

What Aspects of Peer Relationships Are Impaired in Children With Attention-Deficit/Hyperactivity Disorder?

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Participants included 165 children with attention-deficit/hyperactivity disorder (ADHD; 130 boys, 35 girls) and their 1,298 same-sex classmates (1,026 boys, 272 girls) who served as raters. For each child with ADHD, a child of the same sex was randomly selected from the same classroom to serve as a comparison child, which yielded 165 dyads. Consistent with predictions, contrasted with the comparison children, those with ADHD were lower on social preference, higher on social impact, less well liked, and more often in the rejected social status category; they also had fewer dyadic friends. When liking ratings that children made versus received were examined, children with ADHD had less positive imbalance and greater negative imbalance relative to comparison children. Analyses that considered the types of peers who chose children with ADHD as friends or nonfriends demonstrated that children with ADHD were nominated as nonfriends by children of higher social preference and who were better liked by others.

Keywords: attention-deficit/hyperactivity disorder, peer relationships, children

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Attention-deficit/hyperactivity disorder (ADHD) is a common, impairing behavior disorder occurring in approximately 3%–5% of school-age children (American Psychiatric Association, 1994). More often than not, ADHD co-occurs with other problems such as oppositional behavior toward adults, conduct problems, and academic failure. Peer difficulties characterize the social ecologies of children with ADHD and constitute some of the most tenacious functional problems associated with ADHD (Whalen & Henker, 1985, 1992). Yet, few researchers have examined the peer problems of clinically diagnosed children with ADHD using (a) peer-informant methodologies and/or (b) measures representing multiple facets of peer relationships. The use of peer-informant methodologies is important because adult-informant methods of assessing children's difficulties are only moderately correlated with peer report (Achenbach, McConaughy, & Howell, 1987) and not as predictive of later problems (Cowen, Pederson, Babigian, Izzo, & Trost, 1973). A multifaceted approach is critical because there are distinct aspects to the peer ecology, and each contributes uniquely to understanding children's relationships with one another. In this article, a developmental psychopathology perspective is used to compare children with ADHD with their classmates in the natural environment by examining multiple aspects of peer problems. To achieve the primary goal of this article, we comprehensively describe the peer problems of children with ADHD using peer sociometric methods and a multifaceted approach to better understand the social difficulties associated with ADHD.

Importance of Peers as Informants

One limitation of many prior studies of the social functioning of children with ADHD is that adult informants often have been relied on as the only source of information about peer functioning. This is problematic because many of the interactions that occur between peers in unmonitored situations are inaccessible to adults. Indeed, assessment methods that rely on peers as informants have long been considered the gold standard measure of peer functioning among school-age children. The classic reference for this argument is the widely cited study by Cowen et al. (1973) that found peers' perceptions in the third grade to be the best predictor of who developed psychiatric problems by early adulthood (11–13 years later). Negative peer perceptions in childhood predicted later psychiatric status, whereas grades, achievement scores, teacher ratings, and school nurse referrals did not.

When sociometric methods have been used in studying children with ADHD, samples have been small or researchers typically have not formally diagnosed the children using current diagnostic criteria (Johnston & Pelham, 1986; Johnston, Pelham, & Murphy, 1985; Pelham & Bender, 1982; for an exception see Hinshaw & Melnick's, 1995, study). These limitations are understandable given the intensive demands of a sociometric study. For each target child, measurements must be collected from an entire classroom or grade of peer informants and only after securing the cooperation and permission of school principals, teachers, the classmates' parents, and the peers themselves. All such procedures must be done while protecting the confidentiality of the target individual and addressing concerns about the effects of the measurement procedure on the peer group. We find it important that numerous studies now document the lack of ill effects of administering sociometric measures on the peer group (Bell-Dolan, Foster, &

Christopher, 1992; Bell-Dolan, Foster, & Sikora, 1989; Hayvren & Hymel, 1984; Iverson, Barton, & Iverson, 1997), yet misconceptions and logistic constraints remain as impediments.

Importance of a Multifaceted Approach

Although most investigations that have used sociometric methods have limited their focus to one or two peer variables (e.g., acceptance and/or rejection), a rich theoretical literature dating as far back as the mid-20th century has described the importance of multiple levels of peer experiences. Sullivan (1953), for example, described the benefits both of being liked by a larger peer group and of experiencing a close, dyadic friendship. Similarly, Bronfenbrenner's (1979) ecological model of human development emphasized the simultaneous consideration of experiences in multiple spheres as useful in understanding human relations. Bukowski and Hoza (1989) described Bronfenbrenner's model as follows:

... just as one could study children's experiences with their fathers, one could also consider their experiences in a broader social sphere, such as the total family unit. In other words, one may consider simultaneously experiences on both the dyadic and group levels, although one relationship (i.e., the dyad) may be embedded within the other (i.e., the group). (pp. 19–20)

The past decade has yielded much-needed research examining dyadic (i.e., friendship-related) aspects of peer relationships as necessary complements to traditional investigations of acceptance and rejection (e.g., see volumes edited by Bukowski, Newcomb, & Hartup, 1996; Nangle & Erdley, 2001). However, very little of this research has considered children with clinically diagnosed problems whose relationships are likely to be most impaired. Even more important, other aspects of peer experience, such as the types of peers children name as friends, or the types of peers that name a particular child as a friend, have been largely ignored (for exceptions, see the following studies: Mrug, Hoza, & Bukowski, 2004; Nangle, Erdley, & Gold, 1996). This neglect is particularly true in regard to children who already have clinically diagnosed problems. Finally, certain key constructs from early theoretical work on human relationships (Moreno, 1934) have yet to be incorporated into current approaches. Cillessen and Bukowski (2000) noted the following:

... Moreno's [1934] sociometry was bilateral. He emphasized the importance of knowing whether children liked the particular children who liked them, and whether the peers a child liked also liked the child in return. Today's sociometry is, by contrast, largely unilateral; emphasizing how a child is seen by the group and placing no emphasis on how the child sees the group. This is a significant shortcoming. (p. 9)

In this article, we consider these neglected constructs and offer a first examination of what we call *level of imbalance*, a construct describing how the child views the members of his or her peer group relative to how the members of the peer group view the child. Before proceeding, however, we describe all aspects of peer relationships that we consider in this article—both those traditionally studied and those that have remained largely unexplored. Also, for those aspects traditionally studied, we briefly review what is known regarding the peer relationships of children diag-

nosed with ADHD, as well as nondiagnosed children exhibiting high levels of ADHD symptoms.

Acceptance and Rejection

Sociometric assessment procedures involve asking all children in a classroom or grade questions about all other children in the class with standardized criterion questions. Usually both positive and negative nomination criteria are used (e.g., "Who are your best friends?" or "Who do you not want to be friends with?"). A rating-scale procedure also can be used and is often used in conjunction with nominations. The number of positive and negative nominations a child receives from peers can be totaled to derive dimensional measures of *peer acceptance* (number received on positive nominations), *peer rejection* (number received on negative nominations), *social preference* (acceptance minus rejection), and *social impact or visibility* (acceptance plus rejection). In addition, multidimensional peer sociometric classification systems use acceptance, rejection, social preference, and social impact together to categorize children who are popular, rejected, neglected, controversial, or average in peer status (e.g., see Coie, Dodge, & Coppotelli's, 1982, study). All of these constructs are considered unilateral measures reflecting the opinion of the group about the target child, regardless of how the target child feels about the group.

Although relatively few studies have examined peers' views of children with ADHD, the results unequivocally indicate that other children do not see children with ADHD as desirable companions. Pelham and Bender (1982) compared children in a school sample identified as hyperactive or nonhyperactive on the basis of teacher ratings. Results indicated that peers more often nominated children with hyperactivity for negative items and less often picked them for positive items, relative to children without hyperactivity. In another study described in the same article, children with hyperactivity were overwhelmingly rated as less desirable play companions by unfamiliar children without hyperactivity after only two brief play sessions. Similarly, in a summer program setting, boys with ADHD were more rejected and less accepted than comparison boys after only 3 days of interactions, and they also received lower liking ratings (Erhardt & Hinshaw, 1994).

Dyadic Friendships

Whereas the effects of acceptance, rejection, and other group-level variables cannot be ignored, other aspects of peer relationships should be considered as well. The dyadic level has received increasing attention in the past decade because of theoretical arguments suggesting that close, dyadic, reciprocated friendships serve different needs than do peer group relationships (for a review, see Bukowski & Hoza's, 1989, chapter). One unique measurement feature of dyadic friendship is that friendship scores are *bilateral* in nature. In other words, both members of the dyad must verify the importance of the friendship. Research has shown that although dyadic friendship variables are correlated with acceptance and rejection, they account for unique variance in measures of adjustment and predict to different aspects of socioemotional functioning (Bukowski, Hoza, & Boivin, 1993; Hoza, Bukowski, & Beery, 2000).

The number of dyadic friends that children with ADHD have has only rarely been examined, but available studies suggest that they have fewer friends than their classmates. For example, King and Young (1981) reported that teacher-identified boys with hyperactivity received fewer reciprocated positive nominations than comparison boys in the class. Another study showed that 60%–76% of children in a school sample identified as high on both hyperactivity/impulsivity/inattention and conduct problems did not have a reciprocated friend in their class (Gresham, MacMillan, Bocian, Ward, & Forness, 1998).

Nominated Peers and Nominating Peers

The majority of studies of children's peer problems over the past 25 years have studied the impact of peer rejection or low acceptance, and more recently dyadic friendships, on later adjustment. This focus is gradually expanding as recent evidence suggests that other factors may be equally important. One such factor arises from studies of nonclinical high-risk samples indicating that it may be critical to consider the characteristics of the peers with whom a child associates. For example, the type of peers with whom high-risk youths associate can predict ecologically valid outcomes such as substance use (Dishion, Capaldi, Spracklen, & Li, 1995) and increases in delinquent and violent behavior (Dishion, Eddy, Haas, Li, & Spracklen, 1997; Dishion, Spracklen, Andrews, & Patterson, 1996).

Despite this recent emphasis on the potentially negative effects of associating with deviant peers, nearly absent are studies attempting to measure directly the status within the larger peer group of those peers whom a child names as friends (for exceptions, see the following studies: Mrug et al., 2004; Nangle et al., 1996). In other words, rather than seeking the reports of the peer group directly, most investigators who examine the effects of a child's associates on at-risk youths ask the young adolescents to provide self-report information on the characteristics of their friends (Dishion et al., 1995; Keenan, Loeber, Zhang, Stouthamer-Loeber, & Van Kammen, 1995). Although informative in one respect, this strategy tells us nothing about whether a particular child chooses as friends those peers viewed as desirable versus undesirable companions by the larger peer group. In this study, we make an initial step toward addressing this question by examining peer reports about the individuals who choose and are chosen by children with ADHD as friends and nonfriends.

Level of Imbalance

Recent research has suggested that boys with ADHD are poor monitors of their own behavior in social interactions. For example, a direct experimental manipulation of social success and failure (Hoza, Waschbusch, Pelham, Molina, & Milich, 2000) demonstrated that boys with ADHD were less socially effective than control boys in their interactions, yet they rated their own performance more favorably, even following blatant failure. This suggests that lack of insight and poor social perception likely contribute to the peer problems of children with ADHD, perhaps by impairing their ability to select others most likely to reciprocate their attempts at liking or friendship initiation. In this study, we directly investigate the level of imbalance characterizing the liking ratings made versus received by children with ADHD. Specifi-

cally, we consider how children with ADHD rate other children relative to how they are rated by others.

Comparisons of Boys and Girls

The reported ratios of boys to girls with ADHD typically range from 4:1 to 9:1 (American Psychiatric Association, 1994), making recruitment of adequate-sized samples of female participants for research studies extremely difficult. As a result, until very recently, the vast majority of research on children with ADHD has been conducted on male participants. Even when girls are included in research studies, the small size of female subgroups often precludes separate analyses comparing boys and girls. Although this state of affairs is slowly changing because of several important studies of girls with ADHD that are currently underway (Biederman et al., 1999; Hinshaw, 2002), our understanding of the course and nature of ADHD in girls remains rudimentary (Arnold, 1996). Therefore, we report supplementary comparisons of boys and girls, even though our subsample sizes limit the number and types of comparisons made.

There are few studies that directly compare girls and boys with ADHD on peer-report measures. In fact, we could find only three studies, and each involved only 16 or fewer girls (deHaas, 1986; Johnston et al., 1985; Pelham & Bender, 1982). Furthermore, these studies did not involve clinically diagnosed children with ADHD and did not include dyadic friendship, information about nominated or nominating peers, or about level of imbalance. Nonetheless, these three studies uniformly suggest that both boys and girls with ADHD are impaired in their peer relationships, as compared with normative peers. When boys and girls with ADHD are compared with each other, results are less consistent, with some studies reporting more extreme peer problems for boys than girls (Pelham & Bender, 1982) and others finding them equally problematic (deHaas, 1986). Therefore, we expected to find impairments in all aspects of the peer relationships of both girls and boys with ADHD relative to comparison children, although we made no specific predictions regarding comparisons of boys versus girls with ADHD.

Summary and Hypotheses

In this study, we used a developmental psychopathology perspective to compare children with ADHD with their classmates in the natural environment by examining multiple aspects of peer problems. To achieve the primary goal of this article, we comprehensively describe the peer problems of children with ADHD using sociometric methods and a multilevel approach to assessment to better understand the nature of the social difficulties that children with ADHD encounter. Few prior studies exist with clinically diagnosed children with ADHD to guide our hypotheses with regard to dyadic friendship, and none to our knowledge have considered nominated and nominating peers, or levels of imbalance. Nonetheless, on the basis of their generally poor social functioning on traditional peer measures such as acceptance and rejection, we predicted that children with ADHD would be more impaired than comparison peers on all aspects of peer functioning, both those traditionally studied and those not typically considered.

Method

Participants

Participants included 165 children with ADHD (130 boys, 35 girls) and their 1,298 same-sex classmates (1,026 boys, 272 girls) who served primarily as raters. (Opposite sex peers did not participate in the sociometric assessments.) All children with ADHD were participants in the Multimodal Treatment Study of Children With ADHD (MTA) and were 7.0–9.9 years of age at study entry. The MTA study is a National Institute of Mental Health collaborative effort involving six sites designed to compare various treatments for ADHD. However, because the data reported here were collected at baseline (i.e., before any of the treatments began), we do not describe the treatments or outcome findings here (instead, see the following reports: Arnold et al., 1997; Greenhill et al., 1996; MTA Cooperative Group, 1999a, 1999b; Wells et al., 2000).

The data reported in this article were collected at three sites; the remaining MTA sites did not collect sociometric data at baseline because it was an optional part of the protocol. Furthermore, within these three sites, data were not obtained for all MTA children, and some participants did not have enough usable peer data. To ensure validity of the sociometric data (i.e., to eliminate classrooms with too few participants to yield meaningful scores), we retained only children in classes with at least 5 participating children, which resulted in 26 potential participants (7 MTA participants and their 19 classmates) being excluded from the total sample of 1,489 prior to conducting any analyses. Therefore, the final analysis sample included 165 dyads drawn from a larger sample of 1,463 children, all from classes with 5 or more participating children. No two children with ADHD were from the same classroom; therefore, 165 different classrooms participated. The mean, median, and modal number of same-sex participants was 8.9, 8.0, and 8.0, respectively, and the range was 5–16.

Next, to ascertain whether the MTA participants with usable sociometric data (i.e., those from classes with 5 or more participating children) were a representative subsample of MTA participants at the three sites that collected baseline sociometric data, we compared MTA participants with usable sociometric data on demographic and behavioral variables with MTA participants without any sociometric data at the same three sites using one-way analyses of variance for continuous variables and chi-square tests for categorical variables. (The 7 children with too few peer raters were not included in these analyses.) No significant differences between children with and without sociometric data were detected in age, intelligence or achievement level, teacher-rated Swanson, Nolan, and Pelham (SNAP; Swanson, 1992) scale scores, conduct disorder (CD)/oppositional defiant disorder (ODD) diagnosis, anxiety diagnosis, percentage of boys versus girls, ethnicity, grade level, parents' marital status, parental employment status, income level, or welfare reception (all $ps > .05$; see Table 1). The only differences were on parent-rated inattention, hyperactive-impulsive, and total SNAP scores, on which children without sociometric data had more severe scores; no differences were obtained for the parent-rated ODD SNAP score. Because significant differences occurred on only 3 of 25 comparisons (see Table 1), they were not considered further.

Finally, for each child with ADHD, a classmate was randomly selected from among all same-sex participating classmates to serve as a comparison child, which allowed us to derive "matched pairs" for analysis purposes. Such an approach was used to ensure that the index children and the comparison group were from the same classes, schools, and neighborhoods.

Description of Sociometric Data Collection Procedures

Informed consent. There is an absence of evidence suggesting that negative effects result from participation in sociometric procedures, even in studies designed to measure ill effects (Bell-Dolan et al., 1992; Bell-Dolan et al., 1989; Hayvren & Hymel, 1984; Iverson et al., 1997). Yet, the standard in the field is to obtain parental permission, given the sensitive

Table 1
Comparison of Children With and Without Sociometric Data at the Three Sites

Variable	Without sociometric data	With sociometric data	<i>p</i>
<i>N</i>	117	165	
Age, <i>M</i> (<i>SD</i>)	7.8 (0.8)	7.7 (0.8)	<i>ns</i>
Boys, <i>n</i> (%)	94 (80)	130 (79)	<i>ns</i>
Ethnicity, <i>n</i> (%)			<i>ns</i>
White	82 (70)	109 (67)	
African American	21 (18)	21 (13)	
Other	14 (12)	33 (20)	
Grade, <i>n</i> (%)			<i>ns</i>
1	30 (26)	35 (21)	
2	48 (41)	65 (39)	
3	29 (25)	50 (30)	
4	10 (9)	15 (9)	
WISC-III IQ, <i>M</i> (<i>SD</i>)			
Verbal	102 (15)	102 (15)	<i>ns</i>
Performance	102 (17)	102 (14)	<i>ns</i>
Total	102 (16)	102 (14)	<i>ns</i>
WIAT, <i>M</i> (<i>SD</i>)			
Reading	96 (13)	96 (15)	<i>ns</i>
Math	98 (13)	98 (14)	<i>ns</i>
Spelling	94 (14)	95 (13)	<i>ns</i>
SNAP—teacher, <i>M</i> (<i>SD</i>)			
Inattention	2.2 (0.6)	2.2 (0.6)	<i>ns</i>
Hyperactive-impulsive	2.0 (0.7)	1.9 (0.8)	<i>ns</i>
ODD symptoms	1.4 (0.9)	1.3 (0.8)	<i>ns</i>
Total	1.8 (0.5)	1.7 (0.5)	<i>ns</i>
SNAP—parent, <i>M</i> (<i>SD</i>)			
Inattention	2.2 (0.6)	2.0 (0.6)	<.05
Hyperactive-impulsive	2.1 (0.6)	1.9 (0.7)	<.01
ODD symptoms	1.6 (0.7)	1.5 (0.7)	<i>ns</i>
Total	1.8 (0.5)	1.7 (0.5)	<.05
CD or ODD diagnosis, <i>n</i> (%)	65 (59)	91 (61)	<i>ns</i>
Anxiety diagnosis, <i>n</i> (%)	42 (37)	56 (35)	<i>ns</i>
Employed, <i>n</i> (%)			
Mother	81 (70)	124 (75)	<i>ns</i>
Father	78 (80)	109 (87)	<i>ns</i>
Welfare, <i>n</i> (%)	22 (19)	25 (15)	<i>ns</i>
Income, <i>n</i> (%)			<i>ns</i>
<\$20,000	26 (23)	26 (16)	
\$20,000–\$50,000	50 (44)	66 (41)	
>\$50,000	38 (33)	70 (43)	
Married, <i>n</i> (%)	76 (65)	106 (64)	<i>ns</i>

Note. WISC-III = Wechsler Intelligence Scale for Children—Third Edition; WIAT = Weschler Individual Achievement Test; SNAP = Swanson, Nolan, and Pelham scale; CD = conduct disorder; ODD = oppositional defiant disorder.

nature of the questions asked. Consistent with this approach, only children whose parents gave active consent participated in the sociometric procedures as raters and ratees. In this study, our mean, median, and modal rates of classroom participation were 64%, 64%, and 67%, respectively. According to Crick and Ladd (1989), only 3% of rejected children are misclassified with 70% participation, and only 18% are misclassified with 50% participation; hence, our participation rates appear adequate in this regard.

Administration procedures. Three forms of sociometric assessments were conducted individually for children in Grades 1 or 2, or for any classrooms of students in Grades 3 or higher whose teacher indicated that 3 or more students would have difficulty reading the forms. Otherwise, sociometrics were administered in a group format with all instructions (but not children's names) read aloud. When a group administration was used, help was given to individual children who needed it.

Positive nominations. During the group administration procedure, each child was given a list of all same-sex participating class-

mates. He or she was first asked to circle the names of all children on the list who were their "best friends in the class." When this step was completed, the children were asked to number up to three of the classmates they had selected to indicate their "very, very best friend in the class," their "next best friend in the class," and their "third best friend in the class."

The procedure for individual administration was similar with the exception that the classmates' names appeared on individual name cards instead of a list, and the administrator went over each name card individually to make sure the child could read each name. Then, children made their selections during a two-step procedure similar to the one described above by picking up or pointing to the name cards.

Negative nominations. For the group-administered negative nomination procedure, children were given another copy of the class list and were asked to circle the names of the same-sex classmates that they "DO NOT want to be friends with." They were permitted to choose as many or as few as they wished and, for ethical reasons, were instructed not to number the

negative choices. The procedure for younger children was parallel except that individual name cards were used and selections were made by picking up the cards or pointing to them.

Sociometric rating scale. Whereas the positive and negative nomination procedures described above enabled a child to identify the extremes of his or her same-sex peer group in terms of best friends and least-preferred peers, nomination procedures did not provide information about all members of the same-sex peer group. One advantage of a sociometric rating scale is that it requires all same-sex children to make a numerical rating of all other participating same-sex classmates so that a child's degree of liking for each other same-sex classmate is measured directly. For the current study, a 5-point rating scale was used ranging from 1 (*really like*) to 5 (*really do not like*). To clarify the meaning of the scale, we anchored the positive end of the scale with a smiling face and the negative end with a frowning face.

A similar administration procedure was used with the younger children, with the following exceptions. Classmates' names were on individual name cards that were presented one at a time to be rated. A large visual aid showing the numbers on the scale, accompanied by explanatory faces (smiling–neutral–frowning), was used to assist the children in understanding the scale. Also, extra practice time was allotted, if needed, to teach the use of the scale to each child.

Scoring the Sociometric Data

Unilateral scores. As noted earlier, sociometric data can be scored either unilaterally or bilaterally, with these scoring methods reflecting different constructs of the peer ecology. Computation methods and definitions for all sociometric peer variables are listed in Table 2 for easy reference. In terms of unilateral measures, the number of all (unlimited) positive nominations that an individual child receives from his or her same-sex peer group reflects the general feeling of the group toward that individual, that is, the extent to which the child is liked or accepted by the same-sex peer group. Similarly, the number of negative nominations that an individual child receives from his or her same-sex peers reflects the extent to which the child is disliked or rejected by the same-sex peer group. Because the number of participating classmates that a child has affects the number of positive or negative nominations he or she receives, scores must be adjusted in some way to put classrooms with differing numbers of nominators into the same metric. We did so by converting raw sums to z scores, which were computed separately within each classroom. An individual child's acceptance and rejection z scores were then summed to reflect his or her total social impact (acceptance plus rejection), and rejection was subtracted from acceptance to reflect social preference (acceptance minus rejection). These preference and impact scores were again standardized within class. We also computed the average rating that a child received from peers in his or her classroom using the liking rating scale as a second indicator of social preference.¹ We used the social impact and preference scores, derived from unrestricted same-sex nominations (i.e., children were not limited in the number of same-sex children they could choose), as well as the mean liking rating received from same-sex peers, as dependent variables. Because acceptance and rejection were both highly correlated with social preference ($r_s = .94$ and $-.96$, respectively), they were not analyzed as separate dependent variables.

Social status. Acceptance, rejection, social impact, and social preference scores have been used together to classify children into five social status categories: popular (highly visible and well liked), rejected (highly visible and poorly liked), controversial (highly visible and both liked and disliked), neglected (low visibility and neither liked nor disliked), and average (at or about the mean on both visibility and likeableness). Whereas some of these multidimensional methods use logically derived cutoffs based on known properties of z scores (Asher & Dodge, 1986; Coie et al., 1982), others use probability theory to define rare scores (Newcomb & Bukowski, 1983). For the current study, we used Coie et al.'s (1982)

method to classify children in terms of their social status using unlimited same-sex nomination scores.

Dyadic friendship. As noted earlier, dyadic friendship is a bilateral construct that reflects reciprocated intense positive regard between two individuals. To make dyadic friendship scores accurately reflect close relationships, and consistent with prior work (Bukowski, Hoza, & Newcomb, 1994), we only considered relationships wherein both members of the dyad had chosen each other as first or second best friends in determining the number of reciprocated friendships (0, 1, 2) for each child.²

Levels of imbalance. As indicators of levels of imbalance, positive imbalance and negative imbalance scores were computed as follows. Specifically, the score a child assigned to each same-sex classmate on the 5-point liking rating scale was compared with the score he or she received from each classmate. If the child received a better (i.e., lower) rating than he or she gave, then the absolute difference was added to that child's positive imbalance total; if the child received a worse (i.e., higher) rating than he or she gave, then the absolute difference was added to the child's negative imbalance total. Imbalance scores were then converted to z scores, within each class, to produce scores that were comparable across classes of differing size.³

Nominated peers and nominating peers. We considered both peers selected by each child as friends or nonfriends and those children who selected each child as a friend or nonfriend. These scores involved unilateral selections. Therefore, to avoid confusion with our friendship construct, which is defined bilaterally, we refer to these children as *nominated peers* and *nominating peers*. We considered both children chosen by our target children and those who chose them, because there is precedent for each of these approaches in the peer literature (Mrug et al., 2004; Nangle et al., 1996). We computed scores as follows. We identified classmates selected by each child as a first- or second-best friend on the positive nomination procedure and computed the average social preference, social impact, and liking scores for this subgroup. We named these variables positively nominated peers' (a) social preference, (b) social impact, and (c) liking. We next identified classmates who picked each child as a first- or second-best friend on the positive nomination procedure and computed their average social preference, social impact, and liking scores. These variables were named positively nominating peers' (a) social preference, (b) social impact, and (c) liking. We considered only first- and second-best friend selections because prior work has shown that including only the top two choices produces variables with greater variance (Mrug et al., 2004), a result we replicated with this sample.

¹ Prior work (Bukowski, Hoza, & Newcomb, 1994) contains arguments that social preference derived from nominations and average ratings received assess the same construct. The correlation between these two measures in the current study supports that conclusion.

² Recognizing that children may have important dyadic best friendships in other classes or schools, or in their neighborhoods, we initially attempted to collect information about other close friends and to track down these other close friends to confirm reciprocity of friendship choice. Given the enormous efforts and resources needed to do so with a sample of this size, however, data were collected only sporadically and therefore were not analyzed.

³ The standardized scores (i.e., z scores) for acceptance, rejection, social impact, and social preference were calculated using the descriptive sample standard deviation (the square root of the sum of squares divided by the sample size). In contrast, the z scores for positive and negative imbalance were calculated via the procedures used in the SPSS software. It appears that the software algorithm uses the estimate of the population standard deviation (the square root of the sum of squares divided by the sample size minus one) when comparing z scores. This discrepancy is unlikely to have added anything beyond a trivial amount of "noise" in the calculations of the scores we used.

Table 2
Summary of Peer Variables

Measure	Definition	Score type
Unilateral		
1. Social preference	Acceptance – Rejection (standardized)	<i>z</i>
2. Social impact	Acceptance + Rejection (standardized)	<i>z</i>
3. Social status	Multidimensional categories based on unlimited nominations	Category
4. Average liking	Mean received liking rating	Mean
Bilateral		
5. Dyadic friendship	No. of reciprocated positive nominations	0, 1, or 2
6. Positive imbalance	Sum of differences between G and R ratings when difference is favorable (standardized)	<i>z</i>
7. Negative imbalance	Sum of differences between G and R ratings when difference is unfavorable (standardized)	<i>z</i>
Positively Nominated Peers (PED) ^a		
8. PED preference	Mean social preference for positively nominated peers	Mean of <i>z</i> scores
9. PED impact	Mean social impact for positively nominated peers	Mean of <i>z</i> scores
10. PED liking	Mean average liking for positively nominated peers	Mean of means
Negatively Nominated Peers (NED) ^b		
11. NED preference	Mean social preference for negatively nominated peers	Mean of <i>z</i> scores
12. NED impact	Mean social impact for negatively nominated peers	Mean of <i>z</i> scores
13. NED liking	Mean average liking for negatively nominated peers	Mean of means
Positively Nominating Peers (PNG) ^c		
14. PNG preference	Mean social preference for positively nominating peers	Mean of <i>z</i> scores
15. PNG impact	Mean social impact for positively nominating peers	Mean of <i>z</i> scores
16. PNG liking	Mean average liking for positively nominating peers	Mean of means
Negatively Nominating Peers (NNG) ^d		
17. NNG preference	Mean social preference for negatively nominating peers	Mean of <i>z</i> scores
18. NNG impact	Mean social impact for negatively nominating peers	Mean of <i>z</i> scores
19. NNG liking	Mean average liking for negatively nominating peers	Mean of means

Note. G = given; R = received.

^a Mean across classmates picked by the target child as a first or second friend. ^b Mean across classmates picked by the target child as a nonfriend. ^c Mean across classmates who picked the target child as a first or second friend. ^d Mean across classmates who picked the target child as a nonfriend.

A similar computation was followed for the subgroup of children who selected or were selected by each child on the negative nomination procedure, with one exception. As mentioned earlier, the negative choices were not numbered for ethical reasons; therefore, unlimited choice negative nominations were used to produce the scores. However, we find it important that these scores computed from unlimited choice negative nominations were more similar in their variances to the positive nominations when only the two top choices were considered than when all choices were considered (the variance was much smaller for unlimited choice positive nominations); thus, we felt this was an acceptable approach in the absence of limited choice negative nominations. These variables computed for nominated peers were named negatively nominated peers' (a) social preference, (b) social impact, and (c) liking. The parallel variables computed for nominating peers were named negatively nominating peers' (a) social preference, (b) social impact, and (c) liking.

Results

Preliminary Analyses

Correlations among the dependent variables were examined with data from both children with ADHD and all their same-sex classmates who served as raters; these correlations ranged from 0 to .80 (see Table 3), with the majority of correlations being in the low-to-moderate range. The main exceptions were correlations between the social preference and average liking variables, which should be more highly correlated because, as noted earlier, they are different operationalizations of the same construct. The *ns* for these correlations ranged from 830 to 1,463.

Table 3
Correlations Among All Dependent Variables

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. PREF	—																
2. IMP	0.00	—															
3. LIKE	-0.80**	0.06	—														
4. DYAD	0.47**	0.13**	-0.47**	—													
5. POSIM	0.52**	-0.01	-0.60**	0.30**	—												
6. NEGIM	-0.69**	0.06	0.75**	-0.43**	-0.69**	—											
7. PEDPREF	0.02	0.03	-0.01	-0.09**	0.10**	-0.07*	—										
8. PEDIMP	0.00	-0.11**	-0.02	-0.09**	0.01	-0.03	0.11**	—									
9. PEDLIKE	-0.06	-0.03	0.18**	0.07*	-0.05	0.03	-0.67**	-0.02	—								
10. NEDPREF	-0.30**	0.00	0.32**	-0.13**	-0.09*	0.17**	-0.14**	-0.08*	0.27**	—							
11. NEDIMP	0.05	-0.17**	-0.09*	-0.02	0.01	-0.07	0.03	-0.15**	-0.09*	-0.20**	—						
12. NEDLIKE	0.21**	-0.01	-0.10**	0.08*	0.07	-0.14**	0.15**	0.10**	-0.10**	-0.71**	0.18**	—					
13. PNGPREF	0.04	0.00	-0.07	0.28**	0.06	-0.14**	0.38**	0.03	-0.26**	-0.11**	-0.01	0.07	—				
14. PNGIMP	0.06	-0.12**	-0.07	0.09*	0.01	-0.04	0.00	0.37**	0.01	-0.04	-0.10*	0.03	0.01	—			
15. PNGLIKE	-0.01	-0.01	0.18**	-0.09*	0.05	0.05	-0.24**	-0.01	0.49**	0.19**	-0.08	0.04	-0.62**	0.06	—		
16. NNGPREF	-0.32**	0.01	0.27**	-0.17**	-0.14**	0.31**	-0.15**	-0.03	0.09*	0.22**	-0.04	-0.18**	-0.30**	-0.04	0.24**	—	
17. NNGIMP	-0.03	-0.14**	0.01	-0.03	0.01	-0.02	-0.01	-0.11**	-0.03	-0.05	0.21**	0.04	-0.19**	-0.04	-0.13**	-0.04	—
18. NNGLIKE	0.31**	-0.01	-0.12**	0.18**	0.14**	-0.32**	0.12**	0.06	0.12**	-0.11**	-0.02	0.35**	0.22**	0.00	-0.77**	0.15**	—

Note. For all values, *n* ranges between 830 and 1,463. PREF = social preference; IMP = social impact; LIKE = average liking; DYAD = number of dyadic friendships; POSIM = positive imbalance; NEGIM = negative imbalance; PEDPREF = social preference of positively nominated peers; PEDIMP = social impact of positively nominated peers; PEDLIKE = average liking of positively nominated peers; NEDPREF = social preference of negatively nominated peers; NEDIMP = social impact of negatively nominated peers; NEDLIKE = average liking of negatively nominated peers; PNGPREF = social preference of positively nominating peers; PNGIMP = social impact of positively nominating peers; PNGLIKE = average liking of positively nominating peers; NNGPREF = social preference of negatively nominating peers; NNGIMP = social impact of negatively nominating peers; NNGLIKE = average liking of negatively nominating peers.

* *p* < .01. ** *p* < .001.

Primary Analyses

As noted earlier, one same-sex classmate of each participating child with ADHD was selected at random to serve as a comparison child. The participants with ADHD were then compared with these randomly selected children on the dependent variables listed in Table 2. For the majority of these comparisons, paired-sample *t* tests were used. In addition, the proportions of children with ADHD and comparison children, classified into different sociometric groups based on Coie et al.'s (1982) social status classification system, were compared with chi-square tests of independence. Because multiple analyses were run that tested similar hypotheses, we used a Bonferroni correction to preserve an overall Type I error rate of .05. The level of significance for individual tests was thus set at $.05/19 = .0026$.

As can be seen in Table 4, children with ADHD, relative to comparison children, had larger social impact and lower social preference (on both social preference measures). They also had greater negative imbalance, less positive imbalance, and fewer dyadic friends. In fact, considering only the top two positive nominations, of the participants with ADHD, 56% had no dyadic friends, 33% had one dyadic friend, and 9% had two dyadic friends. Among the randomly selected comparison children, however, 32% had no dyadic friends, 39% had one dyadic friend, and 22% had two dyadic friends. These proportions were significantly different across the two groups as indicated by a chi-square test, $\chi^2(2, N = 304) = 21.5, p < .001$. Similarly, when considering multidimensional classification of social status as described by Coie et al. (1982), children with ADHD were more often classified as rejected and less often as popular, relative to the comparison children, $\chi^2(5, N = 330) = 70.49, p < .001$ (see Table 5 for frequencies of all the social status categories). In fact, 52% of all children with ADHD were rejected as compared with 14% of all comparison children.

Analyses of positively and negatively nominated peers' scores (see Table 4) revealed no differences between children chosen as friends or nonfriends by children with ADHD versus randomly selected classmates with respect to social preference, social impact, or received liking scores. These results indicate that children with ADHD and comparison children select friends and nonfriends with similar valence within the larger peer group, or in other words, that they have similar sociometric preferences and dislikes. Similarly, children who chose children with ADHD as friends (i.e., positively nominating peers) did not differ on preference, impact, and liking from those who chose the comparison children as friends. The peers who chose children with ADHD as nonfriends, however, differed from those who chose the classmates without ADHD as nonfriends. In particular, those who specifically chose children with ADHD as nonfriends had higher social preference scores and received more positive (i.e., lower) liking ratings than those who chose children without ADHD as nonfriends, but they did not differ in social impact. These results suggest that children with ADHD are less preferred by more popular peers as compared with children without ADHD.

Comparisons of boys and girls. When differences between children with ADHD and comparison children were further analyzed by adding boys versus girls as a between-subjects factor, there were no interaction effects of sex with ADHD status for any of the sociometric variables. There were two main effects indicating that girls have less negative imbalance ($p = .043$) and more positive (i.e., lower) received ratings ($p = .018$) than boys, but these effects were not significant after Bonferroni correction was applied to the analyses.

Supplementary grade analyses. Finally, we addressed the question of whether differences between children with ADHD and comparison children differed across grades using repeated mea-

Table 4
Comparison of Participants With ADHD and Comparison Children on Peer Variables

Variable	ADHD		Comparison		Effect size (Cohen's <i>d</i>)	<i>t</i>	<i>p</i>	<i>n</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>				
Social preference	-0.95	0.93	0.17	0.98	-1.17	-10.10	<.001	165
Social impact	0.22	0.91	-0.15	1.01	0.38	3.29	<.001	165
Average liking ^a	3.18	0.78	2.34	0.75	1.10	9.75	<.001	165
Dyadic friendship (Top 2)	0.53	0.67	0.91	0.75	-0.53	-4.62	<.001	152
Positive imbalance	-0.60	0.77	0.06	1.01	-0.73	-5.99	<.001	152
Negative imbalance	0.90	0.98	-0.20	0.83	1.22	10.10	<.001	152
Preference of positively nominated peers	0.47	0.58	0.48	0.55	-0.02	-0.05	<i>ns</i>	147
Impact of positively nominated peers	0.19	0.65	0.16	0.60	0.05	0.41	<i>ns</i>	147
Liking of positively nominated peers ^a	2.08	0.51	2.07	0.53	0.02	0.25	<i>ns</i>	147
Preference of negatively nominated peers	-0.73	0.65	-0.88	0.72	0.22	1.77	<i>ns</i>	102
Impact of negatively nominated peers	0.23	0.71	0.36	0.63	-0.19	-1.24	<i>ns</i>	102
Liking of negatively nominated peers ^a	3.01	0.60	3.12	0.65	-0.18	-1.57	<i>ns</i>	102
Preference of positively nominating peers	-0.08	0.80	0.09	0.75	-0.22	-1.43	<i>ns</i>	80
Impact of positively nominating peers	-0.26	0.98	-0.09	0.76	-0.19	-1.18	<i>ns</i>	80
Liking of positively nominating peers ^a	2.45	0.65	2.37	0.58	0.13	1.12	<i>ns</i>	114
Preference of negatively nominating peers	0.11	0.55	-0.27	0.80	0.55	4.32	<.001	99
Impact of negatively nominating peers	-0.14	0.57	0.03	0.84	-0.24	-1.87	<i>ns</i>	99
Liking of negatively nominating peers ^a	2.40	0.49	2.63	0.68	-0.39	-3.56	<.001	99

Note. ADHD = attention-deficit/hyperactivity disorder.

^a Higher scores indicate less liking.

Table 5
Multidimensional Categorization of Social Status of Participants With ADHD and Comparison Children

Category	Popular	Rejected	Neglected	Controversial	Average	Unclassified	Total
ADHD	5	86	2	4	11	57	165
Comparison	38	23	0	3	14	87	165

Note. $\chi^2(5, N = 330) = 70.49, p < .001$. ADHD = attention-deficit/hyperactivity disorder.

tures analyses of variance with ADHD status as a within-subjects factor and grade as a covariate. Only the Grade \times ADHD Status interactions were of interest to us in these analyses. The only significant Grade \times ADHD Status interaction was for impact scores of negatively nominated peers ($p = .015$), but it was nonsignificant after Bonferroni correction and, therefore, was not interpreted.

Supplementary comorbidity analyses. Given the high rates of comorbid ODD or CD and anxiety disorders in our sample (61% and 35%, respectively, as shown in Table 1), we ran post hoc analyses to rule out the possibility that the peer problems documented herein could be more strongly associated with one of these comorbid disorders than with ADHD. Specifically, within the ADHD subgroup, we compared children who had ODD or CD with children with neither ODD nor CD on all 19 variables and similarly compared children with anxiety disorder with those without any anxiety disorder. Of the 38 comparisons made, only 4 were significant at the $p < .05$ level: comorbid ODD-CD children had lower social preference and greater negative imbalance than ADHD children without ODD-CD, and they were overrepresented in the rejected social status group and underrepresented in the average group as classified according to Coie et al.'s (1982) procedures; those with comorbid anxiety had fewer dyadic friends than ADHD children without any anxiety disorder. Cohen's d effect sizes for the three noncategorical comparisons were uniformly small, ranging in magnitude from .35 to .40. (Effect sizes were not computed for the categorical comparison.) After applying the Bonferroni correction ($.05/19 = .0026$), however, none of these comparisons remained significant. Therefore, they were not considered further.

Discussion

The current findings provide evidence that children with ADHD, relative to comparison children, are impaired in their relationships with peers, both in terms of peer variables traditionally studied and those considered here for the first time. Children with ADHD were less socially preferred, had higher social impact, had fewer dyadic friends, and more often fell in the rejected social status category; of concern, 52% of all children with ADHD were of rejected status. They also had both less positive imbalance and greater negative imbalance relative to comparison children. However, we find it interesting that children nominated as friends and nonfriends by participants with ADHD were not different in valence from children chosen by comparison peers, suggesting that children with ADHD do not primarily like other rejected children and/or dislike popular peers. However, children with ADHD, relative to comparison peers, were nominated as nonfriends by children of higher social preference, suggesting that they are

disliked to a greater extent by more popular peers. These conclusions held for both boys and girls and did not appear to be because of common comorbidities associated with ADHD. The absence of Grade \times ADHD Status interactions suggested that these patterns were evident by the age of 7 years—the age of the youngest children in our sample.

These findings are of clinical concern and interest for several reasons. As mentioned at the outset of this article, variables derived from peer informant methodologies are valuable predictors of later adverse outcomes (for reviews, see the following studies: Parker & Asher, 1987; Parker, Rubin, Price, & DeRosier, 1995; Rubin, Bukowski, & Parker, 1998), suggesting they may serve as additional prognostic markers for children with ADHD. Our results indicate that impaired functioning with peers is established by early-to-middle elementary school in children with ADHD, is evident across multiple indices of peer functioning, and is unrelated to whom the children with ADHD choose as friends and nonfriends. Furthermore, more popular peers whose approval or disapproval is likely to be most influential in the peer group reported disliking children with ADHD to a greater extent, suggesting an additional obstacle that children with ADHD need to overcome in any attempts to improve their peer status.

Whereas prior work has provided evidence of impaired peer functioning in children with ADHD (for a review, see Mrug, Hoza, & Gerdes, 2001), this study provided several improvements over prior work, including a large sample size, inclusion of both boys and girls with ADHD, examination of common comorbidities in relation to these peer problems, and use of randomly selected same-sex peers from the same classrooms as comparison children. We find it important that the selection strategy for the comparison children provided a control for demographic and neighborhood factors that might have influenced our results, as well as for site differences among the three data collection locations. Because our comparison children were selected randomly and were not screened for any behavioral, psychological, or learning problems, it is likely that our results constitute an underestimate of differences that would have been found had a more stringent comparison group been used. As such, they indicate that cause for concern with respect to the peer-related problems of children with ADHD is well grounded.

This study also improved on prior work by providing a multi-level assessment of peer functioning, as theoretical writers such as Sullivan (1953) and Bronfenbrenner (1979) suggested should be done. Impairments were found at all levels of peer experience—the individual, the dyadic, and in terms of levels of imbalance. Results at the individual and dyadic levels are consistent with prior studies conducted to date (e.g., King & Young, 1981; Pelham & Bender, 1982). Results on the positive and negative imbalance scores

provide evidence for the first time with sociometrically derived variables that ratings of classmates provided by children with ADHD are not correspondent to others' ratings of them to the same degree as are comparison peers' ratings. This disjunction between ratings given and received is reminiscent of reports elsewhere showing poor correspondence between perceptions of competence in children with ADHD compared with parents' and teachers' perceptions (Hoza et al., 2004; Hoza, Pelham, Dobbs, Owens, & Pillow, 2002) and also of the parent-child relationship compared with parents' perceptions (Gerdes, Hoza, & Pelham, 2003). Although more research is needed, this suggests that sensitivity to and perception of others' attitudes, feelings, and views may be impaired in a general way in children with ADHD. Furthermore, our findings are only partially consistent with findings by Nangle et al. (1996), who reported that children tend to be liked by peers similar to themselves in social status and disliked by peers dissimilar to themselves. Specifically, we found that our children with ADHD, many of whom were rejected, were named as nonfriends by children of higher social preference than were comparison children, but there were no differences in the characteristics of the friends chosen by children with ADHD versus comparison children.

In reflecting on the meaning of these results, it may be that the tendency of children with ADHD to like the same kinds of children that others do at this age may be a mixed blessing. In particular, recent work (Mrug et al., 2004) with a school sample has shown that children may emulate peers they like the most and become more similar to them over time in their behaviors. Had we found that children with ADHD chose other disliked peers as friends, we might have expected these other peers to have similar negative behaviors, which may have worsened the problems of children with ADHD over time. Such an interpretation is consistent with the work of Dishion and colleagues who have argued that deviant peer association relates to outcomes such as adolescent substance use (Dishion et al., 1995) and to increases in delinquent and violent behavior (Dishion et al., 1997; Dishion et al., 1996). At the 7-9 year-old age range considered in this sample, we did not find evidence that self-aggregation of deviant peers was occurring.

At the same time, we need to draw the above conclusions with extreme caution. It is possible that as children with ADHD are thwarted in their attempts to become friends with more desirable peers, they will gravitate toward anyone willing to accept them. Clearly, children with ADHD were already ostracized by their peers at the age studied here, and it may be only a matter of time before such a process begins. It will be important to consider this possibility in future articles from this sample as this group of children is followed over time.

A point worthy of mention is the fact that the negative peer status of children with ADHD was already established by the age of 7 years. Indeed, prior writers (Price & Dodge, 1989) have heralded negative reputation as one of the primary obstacles to changes in peer status and have noted that reputations often persist even after negative behaviors have changed. They have gone so far as to suggest that intervention for peer problems, therefore, must address these reputational effects directly to be effective. However, the complexities and impracticalities involved in intervening with a deviant child's entire peer group have prevented this approach from taking hold. It will be important for researchers to find

a solution to this problem or, alternatively, an effective way to circumvent it.

One avenue that we have begun to investigate involves focusing on a perhaps more realistic goal than trying to change the child's entire peer group. In a prior article (Hoza, Mrug, Pelham, Greiner, & Gnagy, 2003), we reported on a preliminary attempt at a dyadic intervention, the goal of which was to help children with ADHD make at least one good friend. Because our work is very preliminary, and because this intervention has not yet been tested in a controlled trial comparing the treatment with its absence or with alternative treatments, however, we feel it would be premature to recommend it at this time.

Our findings were also consistent with some prior reports documenting that girls and boys with ADHD are similarly deficient in their social functioning (Gaub & Carlson, 1997). At the same time, however, we should acknowledge that our sample size for girls was rather small for most variables, ranging from approximately 16-35. In contrast, our sample size for boys ranged from 64-130. It is possible that our analyses lacked sufficient power to detect differences between boys and girls given our smaller sample of girls. Although this possibility should be investigated with larger samples of girls with ADHD, we believe it is important to proceed under the assumption that girls with ADHD are just as impaired in their peer relationships as are boys with ADHD.

Finally, our post hoc comorbidity analyses indicate that the peer problems observed in this sample cannot be explained solely by comorbid disorders such as ODD-CD or anxiety. Whereas the peer relationships of children with both ADHD and anxiety have not often (if ever) been studied, the results of comparisons of comorbid ODD-CD and noncomorbid children are consistent with previous literature that used nonclinical samples. Pelham and Bender (1982) analyzed the relationship between aggression and ADHD symptoms in a school sample and reported that high levels of ADHD behaviors were associated (independently of aggression) with items that tapped likeability and intrusiveness (e.g., class clown); these behaviors were highly associated with hyperactivity. Similarly, Atkins, Pelham, and Licht (1989) examined the unique associations between peer relations (using observations and sociometrics) and the dimensions of ADHD and aggression defined according to teacher ratings on the IOWA (Inattention Overactivity With Aggression) Conners Inattention/Overactivity (IO) and Aggression factors. They found that the IO dimension was uniquely associated with (a) both positive and negative nominations (name three liked/disliked classmates), (b) peer-reported likeability and withdrawal, and (c) playground observations of high activity (positive) and group play (negative). Furthermore, the peer-reported aggression factor was equally uniquely positively related to the IOWA IO and Aggression scores. Our data document similar relationships between ADHD behaviors and peer difficulties in a clinically diagnosed sample. It appears that the path to peer difficulties in children with ADHD is not only through comorbid aggression. One important implication for treatment is that improving peer relationships in children with ADHD needs to involve a collection of target behaviors much broader than aggressiveness.

Several limitations of our work deserve mention. As is typically the case with sociometric studies, only children whose parents gave active consent for participation took part in the sociometric procedures. Although this is considered the most ethical procedure

for collecting sociometric data from children, it does limit the pool of available nominees to a subgroup of the entire peer group. Furthermore, because nominations were limited to same-sex peers within each classroom, it is conceivable that children may have had same-sex friends in other classrooms or grades within the school, or even in their neighborhoods, that were not taken into account. It is also possible that the findings may have been somewhat different if combined-sex or opposite-sex measures had been used. Because most friendships form between same-sex peers at this age, however, it seems unlikely that results would have been dramatically different. Nonetheless, these design limitations should be considered in pondering the generalizability of our results, as they may have implications for the reliability and validity of our measures. Finally, it is unfortunate that we were only able to obtain data at baseline for 165 of the children with ADHD in the total MTA sample of 579. Had more complete data been obtained at baseline, greater possibilities in terms of longitudinal analyses could have been explored as this sample matures into adolescence and adulthood.

In closing, we reiterate our finding that children with ADHD were impaired across multiple aspects of peer functioning, relative to comparison peers. Given the well-established, predictive value of peer problems for maladaptation later in life, these findings are of clinical concern and suggest that these peer difficulties should be targeted in intervention efforts whenever they are present. We find it important that the current results also indicate a need for early intervention in the peer domain, given that the observed patterns of difficulty were well entrenched by early-to-middle elementary school.

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