Methodological Issues in the Use of Peer Sociometric Nominations with Middle School Youth

François Poulin and
Université du Québec à Montréal

Thomas J. Dishion
University of Oregon

Abstract

Studies reporting sociometric assessments based on nominations have been characterized by important methodological inconsistencies when conducted in the middle school context. The purpose of this study was to examine (1) the possibility of a response bias when participants are provided with a long roster sorted alphabetically, (2) the impact of including or not other-sex peers in the voting population, and (3) the impact of including or not all the grademates in the voting population. Participants were 664 sixth graders from three middle schools. Peer nominations for sociometric items (i.e., *like most* and *like least*), as well as teacher ratings of antisocial behavior and records of academic performance, were collected. A sequence effect in peer nominations was found, suggesting that students whose names were listed higher on the rosters received more nominations than did students whose names were listed lower on the list. Moreover, results indicated that the nominations received from the other-sex grademates and from the grademates outside the classroom improved the predictive validity of the sociometric measure. The implications of these results for the use of sociometric assessment in middle schools are discussed.

Keywords

sociometric; peer nominations; early adolescence; assessment

Introduction

The construct of sociometric peer status has been extensively studied during childhood and, to a lesser extent, during adolescence. The most widely used method to measure sociometric status is peer nomination, in which the participant is asked to nominate peers he or she likes most or likes least. In the past decade, a growing number of researchers have sought to understand peer relations in adolescence (Brown, 2004). Accordingly, sociometric nominations methods used in elementary schools had to be adapted to the logistics of the middle school, where important structural changes occur in the peer environment. These new research questions raise new methodological challenges. The general goal of this study was to examine methodological issues when sociometric peer nominations are used with middle school youth.

The measurement of sociometric peer status is based on liking (e.g., acceptance) and disliking (e.g., rejection) peer nomination items (Coie & Dodge, 1983; Newcomb & Bukowski, 1983).

The nominations received are counted, and the resulting scores can be used to create sociometric categories (rejected, popular, controversial, neglected, and average) or a continuous index of peer status (acceptance, rejection, social preference). Continuous indexes are more stable (Jiang & Cillessen, 2005) and can be used more easily in advanced statistical techniques such as structural equation modeling (Cillessen & Mayeux, 2004). The social preference index (acceptance minus rejection nominations received) is generally used to summarize youth's peer status (Coie, Dodge, & Coppotelli, 1982; Newcomb & Bukowski, 1983).

Sociometric peer status has received considerable attention in developmental psychology because it can be predictive of adaptive and maladaptive outcomes in both social (Parker, Rubin, Erath, Wojslawwowicz, & Buskirk, 2006) and academic domains (Véronneau & Vitaro, 2007). In early adolescence, sociometric peer status is correlated with behavioral and academic dimensions. For example, social preference is negatively associated with antisocial behavior (Coie & Dodge, 1998), although this relationship tends to decline later in adolescence (Cillessen & Mayeux, 2004), and is positively associated with academic performance in middle school (Wentzel & Caldwell, 1997; Wentzel, 1991, 2003).

Researchers who want to use peer nominations to assess sociometric status in the middle school setting must make decisions about the administration of the measure. One decision concerns the stimulus (i.e., the questions) used to solicit the sociometric nominations. The questions could be either general (not referring to a specific situation; e.g., Who do you like the most?) or situation specific (referring to a specific peer context; e.g., Who do you like to play with? Who do you want to sit next to in a bus?). In studies conducted among preadolescents and adolescents, general nominations seem more appropriate given that youth generally understand the concept of *liking*. In any case, Jiang and Cillessen (2005) found in a meta-analysis that the wording of the sociometric questions did not affect the stability of sociometric scores.

A second methodological decision concerning peer nomination methods is whether choices should be unlimited or limited. The unlimited nominations procedure has been found to produce a more reliable and valid assessment of sociometric peer status than has the limited nominations approach (Terry, 2000).

A third methodological issue concerns the procedure used to collect the nominations. Two strategies are most commonly used. In the first, participants are asked to list the names of their nominations for each sociometric question. The strength of this procedure is that it is based on participants' free recall of sociometric preferences. On the other hand, writing the names is time consuming for participants. Moreover, it can artifactually reduce the number of choices given because of fatigue and frustration with the task. In the second strategy, participants are provided with an alphabetized roster and are asked to indicate (e.g., check, cross, circle) their nominations on that list. This procedure has the advantage of saving time and making the task easier for the participants. However, it could potentially produce response bias, especially when the roster contains a large number of names. For example, a student could be nominated more often by peers simply because his or her name is at the top of the list. To our knowledge, this potential assessment problem has never been carefully examined, even though rosters are widely used in this field of research (Cillessen & Bukowski, 2000).

This assessment problem could also contaminate other peer nomination instruments designed to measure various dimensions of social behavior, friendships, or social networks. Social behaviors such as aggression or prosocial behavior are assessed either by using scales that combine several peer nomination items (e.g., Masten, Morison, & Pellegrini, 1985; Pekarik, Prinz, Liebert, Weintraub, & Neale, 1976) or by using a specific single item (Coie & Dodge, 1983). Best-friend relationships or acquaintances could also be identified using participants'

nominations of their best friends or the people they 'hang out with'. Given that these nomination procedures are often based on rosters, the possibility of a response bias is also likely to apply, especially when the roster contains a large number of names.

Fourthly, a key feature in the administration of sociometric nominations is the specification of a *voting population*. The specification of an appropriate voting population is critical because peer status is conceptualized as a group-referent construct reflecting the relationship between the individual youth and the group in which the relationship is being assessed (Coie & Cillessen, 1993). Several types of voting populations have been discussed in the literature, and its specification should be guided by the investigators' research purpose. For example, sociometric nominations have been conducted in various naturally occurring social environments such as summer camp (Parker & Seal, 1996; Wright, Giammarino, & Parad, 1986), organized leisure activities (Durrant & Henggeler, 1987), or in atypical peer groups such as clinical settings (Zakriski & Prinstein, 2001). Nomination procedures have also been applied to experimentally created social environments such as contrived play groups (Coie & Kupersmidt, 1983; Dodge, 1983) or group-based interventions (the FAST Track Program).

Most of the studies that have used sociometric nominations have been conducted in the school setting, where children spend a substantial part of their time and are exposed to a stable peer group. In elementary school, children are confined to a stable classroom where they interact with their classmates for several hours each weekday for nine months. Given the importance of this context in children's social life, it is not surprising that most of the research using sociometric nominations has used the classroom as a voting population.

Once youth have moved from self-contained elementary school classrooms to middle schools, they have contact with a greater number of peers during the course of a day. The classroom organization is less stable, and in several instances youth rotate through a schedule of classes with different configurations of students. A standard group of classmates cannot be identified in several middle schools. Moreover, in some middle schools, students do not necessarily come in contact with all their grademates, resulting in varying degrees of familiarity with peers. Thus, the structure of the middle school poses a serious challenge for the specification of an appropriate voting population (Inderbitzen, 1994). A review of studies using sociometric nominations in middle or high school revealed a clear inconsistency regarding the specification of a voting population. Specifically, the following voting populations have been used: the classroom (also referred to as team class, home room, or academic team, with a lot of variation in size; Borelli & Prinstein, 2006; Frentz, Gresham, & Elliot, 1991; Hatzichristou & Hopf, 1996; Wertheimer, 1957); the classroom, but only same-sex classmates (Parkhurst & Asher, 1992; Parkhurst & Hopmeyer, 1998); the grade level (Cillessen & Mayeux, 2004; Coie et al., 1982; Coie, Terry, Zakriski, & Lochman, 1995; Prinstein & Aikins, 2004); the grade level, but only the same-sex grademates (Bishop & Inderbitzen, 1995; Inderbitzen, Walters, & Bukowski, 1997; Munsch & Kinchen, 1995); or even the entire school (Franzoi, Davis, & Vasquez-Suson, 1994). These various voting populations differ in term of size, frequency of contacts among youth, and inclusion or not of other-sex peers. These inconsistencies in methodologies make it difficult to compare findings across studies.

Surprisingly, the implications of these inconsistencies have not been thoroughly investigated. Two levels of variation in the specification of a voting population are especially relevant: (1) the inclusion or not of other-sex peers, and (2) the inclusion or not of all the grademates. From a simple psychometric standpoint, a larger voting population (i.e., the entire grade level, both genders) should increase the reliability of the sociometric scores. But aside from the psychometric argument, the inclusion of same-sex and other-sex peers, as well as all the grademates in the voting population, has conceptual implications. The structural difference in the middle school system, as well as the beginning of sexual maturation, reorganize the nature

of the relationships between boys and girls (Maccoby, 1998). For example, youth behavior might become more sensitive to approval/disapproval from other-sex peers. Moreover, the middle school classroom is not a significant peer group with clear boundaries as was the elementary school classroom. Students might become more sensitive to approval/disapproval from their larger peer environment. Studies have shown that classroom arrangement and schools' organization can have an impact on students' peer relations (Babad & Ezer, 1993; Epstein, 1983, 1989; Hallinan & Smith, 1989).

These variations in the specification of the voting population might present important implications for the study of early adolescents' peer status. For instance, a central objective described in the peer relation literature is to determine the behavioral or cognitive dimensions associated with a positive or a negative peer status (Asher & Coie, 1990; Cillessen & Mayeux, 2004). Research conducted with children showed that the relationships between peer status and behavior vary according to the composition of the group in which peer status has been assessed (Boivin, Dodge, & Coie, 1995; Stormshak, Bierman, Bruschi, Dodge, & Coie, 1999; Wright et al., 1986). Consequently, any variations in the specification of a voting population for sociometric nominations might affect the findings about the relationship between behavior (or any other relevant dimensions) and peer status, causing the findings to be unstable from one study to another. The impact of these variations when sociometric nominations are conducted in middle school thus deserve careful attention.

The Present Study

In this study, we propose a procedure to measure sociometric status in middle school on the basis of nominations and specifically investigate three of the methodological issues raised earlier in this article. Firstly, the possibility of a response bias when participants are provided with a long roster that was sorted alphabetically was examined. This response bias, or sequence effect, would result in a significant relationship between the order on the list and the number of nominations received (i.e., more nominations for the names at the top of the list). Besides sociometric items (e.g., *like least* (LL) and *like most* (LM)), this potential response bias was also examined when peer nominations were used to assess social behavior, best friendships, and acquaintances.

Secondly, the effect of a variation in the specification of a voting population on the relationships between sociometric status and adolescents' functioning was examined. This variation concerns the inclusion or not of other-sex peers in the voting population. Specifically, the relationships between adolescents' functioning and sociometric status (1) among same-sex peers, and (2) among other-sex peers were examined. Because of the decline in gender segregation in early adolescence, it was expected that status among other-sex peers will have a unique relationship with adolescents' functioning, after controlling for status among same-sex peers. In this study, adolescents' antisocial behavior and academic achievement were chosen as indicators of functioning because their concurrent relationships with sociometric status have been documented in many studies (Cillessen & Mayeux, 2004; Véronneau & Vitaro, 2007).

Thirdly, another type of variation in the specification of a voting population was also investigated: the inclusion or not of all the grademates in the voting population. The relationships between adolescents' functioning and sociometric status (1) among the classroom peers only, and (2) among the grademates outside the classroom, were examined. It was hypothesized that these relationships would vary depending on the classroom organization of the middle schools. Specifically, in middle schools where students spend a lot of their school time interacting with their classmates, the grade-mates outside the classroom would be less meaningful for the measurement of sociometric status. This would translate into an absence of a unique relationship between sociometric status among the grademates outside the classroom

and adolescents' functioning. Conversely, in middle schools where students switch classes frequently and do not spend a significant amount of school time with a stable group of classmates, the grademates outside the classroom would be more relevant for the measurement of their sociometric status. This would result in a significant and unique relationship between sociometric status among the grademates outside the classroom and adolescents' functioning, after controlling for status among classroom peers only.

The study was conducted in three middle schools with grade 6 students, and identical procedures were used. The three schools varied in the amount of school time students spent with their classmates (significantly more time in one school compared with the others), and all of them enrolled boys and girls. These features gave us an opportunity to examine the impact of variations in the specification of a voting population. A general formulation (e.g., Who do you like the most/least?) and an unlimited nomination procedure (Terry, 2000) were used to collect sociometric nomination items. Social behaviors, best friendships, and acquaintanceship items were also included in the peer nominations assessments.

Method

Participants

Participants comprised 664 sixth grade students (346 boys and 318 girls; mean age = 11 years) from three middle schools in a high-risk urban area of the Pacific Northwest. Parents provided written consent for their child's participation. Approximately 93 percent of the available student population participated in this study. Among them, 190 were in School A, 274 in School B, and 200 in School C. In each school, students were assigned to a classroom of between 20 and 30 students. Students in School A spent significantly more school time with their classmates, whereas in Schools B and C the classes changed frequently. This sample was primarily European American (58 percent) and African-American (40 percent).

Measures

Peer Nominations—Each participant received a set of rosters containing the names of all their grademates. The number of students on each list was 216 for School A, 317 for School B, and 230 for School C. Names were sorted alphabetically by first name to make it easier for the participants to find their choices. The names were printed in multiple columns on an 8×14-inch computer-readable sheet of paper, and a separate page was generated for each nomination question. The sociometric questions were printed on the top of each roster, and participants were asked to fill in the bubble next to each of their choices.

Two sociometric questions were used to measure peer status: 'Who do you like the least?'(LL); 'Who do you like the most?'(LM). Participantswere also asked to nominate grademates for three behavioral descriptors commonly used in the peer relations literature (starts fights, co-operates, hangs around with kids who get in trouble; Coie & Dodge, 1998). They were also instructed to nominate grademates for a best-friendship question ('Who are your three best friends?') and for an acquaintanceship question ('Who do you hang around with?'). Unlimited nominations were used (except for the 'three best friends'), allowing both same- and other-sex nominations. Self-nominations were not allowed. For analytical purposes, students on the list were later assigned a sequence number corresponding to their position on the list:The student at the top of the list was assigned number 1, the following student number 2, and so on.

For the behavioral descriptors and the acquaintanceship and friendship items, the number of nominations received from all the grademates was counted. For the LL and LM items, the number of nominations received from all the grademates was counted, along with the number received from specific voting subgroups; specifically, the number of nominations received

from (1) same-sex grademates, (2) other-sex grademates, (3) classmates (e.g., peers of the same classroom), and (4) grademates outside the classroom (e.g., grademates excluding peers from the same classroom). These scores were then standardized within each reference group.

For each of these voting subgroups, the LL and LM items were used to create the social preference index by subtracting LL score from the LM score, according to the procedure developed by Coie and Dodge (1983). The social preference index was used in several of the analyses.

Antisocial Behavior—Teacher ratings of antisocial behavior were collected for each youth. The teacher risk perception (Soberman, 1994) provides a brief single-sheet instrument with which a teacher may quickly evaluate the risk status of all students in the class. Areas of risk assessment include classroom behavior, tobacco use, involvement with troublesome or substance-using peers, and so forth. Teachers provide their ratings on a 1–5 Likert scale. Ten items were summed to form a teacher report of antisocial behavior (Cronbach's alpha = .91). Teachers have been found to be reliable informants regarding youth externalizing problems (Achenbach, McConaughy, & Howell, 1987; Stanger & Lewis, 1993), and a significant relationship between teacher-rated antisocial behavior and peer status has been reported in many studies (for a review see Cillessen & Mayeux, 2004; Coie & Dodge, 1998).

Academic Performance—School records were reviewed at the end of the school year. Grade point average (GPA) was calculated as the mean of the students' five academic-course grades, with a possible range of .0 to 4.0.

Procedures

Participants were assessed as part of a larger longitudinal study of the evaluation of a school-based substance abuse prevention program. The data used in the present study were collected before the implementation of the intervention (e.g., baseline). Participants took part in two 45-minute assessment sessions in the classroom. During the first session, students completed a survey about their lifestyle, family relationships, and community involvement. The data collected in that survey are not analyzed in this article. The sociometric nominations were conducted during the second assessment session. For each session, two to four research assistants were present to give directives and answer students' questions. Students received $20 in compensation for completing the two assessment sessions. The teachers were asked to complete a questionnaire for each participating student in their core classroom (an average of 25 students per teacher). Teachers received $8 per student for completing the assessment. The entire assessment for all three middle schools was completed during the month of March. These procedures were reviewed and approved by the Institutional Review Board at the second author's university and the school district administration of the participating schools.

Results

The Sequence Effect

Pearson's correlations were computed between each student's position on the roster and the number of nominations received for each peer nomination item. These correlations are presented in Table 1. A negative correlation was observed for the LL and LM items. Specifically, the higher a student's name on the roster, the more nominations received. The magnitude of the correlations suggests that the response bias was more pronounced for the LL item compared with the LM item. The three behavioral items were also subject to the same response bias, as revealed by the negative correlations. The correlation analyses were non-significant for the best friendships and the acquaintanceship items, indicating that the number of nominations received for these items was not related to the position on the rosters. Overall,

even though they were significant for several items, the size of the effects remains relatively modest.

To statistically correct for this response bias, the position variable was regressed against the number of nominations received, and the residual was saved. The residual reflects the number of nominations received once the variability explained by the student's position on the roster is partialled out. This correction was applied for the LL and LM items, and the corrected scores were used in subsequent analyses.

Variations in the Voting Population: Same-sex and Other-sex Nominations

Firstly, we looked at the proportion of nominations received from the same-sex grade-mates vs. those received from the other-sex grademates. These proportions were computed for the LL and LM items. For LL, 48 percent of the nominations were received from other-sex grademates, and for LM, the proportion was 16 percent. Thus, even though youth received a majority of their nominations from same-sex grademates, a substantial proportion also came from their other-sex grademates, especially for the LL item. The correlation between the number of nominations received from same-sex grademates and those received from other-sex grademates was .54 for LL and .58 for LM. Thus, these two groups of grademates agreed significantly in terms of who they liked or disliked. However, the moderate size of the correlations suggests that nominations received from other-sex grademates might bring in unique information.

In the next analysis, correlations between social preference based on same-sex nominations (same-sex SP) vs. social preference based on other-sex nominations (other-sex SP) and adolescent adjustment (i.e., antisocial behavior and academic performance) were computed. For this analysis, the social preference index was chosen for parsimony (instead of examining LL and LM separately) and because it is common in the literature to use it as an indicator of sociometric peer status. These correlations are presented in Table 2.

The two social preference scores were negatively correlated with antisocial behavior and positively correlated with academic achievement. In order to verify if other-sex SP brings in unique information, partial correlations were also computed between other-sex SP and adolescents' adjustment, controlling for same-sex SP. Partial correlation allowed us to evaluate the extent to which the unique variance (i.e., the residual variance) showed significant relations with adolescents' adjustment. These correlations are presented in parentheses in Table 2. Following the computation of partial correlations, other-sex SP remained significantly (and negatively) associated with antisocial behavior. However, the correlation with academic achievement became non-significant.

Variations in the Voting Population: Nominations of Classmates and of Grademates Outside the Classroom

Firstly, we looked at the proportion of nominations received from the classmates and those received from the grademates outside the classroom. We considered these proportions within each school because, as mentioned previously, the classroom arrangement was different across the three schools. These proportions were computed for the LL and LM items. For LL, 19 percent of the nominations were received from the classmates in School A, 8 percent in School B, and 11 percent in School C. For LM, these proportions were 21 percent in School A, 7 percent in School B, and 9 percent in School C. The higher proportions observed in School A could be explained by the larger amount of time spent with classmates in this school. The correlation between the number of nominations received from the classmates and those received from the grademates outside the classroom were .39 for LL and .51 for LM for the entire sample. Thus, these two groups tended to agree regarding who they liked or disliked.

However, the moderate size of the correlations suggests that nominations received from grademates outside the classroom might bring in unique information.

In the next analysis, correlations between (1) social preference based on nominations received from classroom-only (in-class SP) vs. social preference based on nominations received from grademates outside the classroom (out-class SP) and (2) adolescent adjustment (i.e., antisocial behavior and academic performance) were computed. These correlations were computed separately for each school and are presented in Table 3.

In School A, in-class SP was not correlated with antisocial behavior, but was positively correlated with academic performance, whereas out-class SP was negatively correlated with antisocial behavior and positively correlated with academic performance. In School B, in-class SP was not correlated to any variables, whereas out-class SP was negatively correlated with antisocial behavior and positively correlated with academic performance. Finally, in School C, in-class SP was negatively correlated with antisocial behavior but not correlated with academic performance, whereas out-class SP was negatively correlated with antisocial behavior and positively correlated with academic performance.

To verify if out-class SP brings in unique information, partial correlations were also computed between out-class SP and adolescents' adjustment, controlling for in-class SP. Partial correlations are presented in parentheses in Table 3. In School A, following the computation of partial correlations, the relations between out-class SP and adolescents' adjustment became non-significant. In School B and School C, these correlations remained significant.

Discussion

This study addressed three specific methodological issues in the use of sociometric peer nominations with middle school youth. Firstly, we examined whether sociometric peer nominations (e.g., LL and LM) could be biased when the assessment is based on the use of long rosters on which the names of the students are alphabetized. Because peer nomination methods are often used to assess other dimensions, this potential response bias was also examined for social behavior, best friendships, and acquaintanceship questions. Secondly, we investigated the impact of including or not other-sex peers in the voting population on the relationships between sociometric status and adolescents' behavioral and academic functioning. Thirdly, we also investigated the effect of including or not all the grademates in the voting population on these relationships.

Method Bias in Sociometric Peer Nominations

We found that the use of long rosters in sociometric peer nominations induced a bias in students' responses. This is an important finding given the amount of research that relies on similar procedures. Specifically, the number of nominations received varied as a function of the position of a student's name on the list. Students whose names were higher on the list received more nominations than did students whose names were lower on the list. Interestingly, this response bias was clearly more pronounced for the rejection item (like least) than for the acceptance item (like most). Moreover, there was no response bias for the friendship and the acquaintanceship items. These findings suggest that youth are more conscientious and attentive when nominating their best friends and acquaintances than they are when completing nominations that involve other students in the grade as a whole. Overall, it seems that participants were completing the nomination task more carefully when the questions involved a positive affective relationship between them and the nominees. Disliking peers might not be as salient in the youth mind as liking is. Perhaps youths might be uncomfortable with sociometric questions about whom they dislike, thus they complete the task in a more expeditious way. Finally, a significant relationship was also observed between the number of

nominations received for behavioral descriptors and the position on the list. This is important given that measurement of constructs, such as social behavior or peer-perceived popularity in adolescence, is often based on peer nomination methods (Cillessen & Mayeux, 2004; Vaillancourt & Hymel, 2007).

When asked to do the peer nomination task, two different strategies could have been used by the students to achieve this task. Firstly, after reading the nomination question, they may have gone through all the names, one by one, and decided whether or not the student corresponded to the sociometric question (or behavioral description). The relationship between position on the list and number of nominations received suggests that some participants might have used this approach. The lists contained more than 200 names; we deduced that after a while, students might have become tired of doing the task or may have realized time was running out and turned to the next page. A second strategy might have been that, after reading the nomination question, students thought about their choices and then looked for those names on the list. This was the desired option. As mentioned previously, the list of names was provided only to ease the participants' task (filling in a bubble instead of writing down names of the chosen peers).

How can we solve this measurement problem? In our study, we statistically corrected for this response bias by partialling out of the number of nominations received the variance explained by the position on the list. Other procedures could also be implemented. For instance, participants should be given clear instructions. They should be specifically instructed to read each nomination question, consider the peers in their grade who fit the description, look for those peers' names on the alphabetized roster, and fill in the bubble (circle) next to their names (Cillessen & Mayeux, 2004). Another alternative strategy to control for possible effects of alphabetization on nominee selection would be to counterbalance the order of names on the rosters (Borelli & Prinstein, 2006; Prinstein & Cillessen, 2003; Wang, Houshyar, & Prinstein, 2006). Moreover, given that a peer nomination task with several questions could be tiring for participants, especially when long rosters are used, the order of the questions should also be counterbalanced. Another option put forward by researchers is to limit the size of the rosters to a maximum of 30 to 50 names by generating random lists of peers for each participant to evaluate. However, this procedure might be more appropriate for peer ratings and peer nominations for behavior or perceived popularity rather than for sociometric assessment (Parkhurst & Asher, 1992; Rose, Swenson, & Waller, 2004; Schwartz, Gorman, Nakamoto, & McKay, 2006; Wentzel, 2003). The impact of these different procedures for response bias should be investigated in future studies.

The Voting Population

The second and third methodological issues addressed in this study pertains to the specification of an appropriate voting population when conducting sociometric nomination in the middle school context. Our analysis of the nominations received from the same-sex grademates vs. those received from the other-sex grademates revealed that half of the nominations for rejection (like least) and more than 16 percent for acceptance (like most) were given by other-sex peers. This finding is consistent with what was reported in other studies with the same age group (Card, Hodges, Little, & Hawley, 2005) and reflects the fact that gender segregation is still very salient in early adolescence. However, the correlational analyses suggest that these other-sex nominations might bring in unique information. Indeed, we found that other-sex social preference was significantly (and negatively) related with antisocial behavior even when same-sex social preference was partialled out. This effect was not found for academic performance, which was mainly associated with same-sex social preference.

Similar analyses were also conducted to examine the impact of including or not including all the grademates in the voting population for sociometric nominations. The relevance of this question is based on the fact that in the majority of middle schools, students do not interact

exclusively with classmates as was the case in elementary schools, but they are likely to switch classes frequently and interact with a much larger numbers of peers. However, there might be variations from one middle school to another regarding classroom arrangement. In fact, in one of the schools in our sample, students spent significantly more time with their classmates than did students in the other two schools. When we looked at the proportion of like least/most nominations received from classmates only vs. those received from the rest of the grademates, we found a pattern of results for the first school that was different from that of the other two. Specifically, a larger proportion (twice as many) of like least/most nominations came from the classmates in the first school than from the two other schools, suggesting that the school's classroom organization might have an impact on students' social preference. Even more interesting, the pattern of the relationships between social preference in the classroom vs. in the rest of the grade level and adolescent adjustment was also different in the first school compared with the other schools. In the first school, social preference among grademates outside the classroom did not share a unique portion of variance with adolescent adjustment, but it did so substantially in the two other schools. This outcome suggests that grade level constitutes a more significant voting population in these two schools that was not necessarily the case for the first school. These findings suggest that if sociometric nominations were conducted only among the classmates in these two schools, one would have missed important information and run the risk of erroneous conclusions regarding the contribution of sociometric social preference to adolescent adjustment.

An important limitation of this investigation is that the dimensions under study were not experimentally manipulated. We did not directly compare the use of short vs. long rosters to determine the threshold before a response bias begins. Moreover, the various voting populations were not experimentally manipulated; we did not directly compare schools where the sociometric voting population would include same-sex peers only with other schools where both genders would be included, or schools where sociometric nominations would be restricted to the classrooms vs. being open to all grade levels. Such manipulations would allow us to clarify the methodological problems that were detected in the present study. Finally, in addition to variations between middle schools in North America, future studies should also consider cross-cultural issues in sociometric assessment. For example, unlike in North America, early adolescents in Western Europe spend the majority of their school time in classroom groups instead of larger grades (see, e.g., recent work by De Bruyn and Cillessen, 2006, in The Netherlands or Kiesner and Pastore, 2005, in Italy).

Acknowledgments

References

Achenbach TM, McConaughy SH, Howell CT. Child/adolescent behavioral and emotional problems: Implications of cross-information correlations for situational specificity. Psychological Bulletin 1987;101:213–232. [PubMed: 3562706]

Asher, SR.; Coie, JD. Peer rejection in childhood. Cambridge: Cambridge University Press; 1990.

Babad E, Ezer H. Seating locations of sociometrically measured student types: Methodological and substantive issues. British Journal of Educational Psychology 1993;63:75–87.

Bishop JA, Inderbitzen HM. Peer acceptance and friendship: An investigation of their relation to self-esteem. Journal of Early Adolescence 1995;15:476–489.

Boivin M, Dodge KA, Coie JD. Individual–group behavioral similarity and peer status in experimental play groups of boys: The social misfit revisited. Journal of Personality and Social Psychology 1995;69:269–279. [PubMed: 7643305]

Borelli JL, Prinstein MJ. Reciprocal, longitudinal associations among adolescents' negative feedback-seeking, depressive symptoms, and peer relations. Journal of Abnormal Child Psychology 2006;34:159–169. [PubMed: 16557357]

Brown, BB. Adolescents' relationships with peers. In: Lerner, R.; Steinberg, L., editors. The handbook of adolescent psychology. New York: Wiley; 2004. p. 363-396.

Card NA, Hodges EVE, Little TD, Hawley PH. Gender effects in peer nominations for aggression and social status. International Journal of Behavioral Development 2005;29:146–155.

Cillessen, AH.; Bukowski, WM. Recent advances in the measurement of acceptance and rejection in the peer system. San Francisco, CA: Jossey-Bass; 2000.

Cillessen AH, Mayeux L. From censure to reinforcement: Developmental changes in the association between aggression and social status. Child Development 2004;75:147–163. [PubMed: 15015681]

Coie JD, Cillessen AHN. Peer rejection: Origins and effects on children's development. Current Directions in Psychological Science 1993;2:89–92.

Coie, JD.; Dodge, KA. Aggression and antisocial behavior. In: Damon, W.; Eisenberg, N., editors. Handbook of child psychology: Vol 3. Social, emotional, and personality development. 3rd ed.. New York: Wiley; 1998. p. 779-862.

Coie JD, Dodge KA. Continuities and changes in children's social status: A five-year longitudinal study. Merrill–Palmer Quarterly 1983;29:261–282.

Coie JD, Kupersmidt JB. A behavioral analysis of emerging social status in boys' groups. Child Development 1983;54:1400–1416.

Coie JD, Dodge KA, Coppotelli H. Dimensions and types of social status: A cross-age perspective. Developmental Psychology 1982;18:557–570.

Coie, JD.; Terry, R.; Zakriski, A.; Lochman, J. Early adolescent social influence on delinquent behavior. In: McCord, J., editor. Coercion and punishment in long-term perspectives. New York: Cambridge University Press; 1995. p. 229-244.

De Bruyn EH, Cillessen AHN. Popularity in early adolescence: Prosocial and antisocial subtypes. Journal of Adolescent Research 2006;21:607–627.

Dodge KA. Behavioral antecedents of peer social status. Child Development 1983;54:1386–1399.

Durrant NC, Henggeler SW. The stability of peer sociometric ratings across ecological settings. The Journal of Genetic Psychology 1987;147:353–358.

Epstein, JL. Selection of friends in differently organized schools and classroom. In: Epstein, JL.; Karweit, W., editors. Friends in schools. NewYork: Academic Press; 1983. p. 73-92.

Epstein, JL. The selection of friends: Changes across the grades and in different school environments. In: Berndt, TJ.; Ladd, GW., editors. Peer relationships and child development. New York: Wiley; 1989. p. 158-187.

Franzoi SL, Davis MH, Vasquez-Suson KA. Two social worlds: Social correlates and stability of adolescent status groups. Journal of Personality and Social Psychology 1994;67:462–473. [PubMed: 7965601]

Frentz C, Gresham FM, Elliot SN. Popular, controversial, neglected, and rejected adolescents: Contrasts of social competence and achievement differences. Journal of School Psychology 1991;29:109–120.

Hallinan MT, Smith SS. Classroom characteristics and student friendship cliques. Social Forces 1989;67:898–919.

Hatzichristou C, Hopf D. A multiperspective comparison of peer sociometric status groups in childhood and adolescence. Child Development 1996;67:1085–1102. [PubMed: 8706511]

Inderbitzen, HM. Adolescent peer social competence: A critical review of assessment methodologies and instruments. In: Ollendick, TH.; Prinz, RJ., editors. Advances in clinical child psychology. Vol. Vol. 16. New York: Plenum; 1994. p. 227-259.

Inderbitzen HM, Walters KS, Bukowski AL. The role of social anxiety in adolescent peer relations: Differences among sociometric status groups and rejected subgroups. Journal of Clinical Child Psychology 1997;4:338–348. [PubMed: 9418172]

Jiang XL, Cillessen AHN. Stability of continuous measures of sociometric status: A meta-analysis. Developmental Review 2005;25:1–25.

Kiesner J, Pastore M. Differences in the relations between antisocial behavior and peer acceptance across contexts and across adolescence. Child Development 2005;76:1278–1293. [PubMed: 16274440]

Maccoby, EE. The two sexes: Growing up apart, coming together. Cambridge, MA: Harvard University Press; 1998.

Masten AS, Morison P, Pellegrini DS. A revised class play method of peer assessment. Developmental Psychology 1985;21:523–533.

Munsch J, Kinchen KM. Adolescent sociometric status and social support. Journal of Early Adolescence 1995;15:181–202.

Newcomb AF, Bukowski WM. Social impact and social preference as determinants of children's peer group status. Developmental Psychology 1983;19:856–867.

Parker JG, Seal J. Forming, losing, renewing, and replacing friendships: Applying temporal parameters to the assessment of children's friendship experiences. Child Development 1996;67:2248–2268.

Parker, JG.; Rubin, KH.; Erath, SA.; Wojslawwowicz, JC.; Buskirk, AR. Peer relationships, child development, and adjustment: A developmental psychopathology perspective. In: Cicchetti, D.; Cohen, DJ., editors. Developmental psychopathology. 2nd ed.. Hoboken, NJ: John Wiley & Sons, Inc.; 2006. p. 419-493.

Parkhurst JT, Asher SR. Peer rejection in middle school: Subgroup differences in behavior, loneliness, and interpersonal concerns. Developmental Psychology 1992;28:231–241.

Parkhurst JT, Hopmeyer A. Sociometric popularity and peer-perceived popularity: Two distinct dimensions of peer status. Journal of Early Adolescence 1998;18:125–144.

Pekarik EG, Prinz RJ, Liebert DE, Weintraub S, Neale JM. The Pupil Evaluation Inventory: A sociometric technique for assessing children's social behavior. Journal of Abnormal Child Psychology 1976;4:83–97. [PubMed: 773996]

Prinstein MJ, Aikins JW. Cognitive moderators of the longitudinal association between peer rejection and adolescent depressive symptoms. Journal of Abnormal Child Psychology 2004;32:147–158. [PubMed: 15164857]

Prinstein MJ, Cillessen AHN. Forms and functions of adolescent peer aggression associated with high levels of peer status. Merrill–Palmer Quarterly 2003;49:310–342.

Rose AJ, Swenson LP, Waller EM. Overt and relational aggression and perceived popularity: Developmental differences in concurrent and prospective relations. Developmental Psychology 2004;40:378–387. [PubMed: 15122964]

Schwartz D, Gorman AH, Nakamoto J, McKay T. Popularity, social acceptance, and aggression in adolescent peer groups: Links with academic performance and school attendance. Developmental Psychology 2006;42:1116–1127. [PubMed: 17087546]

Soberman, L. Psychometric validation of a brief teacher screening instrument. Eugene: University of Oregon; 1994. Unpublished doctoral dissertation

Stanger C, Lewis M. Agreement among parents, teachers, and children on internalizing and externalizing behavior problems. Journal of Clinical Child Psychology 1993;22:107–115.

Stormshak EA, Bierman KL, Bruschi C, Dodge KA, Coie JD. The relation between behavior problems and peer preference in different classroom contexts. Child Development 1999;70:169–182. [PubMed: 10191521]

Terry, R. Recent advances in measurement theory and the use of sociometric techniques. In: Cillessen, AHN.; Bukowski, WM., editors. Recent advances in the measurement of acceptance and rejection in the peer system. San Francisco, CA: Jossey–Bass; 2000.

Vaillancourt T, Hymel S. Aggression and social status: The moderating roles of sex and peer-valued characteristics. Aggressive Behavior 2007;32:396–408.

Véronneau M-H, Vitaro F. Social experience with peers and high school graduation: A review of theoretical and empirical research. Educational Psychology 2007;27:419–445.

Wang SS, Houshyar S, Prinstein MJ. Adolescent girls' and boys' weight-related health behaviors and cognitions: Associations with reputation- and preference-based peer status. Health Psychology 2006;25:658–663. [PubMed: 17014285]

Wentzel KR. Relations between social competence and academic achievement in early adolescence. Child Development 1991;62:1066–1078. [PubMed: 1756656]

Wentzel KR. Sociometric status and adjustment in middle school: A longitudinal study. Journal of Early Adolescence 2003;23:5–28.

Wentzel KR, Caldwell K. Friendships, peer acceptance, and group membership: Relations to academic achievement in middle school. Child Development 1997;68:1198–1209. [PubMed: 9418234]

Wertheimer RR. Consistency of sociometric status position in male and female high school students. The Journal of Educational Psychology 1957;48:385–390.

Wright JC, Giammarino M, Parad HW. Social status in small groups: Individual–group similarity and the social 'misfit.'. Journal of Personality and Social Psychology 1986;50:523–536.

Zakriski AL, Prinstein MJ. Sociometric status of child inpatients in clinical and normative peer groups: Is peer status in a clinical setting a useful measure of adjustment? Applied. Developmental Psychology 2001;22:157–173.

Table 1

Correlations Between Number of Nominations Received and Position in a List of Names

Items	Position on the list
1. Like least	−.31[**]
2. Like most	−.14[**]
3. Starts fights	−.19[**]
4. Co-operates	−.20[**]
5. Trouble peer	−.19[**]
6. Acquaintances	−.09
7. Best friendships	−.07

[**]
Note: $p < .01$.

Table 2

Correlations between Same-sex vs. Other-sex Social Preference and Adolescents' Functioning

	Same-sex social preference	Other-sex social preference
Antisocial behavior	−.27[*]	−.28[*] (−.17[*])
Academic performance	.30[*]	.15[*] (.01)

[*]*Note*: *p* < .05. Partial correlations are in parentheses.

Table 3

Correlations between Classroom *vs.* Outside Classroom Social Preference and Adolescents' Functioning

	School A		School B		School C	
	In–class SP	Out–class SP	In–class SP	Out–class SP	In–class SP	Out–class SP
Antisocial behavior	−.07	−.14[*] (−.12)	−.10	−.36[*] (−.35[*])	−.20[*]	−.34[*] (−.27[*])
Academic performance	.20[*]	.20[*] (.12)	.10	.27[*] (.25[*])	.13	.28[*] (.27[*])

[*]*Note*: $p < .05$. Partial correlations are in parentheses. SP = social preference.