, a composite *social competence* score was derived after all items were standardized.

At the high range, it reflects a child who holds visual attention from peers and is seen by a head teacher as being characterized as socially skilled, engaging with peers, purposive in behavior, and confident in his or her behaviors and actions. The lower range reflects a child who does not hold visual attention from peers; is unskilled; is not engaging with peers; and manifests anxious, unconfident images.

Results

The hierarchical regression was computed with facial attractiveness entered first, followed by the social competence indicator (and vice versa). The findings are summarized in Table 3. For the boys, when facial attractiveness was entered first, the full model accounted for 18%. Facial attractiveness accounted for 10%, and social competence 8%. In the reversed analysis, social competence accounted for 15%, with facial attractiveness adding an incremental 3%. Once again, social competence held the largest unique effect on peer popularity for the boys.

TABLE 3
Study 2 Regression Results: Incremental Contributions of Facial Attractiveness and Social Competence as Predictors of Same-Sex Peer Popularity

Variable in equation	*Beta*	*F*	Multiple *R*	R^2
	Boys			
First regression				
Facial attractiveness	.31	4.27*	.31	.10
Social competence	.24	4.06*	.42	.18
Second regression				
Social competence	.39	4.31*	.39	.15
Facial attractiveness	.13	1.83	.42	.18
	Girls			
First regression				
Facial attractiveness	.41	4.43*	.41	.17
Social competence	.22	3.96*	.49	.24
Second regression				
Social competence	.46	4.51*	.46	.21
Facial attractiveness	.15	2.93	.49	.24

*$p < .05$.

In comparison, for the girls, facial attractiveness accounted for 17% of the variance when entered first, with social competence adding an increment of 7%. When social competence was entered first, it accounted for 21% of the variance, and facial attractiveness added an increment of 3%.

Study 3

Research on self-understanding and person perception suggests that preschool-aged children attend more to physical attributes than to behavioral or psychological qualities of self and others. Age-related changes in conceptions of social behavior in a peer-relationship context have shown, however, that developmental patterns exist in how children process information concerning social behavior (e.g., see Coie & Pennington, 1976; Younger & Boyko, 1987; Younger, Schwartzman, & Ledingham, 1985, 1986). Therefore, there may be developmental differences in how children process or weigh others' physical, behavioral, and psychological attributes and use them in making affectional peer preferences. As suggested by Damon and Hart (1982) in their framework for conceptualizing self-understanding, biological and/or physical attributes should strongly influence the behaviors of young children, but these influences should be replaced by social competencies in middle childhood. Moreover, psychological characteristics should replace social-behavioral capacities in early adolescence.

Therefore, in the third study of the contribution of interpersonal attraction and social skills as predictors of same-sex peer popularity, the sample was broadened to include kindergartners, fourth graders, and seventh graders. Children from four classrooms for each age level were used to provide a relatively representative sample. Observations of visual regard and the dispensing and receiving of positive and negative behaviors between same-sex peers and ratings of social skills, assertiveness, dominance, reserve, inhibition, and social deviance (Vaughn & Martino, 1988) were obtained from teachers and a research assistant. A version of the Asher et al. sociometric rating system was used to measure same-sex peer popularity. The physical attractiveness of each child was assessed by same-sex children in a separate school district.

Our developmental hypothesis was that for young children (kindergartners), an interpersonal attraction mechanism would substantially account for peer popularity. For older children, however, social competence and psychological factors would become more influential in predicting affectional preferences in same-sex peer popularity.

Method

Subjects

The sample consisted of boys and girls from four classrooms in kindergarten, fourth grade and seventh grade. Fifty boys and 50 girls were included for each of the three grade levels. Classrooms were randomly selected from schools that agreed to participate in the study. Parental and subject permission was obtained prior to completion of the study. Only two parents declined participation. All but eight children were from two-parent, middle-class homes. Four children were minorities.

Procedure

Facial attractiveness ratings. Photographs of each child were obtained and were rated by students of identical grade level in another school district. Approximately 20 boys and 20 girls of the same grade level rated same-sex pictures, using the procedure described in the two previous studies. Internal consistency (alpha) was equal to or higher than .73 for all combinations.

Same-sex peer popularity ratings. Each child was administered the Asher et al. (1979) rating task. The task was slightly modified for the older subjects. Pictures were not used for the fourth- and seventh-grade subjects. Instead, the ratings were based on such phrases as "like to spend time with a lot," "like to spend a little time with," and "don't like to spend any time with." Internal consistency was approximately the same for each gender and grade level (kindergarten: for girls, alpha = .77; for boys, alpha = .83; fourth grade: for girls, alpha = .77; for boys, alpha = .81; seventh grade: for girls, alpha = .90; for boys, alpha = .77). Interstudent agreement on the popularity ratings averaged .76 (Spearman's rho) over all combinations.

Social skills. Arrangements were made with teachers to have four social interaction experiences in each classroom where students could interact with all classmates. These interactions involved a free-play social activity that allowed freedom to move around the room and interact with any class member. During these four interactions, observations were completed on receiving and dispensing positive, negative, and neutral behaviors as well as visual attention between same-sex peers. Each student was observed for a total of 90 3-second observations. Overall proportional agreement was 84%, and the correlation between the two observers for the observed behaviors (kappa) ranged from .82 to .93 (median r = .86). Similar, but slightly higher, Pearson r coefficients were obtained.

Research assistants and teachers were asked, after the completion of the observation task, to rate each child on several social skill measures. Using dimensions derived by Vaughn and Martino (1988) from an analysis of the California Child Q-sort, they completed five items measuring each of six domains on a 5-point Likert-type scale (1 = never observed, 2 = infrequently observed, 3 = sometimes observed, 4 = commonly observed, 5 = always observed). The items and the dimensions measured included *social skills* (is talkative, is verbally fluent, is open and straightforward, expresses feelings, initiates interaction), *assertiveness* (self-assertive, is energetic, explores, is active, is lively), *dominance* (is aggressive, is pushy, dominates over others, teases, likes to compete), *reserved* (is shy, withdrawn, compliant, likes to be alone, is quiet), *inhibited* (is inhibited, reaches out, submissive, constricted, distant), *psychological or social deviance* (deviant from peers, disengages under stress, has strong humor or behavior, obnoxious, trouble maker).

Factor analysis (oblique rotation), using the full 300 subjects, confirmed the six dimensions. Internal consistency of the six factors resulted in internal alphas that reached or exceeded .68 for each of the three age levels. Several items loaded on more than one factor. Correlations (using the full sample) between unweighted average scores from teachers' ratings for each of the six dimensions revealed that social skills, dominance (reverse weighting with a high score indicating low dominance), and assertiveness correlated at or higher than $r = .82$. Reserved, inhibited, and psychological/social deviance correlated at or higher than $r = .87$. These two separate composites were negatively correlated with each other ($r = -.28$, $p < .05$). Teacher and research assistant ratings correlated from $r = .72$ to .81. Given the high correlation and the belief that teachers knew the students best, teachers' ratings were used in further analyses. Also, given the strong correlations between dimensions confirmed through the oblique factor analysis, ratings of social skills, assertiveness, and dominance (reverse weighted) were standardized and summed into a composite *social competence* score; the reserved, inhibited, and deviance items were standardized and included in a *psychological functioning* score. Social competence but not psychological functioning was correlated with visual attention ($r = .39$, $p < .05$).

Results

A stepwise regression using hierarchical inclusion was performed first, entering, in order, facial attractiveness, visual attention, social competence, and psychological functioning, along with grade level. The second set of analyses entered the variables as follows: visual attention, social com-

petence, psychological functioning, facial attractiveness, and grade level. Possible interrelationships between grade level and significant social competence, visual attention, and psychological-functioning factors were assessed by examining grade level by behavior/teacher rating interactions.

Table 4 summarizes the significant results from the regression analyses. For the male subjects in the first set of analyses, in which attractiveness was entered first, facial attractiveness accounted for 10% of the variance, with an incremental 3% accounted for by visual attention, and another 2% by social competence. In the second set, entering visual attention first, visual attention accounted for 7% of the variance, with an additional 6% contributed by social competence. Only 2% more variance was accounted for by facial attractiveness. The findings were similar to those observed in Studies 1 and 2. Both facial attractiveness and social skills indicators were predictive of popularity. Although facial attractiveness accounted for

TABLE 4
Study 3 Regression Results: Incremental Contributions of Facial Attractiveness, Visual Attention, Social Competence, and Psychological Functioning as Predictors of Same-Sex Peer Popularity

Variable in equation	*Beta*	*F*	Multiple *R*	R^2
	Boys			
First regression				
Facial attractiveness	.32	7.12*	.32	.10
Visual attention	.16	4.42*	.36	.13
Social competence	.14	3.40	.39	.15
Second regression				
Visual attention	.26	5.79*	.26	.07
Social competence	.35	7.21*	.36	.13
Facial attractiveness	.08	2.21	.39	.15
	Girls			
First regression				
Facial attractiveness	.36	7.43*	.36	.13
Visual attention	.24	5.61*	.42	.18
Social competence	.19	4.46*	.46	.21
Second regression				
Visual attention	.26	5.79*	.26	.07
Social competence	.31	5.31*	.40	.16
Facial attractiveness	.22	4.77*	.46	.21

*$p < .05$.

some degree of popularity, it added little substantial unique variance beyond visual attention and social competence. Likewise, once facial attractiveness and visual attention were accounted for in predicting peer popularity, social competence added little unique variance.

For the girls, in the first set of analyses, in which attractiveness scores were entered first, facial attractiveness accounted for 13% of the variance, followed by increments of 5% for visual attention and 3% for social competence. In the second set of analyses, visual attention contributed to 7% of the variance, with increments of 9% for social competence and 5% for facial attractiveness. Girls' popularity was observed to be influenced by both facial attractiveness and social competence. Although both social skills and attractiveness held unique and meaningful contributions to popularity, facial attractiveness manifested a more prominent influence for the girls than for the boys.

A final analysis was computed with age entered as the first predictor followed by facial attractiveness, visual attention, and social competence. Separate analyses were computed for each gender. No significant age effects were observed. However, a nonsignificant Age $\times$ Social Competence interaction ($p < .10$) suggested that social skills may be more important for older than younger boys in predicting same-sex popularity. Further, a nonsignificant Age $\times$ Facial Attractiveness interaction ($p < .10$) suggested that facial attractiveness may be more influential for older than younger girls in predicting same-sex peer popularity.

Discussion

The three investigations summarized in this report have focused on estimating the unique variance contributed by facial attractiveness and social competence for same-sex peer popularity. Across all three studies, facial attractiveness and social competence individually predicted popularity. Consistent with earlier findings (Dodge, 1983), behavioral indicators of antisocial behaviors and/or social competence added significant incremental contributions to the prediction of popularity beyond that of facial attractiveness. However, facial attractiveness accounted for little additional unique variance for preschool-aged boys and girls. Gender differences were observed in Study 3. For boys, facial attractiveness accounted for little beyond social skill indicators. But for girls, facial attractiveness maintained an influence beyond social competence. These findings are consistent with general notions that physical attractiveness is a major factor in females' social relations (Adams & Crossman, 1978; Langlois, 1986).

Others have found that popular children manifest greater social skills and interpersonal competence (Hartup, 1983). Popular children have mu-

tual social networks (Ladd, 1983), manifest dominance in warm and responsive ways (La Freniere & Charlesworth, 1983), and are perceived by other children and adults as socially mature and adjusted persons (e.g., Thompson et al., 1989). Our data further indicate that popular children maintain high visual attention from peers, positively reinforce others, and receive positive behaviors in return (Study 1). They are characterized by adults as socially skilled, purposive and engaging in their behavior, and confident in their social interactions (Study 2). Likewise, popular children are viewed as initiators, verbally fluent, socially capable, self-assertive, energetic, and active, while manifesting little aggressive behavior but high frequencies of positive and reinforcing behaviors toward others (Study 3). In essence, popular children have social power through effective social action.

One might conceptualize these findings within a framework of social power. Facial attractiveness might be viewed as the power to attract. It facilitates visual attention and enhances visibility. Social competence could be viewed as the behavioral ability to influence others through action. Each form of social power has its influence on popularity. However, the power of action, in the form of social behaviors, appears to offer a substantive contribution above that of attraction. Attractive boys and girls have a good likelihood of being popular; however, attractive children who are also socially competent have an even greater likelihood of popularity.

An additional comment seems warranted here. There may also be a form of social power that is expulsive. Our evidence suggests that aggressive behavior not only involves giving but also receiving negative or antisocial actions. This expulsive power then lowers popularity. Similar to prior findings indicating that physically aversive or aggressive behaviors are predictive of peer rejection (e.g., Coie & Kupersmidt, 1983; Dodge, 1983), it was observed in Study 1 that aggressive behavior was associated with low popularity. Although boys are typically more aggressive than girls (a condition confirmed by data reported in Table 1), the negative influence of antisocial behavior on same-sex peer popularity was found for both genders. Essentially, aggressive behavior has an expulsive effect that reduces popularity.

Facial attractiveness held a consistent positive association for both the boys' and the girls' same-sex peer popularity. Like visual attention, facial attractiveness has a form of social power. Dion (1977) has referred to this as an incentive value. This incentive value is the capacity to attract. Potentially, because of the prestige value of being with others who are attractive, facial attractiveness enhances popularity. This form of power is surpassed, it appears, by the social power of competent actions for boys and girls. However, as girls mature from childhood into adolescence, the power of attraction may become more influential in determining same-sex popularity. Ethologists have offered various conceptualizations based on natural

selection process to account for these findings (e.g., see Weisfeld et al., 1984).

The influence of facial attractiveness and social competence was observed in the two studies using preschool children and in the cross-sectional study using middle childhood and early adolescence groups. Although expected, no significant age differences were observed. Nonetheless, nonsignificant trends suggest that, for older children, facial attractiveness may become more salient for predicting girls' popularity, and social competence may become more influential for boys. If these trends are a true reflection of social development, then the power of attraction becomes more salient for girls and the power of action more important for boys. This trend is consistent with several overviews of gender differences in socialization process and social development (e.g., see Block, 1973, 1983).

AUTHORS' NOTES

We are thankful for the assistance of the faculty in two laboratory schools at Utah State University and several preschools in Cache Valley. We appreciate the cooperation of administrators and teachers at the Logan and Cache Valley School Districts. Considerable assistance was provided by Kelly McCoy, Mahshid Salihi, Lydia Ball, Laura Craig-Bray, Sean Noble, Layne Bennion, Debbie Braeger, and Maria Norton. We appreciate constructive feedback on an early version of this manuscript from Drs. Tamara Ferguson and Frank Ascione and statistical consultation from personnel in the information and technology statistics group in the College of Family and Consumer Studies, University of Guelph.

Our research was supported, in part, by the Utah State Agricultural Experiment Station at Logan, and a grant from the Social Science and Humanities Research Council at the University of Guelph.

REFERENCES

Adams, G. R., & Crane, P. (1980). An assessment of parents' and teachers' expectations of preschool children's social preference for attractive or unattractive children and adults. *Child Development, 51*, 224–231.

Adams, G. R., & Crossman, S. (1978). *Physical attractiveness: A cultural imperative.* Roslyn Heights, NJ: Libra Publications.

Adams, G. R., & Read, D. (1983). Personality and social influence styles of attractive and unattractive college age students. *Journal of Psychology, 114*, 151–157.

Asher, S. R. (1983). Social competence and peer status: Recent advances and future directions. *Child Development, 54*, 1427–1434.

Asher, S., Singleton, L., Tinsley, B., & Hymel, S. (1979). A reliable sociometric measure of preschool children. *Developmental Psychology, 15*, 443–444.

Berscheid, E., & Walster, E. (1974). Physical attractiveness. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 7, pp. 157–215). New York: Academic Press.

Block, J. H. (1973). Conceptions of sex role: Some cross-cultural and longitudinal perspectives. *American Psychologist, 28*, 512–526.

Block, J. H. (1983). Differential premises arising from differential socialization of the sexes: Some conjectures. *Child Development, 54*, 1335-1354.

Byrnes, D. A. (1987). The physically unattractive child. *Child Education, 64*, 80-85.

Chaiken, S. (1971). Communicator physical attractiveness and persuasion. *Journal of Personality and Social Psychology, 37*, 1387-1397.

Coie, J. D., & Dodge, K. A. (1983). Continuities and changes in children's social status: A five-year longitudinal study. *Merrill-Palmer Quarterly, 29*, 261-282.

Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology, 18*, 557-570.

Coie, J. D., & Kupersmidt, J. B. (1983). A behavioral analysis of emerging social status in boys' groups. *Child Development, 54*, 1400-1416.

Coie, J. D., & Pennington, B. F. (1976). Children's perception of deviance and disorder. *Child Development, 47*, 400-413.

Cowen, E. L., Pederson, A., Babijian, H., Izzo, L. D., & Trost, M. A. (1973). Long-term follow-up of early detected vulnerable children. *Journal of Consulting and Clinical Psychology, 41*, 438-446.

Damon, W., & Hart, D. (1982). The development of self-understanders from infancy through adolescence. *Child Development, 53*, 831-857.

Dion, K. K. (1973). Young children's stereotyping of facial attractiveness. *Developmental Psychology, 9*, 183-188.

Dion, K. K. (1977). The incentive value of physical attractiveness for young children. *Personality and Social Psychology Bulletin, 3*, 67-70.

Dion, K. K., & Berscheid, E. (1974). Physical attractiveness and peer perception among children. *Sociometry, 37*, 1-12.

Dion, K. K., & Stein, S. (1978). Physical attractiveness and interpersonal influence. *Journal of Experimental Social Psychology, 14*, 97-108.

Dodge, K. A. (1983). Behavioral antecedents of peer social status. *Child Development, 54*, 1386-1399.

Furman, W., & Masters, J. C. (1978). (In collaboration with Rahe, D. & Binger, C.) *An observational manual for coding reinforcing, neutral, and punishing interactions among children.* Minneapolis: Institute of Child Development.

Goldman, W., & Lewis, P. (1977). Beautiful is good: Evidence that the physically attractive are more socially skillful. *Journal of Experimental Social Psychology, 13*, 125-130.

Hartup, W. W. (1983). Peer relations. In E. M. Hetherington (Ed.), *Handbook of child psychology, Vol. 4: Socialization, personality, and social development* (pp. 103-196). New York: Wiley.

Hayden-Thomson, L., Rubin, K. H., & Hymel, S. (1987). Sex preferences in sociometric choices. *Developmental Psychology, 23*, 558-562.

Kleck, R. E., Richardson, S. A., & Ronald, L. (1974). Physical appearance cues and interpersonal attraction in children. *Child Development, 45*, 305-310.

Krantz, M. (1987). Physical attractiveness and popularity: A predictive study. *Psychological Reports, 60*, 723-726.

Ladd, G. W. (1983). Social networks of popular, average, and rejected children in school settings. *Merrill-Palmer Quarterly, 29*, 283-307.

La Freniere, P. J., & Charlesworth, W. R. (1983). Dominance, attention and affiliation in a preschool group: A nine-month longitudinal study. *Ethology and Sociobiology, 4*, 55-67.

La Freniere, P. J., & Sroufe, L. A. (1985). Profiles of peer competence in the preschool: Interrelations between measures, influence of social ecology, and relation

to attachment history. *Developmental Psychology, 21*, 56–69.
Langlois, J. H. (1986). From the eye of the beholder to behavioral reality: Development of social behaviors and social relations as a function of physical attractiveness. In C. P. Herman, M. P. Zanna, & E. T. Higgins (Eds.), *Physical appearance, stigma, and social behavior: The Ontario Symposium* (Vol. 3, pp. 23–51). Hillsdale, NJ: Erlbaum.
Langlois, J. H., & Stephan, C. (1977). The effects of physical attractiveness and ethnicity of children's behavioral attributions and peer preferences. *Child Development, 48*, 1694–1698.
Langlois, J. H., & Stycznski, L. (1979). The effects of physical attractiveness on the behavioral attributions and peer preferences in acquainted children. *International Journal of Behavioral Development, 2*, 325–341.
Lerner, R. M., & Lerner, J. V. (1977). Effects of age, sex, and physical attractiveness on child-peer relations, academic performance, and elementary school adjustment. *Developmental Psychology, 13*, 585–590.
Masters, J. C., & Furman, W. (1981). Popularity, individual friendship selection, and specific peer interaction among children. *Developmental Psychology, 17*, 344–350.
Parker, J. G., & Asher, S. T. (1987). Peer relations and later personal adjustment: Are low-accepted children at risk? *Psychological Bulletin, 102*, 357–389.
Putallaz, M. (1983). Predicting children's sociometric status from their behavior. *Child Development, 54*, 1417–1426.
Rubin, K. (1985). Socially withdrawn children: An "at risk" population? In B. H. Schneider, K. H. Rubin, and J. E. Ledingham (Ed.), *Children's peer relations: Issues in assessment and intervention* (pp. 125–139). New York: Springer-Verlag.
Thompson, S. K., Carlisle, M. F., & Beaman, T. R. (1989, April). *A longitudinal study of extremely popular children.* A paper presented at the biennial meetings of the Society for Research in Child Development, Kansas City, KS.
Vaughn, B., & Langlois, J. H. (1983). Physical attractiveness as a correlate of peer status and social competence in preschool children. *Developmental Psychology, 19*, 561–567.
Vaughn, B. E., & Martino, D. G. (1988). Q-sort correlates of visual regard in groups of young preschool children. *Developmental Psychology, 24*, 4, 589–594.
Vaughn, B. E., & Waters, E. (1980). Social organization among preschool peers: Dominance, attention, and sociometric correlates. In D. R. Omark, F. F. Strayer, & D. G. Freedman (Eds.), *Dominance relations: Ethological perspectives on human conflict* (pp. 126–141). New York: Garland.
Vaughn, B. E., & Waters, E. (1981). Attention structures, sociometric status, and dominance: Interrelations, behavioral correlates, and relationships to social competence. *Developmental Psychology, 17*, 275–288.
Waters, E., Garber, J., Gornal, M., & Vaughn, B. E. (1983). Q-sort correlates of visual regard among preschool peers: Validation of a behavioral index of social competence. *Developmental Psychology, 19*, 550–560.
Weisfeld, G. E., Block, S. A., & Ivers, J. W. (1984). Possible determinants of social dominance among adolescent girls. *Journal of Genetic Psychology, 144*, 115–129.
Weisfeld, G. E., Muczenski, D. M., Weisfeld, C. C., & Omark, D. R. (1987). Stability of boys' social success among peers over an eleven-year period. *Contributions to Human Development, 58*, 1094–1100.
Younger, A. J., & Boyko, K. A. (1987). Aggression and withdrawal as social schemas underlying children's peer perceptions. *Child Development, 58*, 1094–1100.
Younger, A. J., Schwartzman, A. E., & Ledingham, J. E. (1985). Age-related

changes in children's perceptions of aggression and withdrawal in their peers. *Developmental Psychology, 21*, 70–75.

Younger, A. J., Schwartzman, A. E., & Ledingham, J. E. (1986). Age-related changes in children's perceptions of social deviance: Changes in behavior or in perspective? *Developmental Psychology, 22*, 531–542.

GERALD ADAMS, professor of family relations and human development at the University of Guelph, focuses his research on personality and social development during childhood and adolescence. His current research involves the study of the interconnecting influences of family, school, and peers on academic performance and social adjustment. JAIPAUL L. ROOPNARINE is professor of child studies and early childhood education at Syracuse University. His research interests include father-child relations in diverse cultures, childcare, immigrant children, and schooling. He is currently conducting research on fathers in Jamaica, Guyana, and Domenica.

Assessing Children's Sociometric Status: Issues and the Application of Social Network Analysis

JEFFREY JOHNSON
MARSHA IRONSMITH
G. MICHAEL POTEAT

ABSTRACT. A child's sociometric status has been recognized as an important predictor of future social and psychological adjustment. Most of the extant developmental research has employed measures based on summary statistics obtained from either peer nominations or ratings. Although these measures demonstrate adequate reliability and predictive validity, alternative methods of analysis using the sociometric matrix are widely used in other areas of social science to examine social networks. In this article, we review sociometric research with children and introduce social network analysis with examples from our work with children and adults. We discuss applications, make suggestions for further research, and provide references to a technical introduction.

SOCIOMETRICS, THE TECHNIQUES USED TO MEASURE the individual's status within the peer group, were developed by Moreno (1934), and their use with children was popularized by Gronlund (1959). Hartup (1970) estimated that the number of sociometric studies was then in the thousands, and interest in sociometrics has increased over the past two decades as a result of attempts to enhance children's social competence. Sociometric measures have been used both to determine the behaviors associated with peer acceptance and rejection and to identify children at risk for social rejection. Although a variety of sociometric instruments have been developed, most research with children has employed either peer-nomination or peer-rating scales, with the child's status determined by either summing negative and positive nominations or calculating an average rating.

Alternative methods for examining sociometric status by analyzing so-

cial networks based on the nomination or rating matrix have been widely used by social scientists (see Burt & Minor, 1983) but appear to have had little influence on sociometric work with children. Historical antecedents for the use of matrix analysis in examining social networks exist in the social psychology literature, and a brief introduction to the work of Festinger (1949), Harary and Ross (1957), and others can be found in Lindzey and Byrne (1968). We (Johnson, Poteat, & Ironsmith 1991) have more recently analyzed the sociometric data obtained from preschool children and addressed some issues related to the use and the reliability of network analysis based on sociometric matrices.

In this article, we examine issues related to sociometric measures, including the reliability of the traditional nominations and ratings. We review classification schemes and the predictive validity of sociometrics and introduce methods for examining group structure, using examples obtained with adults in the work of Johnson and Boster (1993). We offer recommendations for further research, using social network analysis with children.

Methodological Issues in Sociometric Research

Measurement and Reliability

In the late 1970s and early 1980s, developmental psychologists began moving away from the heavy emphasis that was placed on cognitive development during the Piaget decades of the '60s and early '70s and rediscovered social development as a research area (Hartup, 1983). Sociometry quickly became a widely used method for assessing social competence in children (Foster & Richey, 1979; Hymel, 1983). Early studies of sociometry with young children relied on peer nomination measures (Hartup, Glazer, & Charlesworth, 1967; McCandless & Marshall, 1957). The concurrent validity of peer nominations was demonstrated by their correlation with other measures of social competence, such as behavioral observations and teacher ratings. However, nomination measures, particularly negative nominations, were criticized for having only moderate reliability (Hymel, 1983).

Asher, Singleton, Tinseley, and Hymel (1979) developed an alternative to the peer-nomination procedure: a peer-rating scale on which children are asked to rate how much they like to play with a target peer on a 3-point scale, using sad, happy, and neutral faces as anchor points. Asher et al. (1979) found higher reliability using the rating scale with preschoolers (.74 to .81 for 4-week test/retest correlations) compared with

the peer nominations (.38 – .56 test/retest correlations). Some researchers have reported more comparable test/retest reliability for nomination and rating scores (Poteat, Ironsmith, & Bullock, 1986), but nominations are typically found to be less reliable than ratings, especially with preschoolers. Ratings may also be less objectionable than nominations to parents, teachers, and human-subjects review committees concerned about the effects of asking children to make negative nominations of their peers.

Nomination measures continued to be widely used in spite of low reliability because of their predictive validity (Hymel, 1983; Ironsmith & Poteat, 1990; Olson & Lifgren, 1988) and because they appeared to measure a different dimension of sociometric status from what is assessed by ratings (Gresham, 1981; Musun-Miller, 1990). Begin and colleagues altered the peer-nomination procedure to include training and asking the child to nominate more peers or to make nominations across different situations (i.e., whom do you most like to play with indoors? sit next to while listening to stories? sit next to at snack time?) This procedure, similar in some respects to the procedure described by McCandless and Marshall (1957), yielded reliability scores for nominations in the .60–.80 range even across 22-week follow-ups among children at least 5 years old. With younger children, the reliability of nominations continued to be lower than that of ratings (Alain & Begin, 1987; Boivin & Begin, 1986; Dorval & Begin, 1985).

Some researchers complained that early sociometric studies oversimplified social status by using a unitary dimension of popular versus unpopular and suggested that sociometric status has a more complex structure (Peery, 1979; Coie, Dodge & Coppotelli, 1982). Coie et al. (1982) devised a classification system based on social *preference scores* (positive minus negative nominations) and social *impact scores* (positive plus negative nominations). They identified five categories of social status: popular, rejected, neglected, controversial, and average. Popular children received social preference standard scores above + 1.00; rejected children received social preference standard scores below – 1.00. Neglected children had social impact scores of less than – 1.00 and no positive nominations, whereas controversial children had social impact standard scores above + 1.00 and received some positive and some negative nominations. Average children had social preference standard scores between – .5 and .5. Researchers found that grade-school children showed clear differences in their perceptions of peer behavior. Peery (1979) proposed a similar classification system and found correlations between preschoolers' status classification and social cognition skills. This classification system has been widely adopted in research, and the long-term predictive validity of

these categories is currently being examined (Dodge, 1993; Rubin & Asendorpf, 1993).

Predictive Validity

The significance of sociometric status was underscored by a series of widely cited studies that reported that difficulties in peer relationships in childhood are related to adolescent- and adult-adjustment problems that include dropping out of school, criminal behavior, and psychopathology (Cowen, Pederson, Babijian, Izzo, & Trost, 1973; Roff, Sells, & Golden, 1972; Ullman, 1957). An excellent review of the literature by Parker and Asher (1987) revealed strong support for the relationship between aggressive behavior and low acceptance in childhood and undesirable developmental outcomes, but less compelling evidence existed for the predictive validity of shyness and withdrawal. For instance, Kupersmidt (1983) found that rejected children had higher than expected rates of academic failure, dropping out of school, and delinquency but neglected children did not.

Recent longitudinal research by Kenneth Rubin suggests that shy, withdrawn behavior can also lead to undesirable social outcomes. Rubin and Asendorpf (1993) found that children who exhibit shy, withdrawn behavior in preschool and continue to isolate themselves from others may become actively disliked by their peers by age 11 and may exhibit more internalizing disorders, such as depression.

Parker and Asher (1987) pointed out that existing research makes it impossible to judge whether peer rejection and aggressiveness are the causes of later maladjustment or merely the early manifestation of an underlying disorder. Indeed, research by Dodge (1993) seems to support the latter view. Dodge's ongoing longitudinal study of rejected children provides evidence that the relation between early aggressive behavior and social rejection later in elementary school is less clear-cut than the relationship between early rejection and later aggressive behavior.

This raises a perplexing problem. Many researchers began the search for behavioral correlates of sociometric status in hopes of identifying those social behaviors that led to peer acceptance and rejection and to use these data to design intervention programs to prevent social rejection. Dodge's research raises the possibility that some children may be rejected by the peer group on some basis other than behavior patterns and then develop behavior problems (such as aggression) because of that rejection. Bierman, Smoot, and Aumiller (1993) identified different categories of rejected children, some of whom display aggressive behavior and some who do not, and found different behavioral patterns in these two groups (see also French, 1988). The nonaggressive rejected

boys were perceived by peers as more immature and bothersome and less attractive. These data suggest that sociometric status has a complex etiology that requires sophisticated analysis to determine the relationship between behavior and peer status.

Parker and Asher (1993) have recently reported that many low-accepted (low sociometric status based on a rating scale) children had friends based on peer nominations. Conversely, some high-accepted children did not receive nominations as "best friend" or "very best friend" from children they nominated as "very best friend." This suggests that children's social networks are complex, and the experiences of children with similar social status can differ greatly. Methods for analyzing the complexities of peer relationships can be found in the techniques included under network analysis.

The Analysis of Social Networks

Group Structure

Johnson et al. (1991) contend that classifying children into sociometric categories has the potential for resulting in a loss of important information contained in sociometric data. Their data suggest that the nature of rejection can vary from one child to another, depending on the matrix of friendship reciprocity. For instance, one boy may be disliked by a number of girls but may receive one positive nomination from a boy whom he likes. That child's experience of rejection may be much different from that of a boy who receives negative nominations from other boys whom he perceives as friends. In an exploratory study using methods of quantitative social network analysis (techniques discussed in more detail in the next section), Johnson et al. (1991) demonstrated that preschool children with similar sociometric status can indeed have quite different social network structures. Further research is needed with preschoolers and other children to examine the behavioral differences among children with different social networks and the long-term prognosis for social adjustment.

As Johnson et al. (1991) have also pointed out, the entire structure of the group needs to be taken into consideration in determining the status of children in the preschool setting. This concern stems from the fact that rejection itself should be reflected in some manner in the group's structure. Rejected children, for example, may occupy an isolated structural position reflecting their marginal social status. This position or status, however, is defined vis-à-vis the relationships among and between all members of the social group, as opposed to simply taking into account an individual's sum of negative and positive nominations or average peer

rating. This manner of conceptualizing the problem corresponds to the sociological concern for relating social position, social role, and role behaviors.

In social-network analysis, there is an important distinction made between two different methods for partitioning networks into subgroups. The first method determines subgroup membership on the basis of cohesion or intensity of interaction (Burt, 1983a, 1983b). This is historically the most common way of determining subgroups and is best reflected in the concept of a clique. Methods for determining cliques are generally derived from graph theory (Harary, 1969). Thus, cliques among preschool children may reflect play groups, work groups, or any other group in which its members interact frequently or intensely.

The other means for partitioning are fundamentally different in that subgrouping is based on the structural similarity of the actors (subjects). The two primary means for conceptualizing these structural similarities are referred to as general equivalence (Faust, 1988). The first, structural equivalence, determines subgroup membership on the basis of overlap in network linkages. Two individuals (or actors) are structurally equivalent to the extent that they share relations with the same others, independent of the presence or absence of a relationship between each other. The second, regular equivalence, determines subgroup membership on the basis of overlap in relations to the same types of others, not necessarily the same others (White & Reitz, 1983). Two individuals (actors) are regularly equivalent to the extent they structurally share relations to the same types of others. These approaches best reflect the concept of role in which two managers, for example, are equivalent because they share the same structural relations to the same type of others (e.g., employees). Thus, two children may be regularly equivalent because they are play leaders in the classroom, even though they are not members of the same clique.

These equivalence approaches are algebraic in nature and were initially referred to as blockmodels (White, Boorman, & Breiger, 1976). In contrasting these equivalence and clique approaches, Sailer (1978) illustrated the importance of the role distinction in comparing the application of these methods in the study of kinship. Sailer defined cliques as entities, for example, families in a kinship network; but a family is not a role. In kin networks, an example of a role would be "father" or "son." Sailer also defines roles as forming the "blocks" in a "blockmodel," which is a set of blocks and the relationships among the blocks. Clusters can be used to define a "block" as a set of actors (subjects) who are categorized together on the basis of structural similarities (Sailer, 1978, p. 75).

The clique approach is more suited to identifying play groups in the preschool setting or other groups in which interaction is of primary concern, whereas the equivalence approach identifies status/role sets (Burt

1983b). Both approaches can be useful in the study of rejected or neglected children. The role approach, however, has important theoretical and applied implications in that it links the concepts of position or status with role or function in the group. Different types of rejection, for example, may be linked to the different roles and the corresponding behaviors associated with a particular rejected status. Thus, such methods have the potential to aid not only in determining the severity of rejection (Johnson et al., 1991) but also in helping to define the different forms of rejection and their corresponding role behaviors. The need for such research is indicated by the work of French (1988) and Bierman et al. (1993).

Networks Over Time

Classrooms, or any setting for a similar group, develop structure over time, starting from initial contact until the final day of class or group interaction. Two important questions to be answered about that structure involve assessing how quickly the group structure forms and how stable it is over time. The answers to these questions are important for understanding the structural development of rejection and can have important implications for intervention strategies. In addition, over-time approaches help not only in understanding stability and change but also in assessing reliability (Johnson et al., 1991). Bernard and Killworth (1973) and Killworth and Bernard (1976) provide early examples of the concern for both the development and stability of network structure. In the study of an ocean-going research vessel, Bernard and Killworth (1973) posit that group and subgroup size (e.g., cliques) are limited by the constraints of effective communication (i.e., clique or subgroup size tends to be $5+-2$). In addition, they found that the structure of the group forms quickly (within 2 weeks) and stays relatively stable over time. Romney, Borgatti, and Nakao (1989) have corroborated the findings of Bernard and Killworth in their application of three-way correspondence analysis.

In order to illustrate the importance of understanding network structure over time, we will review some examples described by Boster and Johnson (1992) and Johnson and Boster (1993) in their study of winter-over personnel at a research station in Antarctica. This is an example of a closed social system in which the nine separate network structures are examined over the course of a winter-over (an 8.5-month period), a context in which the 22 personnel are isolated from contact with the outside. Aside from the questions of stability and change, we are interested in any changes in the position or status of the individual actors over the course of time. Thus, the development of isolation and rejection can be examined in a group context.

In answering questions about the development and stability of group

structure, Johnson and Boster (1993) employed three-mode, principal-component analysis (Kroonenberg, 1983). This multivariate technique allows for an examination of the relationships among and between items in a three-dimensional matrix R × C × Z. In this technique, the rows of the matrix represent an actor's (subject's) ratings of interactions with all other actors given, the columns are interaction ratings received, and the layers are each of the eight time periods. A plot is produced that visually demonstrates group sociometric stability across time (refer to Johnson & Boster, 1993, for an example).

To examine the changes over time within a group structure, Johnson and Boster (1993) employed a correspondence analysis of the stacked interaction rating matrices (i.e., each of the structure matrices was appended to another in sequence, yielding a 198 × 22 matrix). Correspondence analysis (Greenacre, 1984) is a multivariate technique that allows for the examination of relationships among rows and columns of an $N \times M$ matrix in the same low-dimensional vector space. In this case, the rows of the matrix are interaction ratings given during the nine time periods, and the columns are ratings received. This technique allows the visualization of changes in an individual's sociometric status across time against the background of changes in the entire group (Johnson & Boster, 1993).

These and other means for investigating changes over time in group structure provide a means for examining and relating changes in group-level structures that correspond to changes in the individual actor's positions and, hence, status. In this case, for example, disruptions in the stability of the overall group structure results in part from dramatic shifts in the position and status of individual actors, particularly one actor who was being isolated from the group, an indication of rejection by other group members. For a review of these and other social network approaches, see Wellman and Berkowitz (1988); Freeman, White, and Romney, (1989); and Wasserman and Glaskiewicz (in press).

Conclusions and Recommendations for Further Research

Sociometric measures, based on either ratings or nominations, offer a relatively reliable and valid measure of children's peer-group status. These measures, which are typically based on summary statistics, have resulted in a variety of classification systems and have been demonstrated to have predictive validity for a number of future social outcomes. Nonetheless, the traditional sociometric measures used in the developmental literature do not consider important information included in the data because they fail to examine group structure. Social network analysis offers potentially important information related to the individual's

status and role within the group (Johnson et al., 1991). Basically, network analysis allows the researcher to determine if the low-status (or rejected) child has no reciprocated friendships or if he or she is nominated (or highly rated) by another child identified as a friend. Examining the structure of a group also allows the elucidation of cliques and sources of positive and negative sociometric choices. For example, a low-status child might receive negative nominations or low ratings primarily from children of the other sex or who belong to a particular subgroup within the classroom or play group. All low-status children may not have the same severity of social problems (Parker & Asher, 1993). In addition, network analysis has the potential for allowing the tentative identification of the social role filled by the child within the group. Some children may serve in the role of a social organizer around whom groups form, and others may serve as links between separate cliques. Different types of rejected children may also be identified in terms of the different roles they play within the group.

Social network analysis can also be used as a method for measuring the consistency of social status and structure across time. As pointed out by Johnson et al. (1991), traditional measures of sociometric status may demonstrate a high degree of temporal stability even when there are large changes within the social network. Changes in the social network may reflect aberrant behaviors (e.g., aggression) or rejection for other, perhaps more subtle, reasons. It is also possible to track across time an individual's social status and movement in and out of the group structure. This movement then can be connected to the individual's behavior and other environmental events.

Despite the attraction of social network analysis as a methodology for examining children's peer groups, it has been little used by developmental researchers. Network analysis has its origin in the work of social psychologists but is now more commonly used by other social scientists. The differences in terminology and the mathematical complexity of the procedures appear to be obstacles to the adoption of these techniques by developmental researchers. In this article, we provide a brief evaluation of the techniques of network analysis, and Burt and Minor (1983) present a broad introduction to the methodology. A commercially available set of routines, UCINET (Borgatti, Everett, & Freeman, 1992), is available and will run on most microcomputers.

We are now conducting research to explore the relationship between the sociometric and the behavioral networks of preschool children. Similar research is needed with school-aged children, and attempts should be made to use network analysis to examine behavioral differences between children with similar social status but varying social networks. New class-

ification schemes may also result from the applications of network analysis to children's sociometric data. Social network analysis can be regarded as an additional tool in the ongoing effort to develop a better understanding of the individual's role in, and his or her relationship to, the peer group.

Author Note

Requests for examples of the graphical and plotting procedures discussed in this article should be addressed to Jeffrey Johnson, PhD, Institute for Coastal and Marine Resources, East Carolina University, Greenville, NC 27858-4353.

REFERENCES

Alain, M., & Begin, G. (1987). Improving reliability of peer-nomination with young children. *Perceptual and Motor Skills, 64*, 1263-1273.

Asher, S. R., Singleton, L. C., Tinsley, B. R., & Hymel, S. (1979). A reliable sociometric measure for preschool children. *Developmental Psychology, 15*, 443-444.

Bernard, H. R., & Killworth, P. D. (1973). On the social structure of an ocean-going research vessel and other important things. *Social Science Research, 2*, 145-184.

Bierman, K. L., Smoot, D. L., & Aumiller, K. (1993). Characteristics of aggressive-rejected, aggressive (nonrejected), and rejected (nonaggressive) boys. *Child Development, 64*, 139-151.

Boivin, M., & Begin, G. (1986). Temporal reliability and validity of three sociometric status assessments with young children. *Canadian Journal of Behavioural Science, 18*, 167-172.

Borgatti, S., Everett, M., & Freeman, L. (1992). *UNICET IV Version 1.00*. Columbia, SC: Analytic Technologies.

Boster, J. S., & Johnson, J. C. (1992, February). *Network structure and roles in isolated groups*. Paper presented at the 12th Annual International Sunbelt Social Network Conference, San Diego, CA.

Burt, R. S. (1983a). Cohesion versus structural equivalence as a basis for network subgroups. In R. S. Burt & M. J. Minor (Eds.), *Applied network analysis* (pp. 262-282). Beverly Hills: Sage.

Burt, R. S. (1983b). *Toward a structural theory of action*. New York: Academic Press.

Burt, R. S., & Minor, M. J. (Eds.). (1983). *Applied Network Analysis*. Beverly Hills: Sage.

Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology, 18*, 557-570.

Cowen, E. L., Pederson, A., Babigian, H., Izzo, L. D., & Trost, M. A. (1973). Long-term follow-up of early detected vulnerable children. *Journal of Consulting and Clinical Psychology, 41*, 438-446.

Dodge, K. A. (1993, March). *Social information processing and peer rejection factors in the development of behavior problems in children*. Paper presented at the Biennial Meeting of the Society for Research in Child Development, New Orleans, LA.

Dorval, M., & Begin, G. (1985). Temporal reliability and convergent validity of the rating scale and the peer nomination sociometric measures among preschool and kindergarten children. *Perceptual and Motor Skill, 60,* 667-675.

Faust, K. (1988). Comparison of methods of positional analysis: Structural and general equivalences. *Social Networks, 10,* 313-341.

Festinger, L. (1949). The analysis of sociograms using matrix algebra. *Human Relations, 2,* 153-158.

Freeman, L., White, D., & Romney, A. K. (1989). *Research methods in social network analysis.* Fairfax, VA: George Mason University Press.

French, D. C. (1988). Heterogeneity of peer rejected boys: Aggressive and nonaggressive subtypes. *Child Development, 50,* 976-985.

Foster, S. L., & Ritchey, W. (1979). Issues in the assessment of social competence in children. *Journal of Applied Behavior Analysis, 12,* 625-638.

Greenacre, M. J. (1984). *Theory and application of correspondence analysis.* London: Academic Press.

Gresham, F. (1981). Validity of social skills measures for assessing social competence in low status children: A multivariate investigation. *Developmental Psychology, 17,* 390-398.

Gronlund, N. E. (1959). *Sociometry in the classroom.* New York: Harper & Row.

Harary, F. (1969). *Graph theory.* Reading, MA: Addison-Wesley.

Harary, F., & Ross, I. C. (1957). A procedure for clique detection using the group matrix. *Sociometry, 20,* 205-215.

Hartup, W. W. (1970). Peer interaction and social organization, in P. H. Mussen (Ed.)., *Carmichael's manual of child psychology.* New York: Wiley.

Hartup, W. W. (1983). Peer relations. In E. M. Hetherington (Ed.), *Handbook of child psychology: Vol. 4, Socialization, personality and social development* (pp. 103-196). New York: Wiley.

Hartup, W. W., Glazer, J. A., & Charlesworth, R. (1967). Peer reinforcement and sociometric status. *Child Development, 38,* 1017-1024.

Hymel, S. (1983). Preschool children's peer relations: Issues in sociometric assessment. *Merrill Palmer Quarterly, 20,* 237-260.

Ironsmith, M., & Poteat, G. M. (1990). Behavioral correlates of preschool sociometric status and the prediction of teacher ratings of behavior in kindergarten. *Journal of Clinical Child Psychology, 19,* 17-25.

Johnson, J. C., & Boster, J. S. (1993, February). *Social networks of groups in isolation: Informal roles, interaction, and morale.* Paper presented at the 13th Annual International Sunbelt Social Network Conference, Tampa, FL.

Johnson, J. C., Poteat, G. M., & Ironsmith, M. (1991). Structural vs. marginal effects: A note on the importance of structure in determining sociometric status. *Journal of Social Behavior and Personality, 6,* 489-508.

Killworth, P. D., & Bernard, H. R. (1976). A model of human group dynamics. *Social Science Research, 5,* 173-224.

Kroonenberg, P. M. (1983). *Three-mode principal component analysis.* Leiden: DWSO-Press.

Kupersmidt, J. B. (1983, April). Predicting delinquency and academic problems from childhood peer status. In J. D. Coie (Chair), *Strategies for identifying children at social risk: Longitudinal correlates and consequences.* Symposium conducted at the biennial meeting of the Society for Research in Child Development, Detroit, MI.

Lindzey, G., & Byrne, D. (1968). Measurement of social choice and interpersonal

attractiveness. In G. Lindzey & E. Aronson (Eds.), *The handbook of social psychology* (2nd ed.) (pp. 452–525). Reading, MA: Addison-Wesley.

McCandless, B. R., & Marshall, H. R. (1957). A picture sociometric technique for preschool children and its relation to teacher judgments of friendships. *Child Development, 28*, 139–147.

Moreno, J. L. (1934). *Who shall survive?* Washington: Nervous and Mental Disease Monograph, No. 58.

Musun-Miller, L. (1990). Sociometrics with preschool children: Agreement between different strategies. *Journal of Applied Developmental Psychology, 11*, 195–207.

Olson, S. L., & Lifgren, K. (1988). Concurrent and longitudinal correlates of preschool peers sociometrics: Comparing rating scale and nomination measures. *Journal of Applied Developmental Psychology, 9*, 409–420.

Parker, J. G., & Asher, S. R. (1987). Peer relations and later personal adjustment: Are low accepted children at risk? *Psychological Bulletin, 102*, 357–389.

Parker, J. G., & Asher, S. R. (1993). Friendship and friendship quality in middle childhood: Links with peer group acceptance and feelings of loneliness and social dissatisfaction. *Developmental Psychology, 29*, 611–621.

Peery, J. C. (1979). Popular, amiable, isolated, and rejected: A reconceptualization of sociometric status in preschool children. *Child Development, 50*, 1231–1234.

Poteat, G. M., Ironsmith, M., & Bullock, M. J. (1986). The classification of preschool children's sociometric status. *Early Childhood Research Quarterly, 1*, 349–360.

Roff, M., Sells, S. B., & Golden, M. M. (1972). *Social adjustment and personality development in children*. Minneapolis: University of Minnesota.

Romney, A. K., Borgatti, S. P., & Nakao, K. (1989, February). *Three-way correspondence analysis: The Newcomb and Nordlie data*. Paper presented at the 9th Sunbelt Social Network Conference, Tampa, FL.

Rubin, K. H., & Asendorpf, J. B. (1993). Social withdrawal, inhibition, and shyness in childhood: Conceptual and definitional issues. In K. H. Rubin & J. B. Asendorpf, *Social withdrawal, inhibition, and shyness in childhood*. Hillsdale, NJ: Earlbaum.

Sailer, L. D. (1978). Structural equivalence: Meaning and definition, computation and application. *Social Networks, 1*, 73–90.

Ullman, C. H. (1957). Teachers, peers, and test predictors of adjustment. *Journal of Educational Psychology, 48*, 257–267.

Wasserman, S., & Glaskeiwicz, J. (In press). *Advances in social and behavioral sciences from social social network analysis*. Beverly Hills, CA: Sage.

Wellman, B., & Berkowitz, S. D. (1988). *Social structures: A network approach*. Cambridge: Cambridge University Press.

White, H., Boorman, S. C., & Brieger, R. L. (1976). Social structure from multiple networks I: Blockmodels of roles and positions. *American Journal of Sociology, 81*, 730–80.

White, D. R., & Reitz, K. P. (1983). Graph and semigroup homomorphisms on networks of relations. *Social Networks, 5*, 193–234.

JEFFREY JOHNSON is an associate professor in the Departments of Biostatistics and Sociology and an associate scientist in the Institute for Coastal and

Marine Resources at East Carolina University. He is currently the editor-in-chief of the *Journal of Quantitative Anthropology*. MARSHA IRONSMITH and G. MICHAEL POTEAT are associate professors in the Department of Psychology at East Carolina University. Both have published extensively on sociometric factors as they relate to the well-being of preschool children.

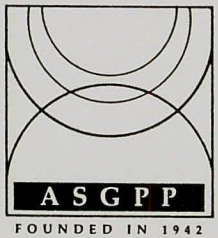
INFORMATION FOR AUTHORS

The *Journal of Group Psychotherapy, Psychodrama and Sociometry* publishes manuscripts that deal with the application of group psychotherapy, psychodrama, sociometry, roleplaying, life-skills training, and other action methods to the fields of psychotherapy, counseling, and education. Preference will be given to articles dealing with experimental research and empirical studies. The journal will continue to publish reviews of the literature, case studies, and action techniques. Theoretical articles will be published if they have practical application. Theme issues will be published from time to time.

The journal welcomes practitioners' short reports of approximately 500 words. This brief reports section is devoted to descriptions of new techniques, clinical observations, and results of small surveys and short studies.

1. Contributors should submit two copies of each manuscript to be considered for publication. In addition, the author should keep an exact copy so the editors can refer to specific pages and lines if a question arises. The manuscript should be double spaced with wide margins.
2. Each manuscript must be accompanied by an abstract of about 100 words. It should precede the text and include brief statements of the problem, the method, the data, and conclusions. In the case of a manuscript commenting on an article previously published in the JGPPS, the abstract should state the topics covered and the central thesis, as well as identifying the date of the issue in which the article appeared.
3. The *Publication Manual of the American Psychological Association*, 3rd edition, the American Psychological Association, 1983, should be used as a style reference in preparation of manuscripts. Special attention should be directed to *references*. Only articles and books specifically cited in the text of the article should be listed in the references.
4. Reproductions of figures (graphs and charts) may be submitted for review purposes, but the originals must be supplied if the manuscript is accepted for publication. Tables should be prepared and captioned exactly as they are to appear in the journal.
5. Explanatory notes are avoided by incorporating their content into the text.
6. Accepted manuscripts, usually published within six months of acceptance, are edited for style and readability. Normally, proofs are not sent to authors. Each author receives two complimentary copies of the issue in which the article appears.
7. Submissions are addressed to the managing editor, *Journal of Group Psychotherapy, Psychodrama, and Sociometry*, HELDREF Publications, 1319 Eighteenth Street, NW, Washington, DC 20036-1802.

The American Society of Group Psychotherapy & Psychodrama



For more information, call or write:
ASGPP
6728 Old McLean Village Drive
McLean, VA 22101
(703) 556-9222

The American Society of Group Psychotherapy & Psychodrama is dedicated to the development of the fields of group psychotherapy, psychodrama, sociodrama, and sociometry, their spread and fruitful application.

Aims: to establish standards for specialists in group psychotherapy, psychodrama, sociometry, and allied methods; to increase knowledge about them; and to aid and support the exploration of new areas of endeavor in research, practice, teaching, and training.

The pioneering membership organization in group psychotherapy, the American Society of Group Psychotherapy and Psychodrama, founded by J. L. Moreno, MD, in April 1942 has been the source and inspiration of the later developments in this field. It sponsored and made possible the organization of the International Association on Group Psychotherapy. It also made possible a number of international congresses of group psychotherapy. Membership includes subscription to *The Journal of Group Psychotherapy, Psychodrama & Sociometry,* founded in 1947 by J. L. Moreno as the first journal devoted to group psychotherapy in all its forms.