

---

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

François Poulin, *Université du Québec à Montréal*, and  
Thomas J. Dishion, *University of Oregon*

---

## Abstract

1

2  
3  
4  
5  
6  
7  
8  
9  
10  
11  
12  
13  
14  
15  
16  
17  
18  
19  
20  
21  
22  
23  
24  
25  
26  
27  
28  
29  
30  
31  
32  
33  
34  
35  
36  
37  
38  
39  
40  
41  
42  
43  
44  
45

*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

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 &

Correspondence should be addressed to François Poulin, Département de psychologie, Université du Québec à Montréal, Case Postale 8888, Succursale Centre-Ville, Montréal, Québec, Canada H3C 3P8. E-mail: [poulin.francois@uqam.ca](mailto:poulin.francois@uqam.ca)

## 2 *François Poulin and Thomas J. Dishion*

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

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

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

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

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

46 This assessment problem could also contaminate other peer nomination instruments  
47 designed to measure various dimensions of social behavior, friendships, or social  
48 networks. Social behaviors such as aggression or prosocial behavior are assessed either  
49 by using scales that combine several peer nomination items (e.g., Masten, Morison, &

1 Pellegrini, 1985; Pekarik, Prinz, Liebert, Weintraub, & Neale, 1976) or by using a  
2 specific single item (Coie & Dodge, 1983). Best-friend relationships or acquaintances  
3 could also be identified using participants' nominations of their best friends or the  
4 people they 'hang out with'. Given that these nomination procedures are often based on  
5 rosters, the possibility of a response bias is also likely to apply, especially when the  
6 roster contains a large number of names.

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

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

28 Once youth have moved from self-contained elementary school classrooms to  
29 middle schools, they have contact with a greater number of peers during the course of  
30 a day. The classroom organization is less stable, and in several instances youth rotate  
31 through a schedule of classes with different configurations of students. A standard  
32 group of classmates cannot be identified in several middle schools. Moreover, in some  
33 middle schools, students do not necessarily come in contact with all their grademates,  
34 resulting in varying degrees of familiarity with peers. Thus, the structure of the middle  
35 school poses a serious challenge for the specification of an appropriate voting  
36 population (Inderbitzen, 1994). A review of studies using sociometric nominations in  
37 middle or high school revealed a clear inconsistency regarding the specification of a  
38 voting population. Specifically, the following voting populations have been used: the  
39 classroom (also referred to as team class, home room, or academic team, with a lot  
40 of variation in size; Borelli & Prinstein, 2006; Frentz, Gresham, & Elliot, 1991;  
41 Hatzichristou & Hopf, 1996; Wertheimer, 1957); the classroom, but only same-sex  
42 classmates (Parkhurst & Asher, 1992; Parkhurst & Hopmeyer, 1998); the grade level  
43 (Cillessen & Mayeux, 2004; Coie et al., 1982; Coie, Terry, Zakriski, & Lochman,  
44 1995; Prinstein & Aikins, 2004); the grade level, but only the same-sex grademates  
45 (Bishop & Inderbitzen, 1995; Inderbitzen, Walters, & Bukowski, 1997; Munsch &  
46 Kinchen, 1995); or even the entire school (Franzoi, Davis, & Vasquez-Suson, 1994).  
47 These various voting populations differ in term of size, frequency of contacts among  
48 youth, and inclusion or not of other-sex peers. These inconsistencies in methodologies  
49 make it difficult to compare findings across studies.

#### 4 *François Poulin and Thomas J. Dishion*

1 Surprisingly, the implications of these inconsistencies have not been thoroughly  
2 investigated. Two levels of variation in the specification of a voting population are  
3 especially relevant: (1) the inclusion or not of other-sex peers, and (2) the inclusion or  
4 not of all the grademates. From a simple psychometric standpoint, a larger voting  
5 population (i.e., the entire grade level, both genders) should increase the reliability of  
6 the sociometric scores. But aside from the psychometric argument, the inclusion of  
7 same-sex and other-sex peers, as well as all the grademates in the voting population,  
8 has conceptual implications. The structural difference in the middle school system, as  
9 well as the beginning of sexual maturation, reorganize the nature of the relationships  
10 between boys and girls (Maccoby, 1998). For example, youth behavior might become  
11 more sensitive to approval/disapproval from other-sex peers. Moreover, the middle  
12 school classroom is not a significant peer group with clear boundaries as was the  
13 elementary school classroom. Students might become more sensitive to approval/  
14 disapproval from their larger peer environment. Studies have shown that classroom  
15 arrangement and schools' organization can have an impact on students' peer relations  
16 (Babad & Ezer, 1993; Epstein, 1983, 1989; Hallinan & Smith, 1989).

17 These variations in the specification of the voting population might present impor-  
18 tant implications for the study of early adolescents' peer status. For instance, a central  
19 objective described in the peer relation literature is to determine the behavioral or  
20 cognitive dimensions associated with a positive or a negative peer status (Asher &  
21 Coie, 1990; Cillessen & Mayeux, 2005). Research conducted with children showed [2]  
22 that the relationships between peer status and behavior vary according to the compo-  
23 sition of the group in which peer status has been assessed (Boivin, Dodge, & Coie,  
24 1995; Stormshak, Bierman, Bruschi, Dodge, & Coie, 1999; Wright et al., 1986).  
25 Consequently, any variations in the specification of a voting population for sociometric  
26 nominations might affect the findings about the relationship between behavior (or any  
27 other relevant dimensions) and peer status, causing the findings to be unstable from one  
28 study to another. The impact of these variations when sociometric nominations are  
29 conducted in middle school thus deserve careful attention.

#### 30 *The Present Study*

31  
32 In this study, we propose a procedure to measure sociometric status in middle school  
33 on the basis of nominations and specifically investigate three of the methodological  
34 issues raised earlier in this article. First, the possibility of a response bias when  
35 participants are provided with a long roster that was sorted alphabetically was exam-  
36 ined. This response bias, or sequence effect, would result in a significant relationship  
37 between the order on the list and the number of nominations received (i.e., more  
38 nominations for the names at the top of the list). Besides sociometric items (e.g., *like*  
39 *least (LL)* and *like most (LM)*), this potential response bias was also examined  
40 when peer nominations were used to assess social behavior, best friendships, and  
41 acquaintances.

42 Second, the effect of a variation in the specification of a voting population on the  
43 relationships between sociometric status and adolescents' functioning was examined.  
44 This variation concerns the inclusion or not of other-sex peers in the voting population.  
45 Specifically, the relationships between adolescents' functioning and sociometric status  
46 (1) among same-sex peers, and (2) among other-sex peers were examined. Because of  
47 the decline in gender segregation in early adolescence, it was expected that status  
48 among other-sex peers will have a unique relationship with adolescents' functioning,

1 after controlling for status among same-sex peers. In this study, adolescents' antisocial  
2 behavior and academic achievement were chosen as indicators of functioning because  
3 their concurrent relationships with sociometric status have been documented in many  
4 studies (Cillessen & Mayeux, 2005; Véronneau & Vitaro, 2007).

5 Third, another type of variation in the specification of a voting population was also  
6 investigated: the inclusion or not of all the grademates in the voting population. The  
7 relationships between adolescents' functioning and sociometric status (1) among  
8 the classroom peers only, and (2) among the grademates outside the classroom, were  
9 examined. It was hypothesized that these relationships would vary depending on the  
10 classroom organization of the middle schools. Specifically, in middle schools where  
11 students spend a lot of their school time interacting with their classmates, the grade-  
12 mates outside the classroom would be less meaningful for the measurement of socio-  
13 metric status. This would translate into an absence of a unique relationship between  
14 sociometric status among the grademates outside the classroom and adolescents'  
15 functioning. Conversely, in middle schools where students switch classes frequently  
16 and do not spend a significant amount of school time with a stable group of classmates,  
17 the grademates outside the classroom would be more relevant for the measurement of  
18 their sociometric status. This would result in a significant and unique relationship  
19 between sociometric status among the grademates outside the classroom and adoles-  
20 cents' functioning, after controlling for status among classroom peers only.

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

## 31 **Method**

### 32 *Participants*

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

### 43 *Measures*

44 *Peer Nominations.* Each participant received a set of rosters containing the names of  
45 all their grademates. The number of students on each list was 216 for School A, 317 for  
46 School B, and 230 for School C. Names were sorted alphabetically by first name to

## 6 *François Poulin and Thomas J. Dishion*

1 make it easier for the participants to find their choices. The names were printed in  
2 multiple columns on an 8 × 14-inch computer-readable sheet of paper, and a separate  
3 page was generated for each nomination question. The sociometric questions were  
4 printed on the top of each roster, and participants were asked to fill in the bubble next  
5 to each of their choices.

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

17 For the behavioral descriptors and the acquaintanceship and friendship items, the  
18 number of nominations received from all the grademates was counted. For the LL and  
19 LM items, the number of nominations received from all the grademates was counted,  
20 along with the number received from specific voting subgroups; specifically, the  
21 number of nominations received from (1) same-sex grademates, (2) other-sex grade-  
22 mates, (3) classmates (e.g., peers of the same classroom), and (4) grademates outside  
23 the classroom (e.g., grademates excluding peers from the same classroom). These  
24 scores were then standardized within each reference group.

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

29  
30 *Antisocial Behavior.* Teacher ratings of antisocial behavior were collected for each  
31 youth. The teacher risk perception (Soberman, 1994) provides a brief single-sheet  
32 instrument with which a teacher may quickly evaluate the risk status of all students in  
33 the class. Areas of risk assessment include classroom behavior, tobacco use, involve-  
34 ment with troublesome or substance-using peers, and so forth. Teachers provide their  
35 ratings on a 1–5 Likert scale. Ten items were summed to form a teacher report of  
36 antisocial behavior (Cronbach's alpha = .91). Teachers have been found to be reliable  
37 informants regarding youth externalizing problems (Achenbach, McConaughy, &  
38 Howell, 1987; Stanger & Lewis, 1993), and a significant relationship between teacher-  
39 rated antisocial behavior and peer status has been reported in many studies (for a  
40 review see Cillessen & Mayeux, 2005; Coie & Dodge, 1998).

41  
42 *Academic Performance.* School records were reviewed at the end of the school year.  
43 GPA was calculated as the mean of the students' five academic-course grades, with a  
44 possible range of .0 to 4.0. 3

### 45 46 *Procedures*

47 Participants were assessed as part of a larger longitudinal study of the evaluation of a  
48 school-based substance abuse prevention program. The data used in the present study

**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. Cooperates	-.20**
5. Trouble peer	-.19**
6. Acquaintances	-.09
7. Best friendships	-.07

Note: \*  $p < .05$ ; \*\*  $p < .01$ .

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 authors' 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.

**Table 2. Correlations Between Same-sex Vs. Other-sex Social Preference and Adolescents' Functioning**

	Same-sexsocial preference	Other-sexsocial preference
Antisocial behavior	-.27*	-.28* (-.17*)
Academic performance	.30*	.15* (.01)

Note: \*  $p < .05$ . Partial correlations are in parentheses.

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

First, we looked at the proportion of nominations received from the same-sex grademates 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* 4

First, 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



**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 perform.	.20*	.20* (.12)	.10	.27* (.25*)	.13	.28* (.27*)

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

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. First, 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. Second, 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. Third, 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, 2006). 5

When asked to do the peer nomination task, two different strategies could have been used by the students to achieve this task. First, 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).

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

### 20 21 *The Voting Population*

22 The second and third methodological issues addressed in this study pertains to the  
23 specification of an appropriate voting population when conducting sociometric nomi-  
24 nation in the middle school context. Our analysis of the nominations received from the  
25 same-sex grademates vs. those received from the other-sex grademates revealed that  
26 half of the nominations for rejection (like least) and more than 16 percent for accep-  
27 tance (like most) were given by other-sex peers. This finding is consistent with what  
28 was reported in other studies with the same age group (Card, Hodges, Little, & Hawley,  
29 2005) and reflects the fact that gender segregation is still very salient in early adoles-  
30 cence. However, the correlational analyses suggest that these other-sex nominations  
31 might bring in unique information. Indeed, we found that other-sex social preference  
32 was significantly (and negatively) related with antisocial behavior even when same-sex  
33 social preference was partialled out. This effect was not found for academic perfor-  
34 mance, which was mainly associated with same-sex social preference.

35 Similar analyses were also conducted to examine the impact of including or not  
36 including all the grademates in the voting population for sociometric nominations. The  
37 relevance of this question is based on the fact that in the majority of middle schools,  
38 students do not interact exclusively with classmates as was the case in elementary  
39 schools, but they are likely to switch classes frequently and interact with a much larger  
40 numbers of peers. However, there might be variations from one middle school to  
41 another regarding classroom arrangement. In fact, in one of the schools in our sample,  
42 students spent significantly more time with their classmates than did students in the  
43 other two schools. When we looked at the proportion of like least/most nominations  
44 received from classmates only vs. those received from the rest of the grademates, we  
45 found a pattern of results for the first school that was different than that of the other  
46 two. Specifically, a larger proportion (twice as many) of like least/most nominations  
47 came from the classmates in the first school than from the two other schools, suggest-  
48 ing that the school's classroom organization might have an impact on students' social

12 *François Poulin and Thomas J. Dishion*

1 preference. Even more interesting, the pattern of the relationships between social  
2 preference in the classroom vs. in the rest of the grade level and adolescent adjustment  
3 was also different in the first school compared with the other schools. In the first  
4 school, social preference among grademates outside the classroom did not share a  
5 unique portion of variance with adolescent adjustment, but it did so substantially in the  
6 two other schools. This outcome suggests that grade level constitutes a more significant  
7 voting population in these two schools that was not necessarily the case for the first  
8 school. These findings suggest that if sociometric nominations were conducted only  
9 among the classmates in these two schools, one would have missed important  
10 information and run the risk of erroneous conclusions regarding the contribution of  
11 sociometric social preference to adolescent adjustment.

12 An important limitation of this investigation is that the dimensions under study were  
13 not experimentally manipulated. We did not directly compare the use of short vs. long  
14 rosters to determine the threshold before a response bias begins. Moreover, the various  
15 voting populations were not experimentally manipulated; we did not directly compare  
16 schools where the sociometric voting population would include same-sex peers only  
17 with other schools where both genders would be included, or schools where sociomet-  
18 ric nominations would be restricted to the classrooms vs. being open to all grade levels.  
19 Such manipulations would allow us to clarify the methodological problems that were  
20 detected in the present study. Finally, in addition to variations between middle schools  
21 in North America, future studies should also consider cross-cultural issues in socio-  
22 metric assessment. For example, unlike in North America, early adolescents in western  
23 Europe spend the majority of their school time in classroom groups instead of larger  
24 grades (see, e.g., recent work by De Bruyn and Cillessen, 2006a, 2006b, in The 6  
25 Netherlands or Kiesner and Pastore, 2005, in Italy).

26  
27 **References**

- 28 Achenbach, T. M., McConaughy, S. H., & Howell, C. T. (1987). Child/adolescent behavioral and  
29 emotional problems: Implications of cross-information correlations for situational specificity.  
30 *Psychological Bulletin*, *101*, 213–232.
- 31 Asher, S. R., & Coie, J. D. (1990). *Peer rejection in childhood*. Cambridge, MA: Cambridge  
32 University Press.
- 33 Babad, E., & Ezer, H. (1993). Seating locations of sociometrically measured student types:  
34 Methodological and substantive issues. *British Journal of Educational Psychology*, *63*,  
35 75–87.
- 36 Bishop, J. A., & Inderbitzen, H. M. (1995). Peer acceptance and friendship: An investigation of  
37 their relation to self-esteem. *Journal of Early Adolescence*, *15*, 476–489.
- 38 Boivin, M., Dodge, K. A., & Coie, J. D. (1995). Individual–group behavioral similarity and peer  
39 status in experimental play groups of boys: The social misfit revisited. *Journal of Personality  
40 and Social Psychology*, *69*, 269–279.
- 41 Borelli, J. L., & Prinstein, M. J. (2006). Reciprocal, longitudinal associations among adoles-  
42 cents' negative feedback-seeking, depressive symptoms, and peer relations. *Journal of  
43 Abnormal Child Psychology*, *34*, 159–169.
- 44 Brown, B. B. (2004). Adolescents' relationships with peers. In R. Lerner, & L. Steinberg (Eds.),  
45 *The handbook of adolescent psychology* (pp. 363–396). New York: Wiley.
- 46 Card, N. A., Hodges, E. V. E., Little, T. D., & Hawley, P. H. (2005). Gender effects in peer  
47 nominations for aggression and social status. *International Journal of Behavioral Develop-  
48 ment*, *29*, 146–155.
- 49 Cillessen, A. H., & Bukowski, W. M. (2000). *Recent advances in the measurement of accep-  
50 tance and rejection in the peer system*. San Francisco: Jossey-Bass.
- 51 Cillessen, A. H., & Mayeux, L. (2004). From censure to reinforcement: Developmental changes  
52 in the association between aggression and social status. *Child Development*, *75*, 147–163.

- 1 Coie, J. D., & Cillessen, A. H. N. (1993). Peer rejection: Origins and effects on children's  
2 development. *Current Directions in Psychological Science*, 2, 89–92.
- 3 Coie, J. D., & Dodge, K. A. (1998). Aggression and antisocial behavior. In W. Damon, & N.  
4 Eisenberg (Eds.), *Handbook of child psychology: Vol 3. Social, emotional, and personality*  
5 *development* (3rd ed., pp. 779–862).
- 6 Coie, J. D., & Dodge, K. A. (1983). Continuities and changes in children's social status: A  
7 five-year longitudinal study. *Merrill-Palmer Quarterly*, 29, 261–282.
- 8 Coie, J. D., & Kupersmidt, J. B. (1983). A behavioral analysis of emerging social status in boys'  
9 groups. *Child Development*, 54, 1400–1416.
- 10 Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A  
11 cross-age perspective. *Developmental Psychology*, 18, 557–570.
- 12 Coie, J. D., Terry, R., Zakriski, A., & Lochman, J. (1995). Early adolescent social influence on  
13 delinquent behavior. In J. McCord (Eds.), *Coercion and punishment in long-term perspectives*  
14 (pp. 229–244). New York, Cambridge.
- 15 De Bruyn, E. H., & Cillessen, A. H. N. (2006). Popularity in early adolescence: Prosocial and  
16 antisocial subtypes. *Journal of Adolescent Research*, 21, 607–627.
- 17 Dodge, K. A. (1983). Behavioral antecedents of peer social status. *Child Development*, 54,  
18 1386–1399.
- 19 Durrant, N. C., & Henggeler, S. W. (1987). The stability of peer sociometric ratings across  
20 ecological settings. *The Journal of Genetic Psychology*, 147, 353–358.
- 21 Epstein, J. L. (1983). Selection of friends in differently organized schools and classroom. In  
22 J. L. Epstein, & W. Karweit (Eds.), *Friends in schools* (pp. 73–92). Xxx: xxx. [7]
- 23 Epstein, J. L. (1989). The selection of friends: Changes across the grades and in different school  
24 environments. In T. J. Berndt, & G. W. Ladd (Eds.), *Peer relationships and child development*  
25 (pp. 158–187). New York: Wiley.
- 26 Franzoi, S. L., Davis, M. H., & Vasquez-Suson, K. A. (1994). Two social worlds: Social  
27 correlates and stability of adolescent status groups. *Journal of Personality and Social Psy-*  
28 *chology*, 67, 462–473.
- 29 Frenzt, C., Gresham, F. M., & Elliot, S. N. (1991). Popular, controversial, neglected, and rejected  
30 adolescents: Contrasts of social competence and achievement differences. *Journal of School*  
31 *Psychology*, 29, 109–120.
- 32 Hallinan, M. T., & Smith, S. S. (1989). Classroom characteristics and student friendship cliques.  
33 *Social Forces*, 67, 898–919.
- 34 Hatzichristou, C., & Hopf, D. (1996). A multiperspective comparison of peer sociometric status  
35 groups in childhood and adolescence. *Child Development*, 67, 1085–1102.
- 36 Inderbitzen, H. M. (1994). Adolescent peer social competence: A critical review of assessment  
37 methodologies and instruments. In T. H. Ollendick, & R. J. Prinz (Eds.), *Advances in clinical*  
38 *child psychology* (Vol. 16, pp. 227–259). New York: Plenum.
- 39 Inderbitzen, H. M., Walters, K. S., & Bukowski, A. L. (1997). The role of social anxiety in  
40 adolescent peer relations: Differences among sociometric status groups and rejected sub-  
41 groups. *Journal of Clinical Child Psychology*, 4, 338–348.
- 42 Jiang, X. L., & Cillessen, A. H. N. (2005). Stability of continuous measures of sociometric  
43 status: A meta-analysis. *Developmental Review*, 25, 1–25.
- 44 Kiesner, J., & Pastore, M. (2005). Differences in the relations between antisocial behavior and  
45 peer acceptance across contexts and across adolescence. *Child Development*, 76, 1278–1293.
- 46 Maccoby, E. E. (1998). *The two sexes: Growing up apart, coming together*. Cambridge: Harvard  
47 University Press.
- 48 Masten, A. S., Morison, P., & Pellegrini, D. S. (1985). A revised class play method of peer  
49 assessment. *Developmental Psychology*, 21, 523–533.
- 50 Munsch, J., & Kinchen, K. M. (1995). Adolescent sociometric status and social support. *Journal*  
51 *of Early Adolescence*, 15, 181–202.
- 52 Newcomb, A. F., & Bukowski, W. M. (1983). Social impact and social preference as determi-  
53 nants of children's peer group status. *Developmental Psychology*, 19, 856–867.
- 54 Parker, J. G., & Seal, J. (1996). Forming, losing, renewing, and replacing friendships: Applying  
55 temporal parameters to the assessment of children's friendship experiences. *Child Develop-*  
56 *ment*, 67, 2248–2268.
- 57 Parker, J. G., Rubin, K. H., Erath, S. A., Wojslawowicz, J. C., & Buskirk, A. R. (2006). Peer  
58 relationships, child development, and adjustment: A developmental psychopathology

14 François Poulin and Thomas J. Dishion

- 1 perspective. In D. Cicchetti, & D. J. Cohen (Eds.), *Developmental psychopathology* (2nd ed.,  
2 pp. 419–493). Xxx: xxx. 8
- 3 Parkhurst, J. T., & Asher, S. R. (1992). Peer rejection in middle school: Subgroup differences in  
4 behavior, loneliness, and interpersonal concerns. *Developmental Psychology*, *28*, 231–241.
- 5 Parkhurst, J. T., & Hopmeyer, A. (1998). Sociometric popularity and peer-perceived popularity:  
6 Two distinct dimensions of peer status. *Journal of Early Adolescence*, *18*, 125–144.
- 7 Pekarik, E. G., Prinz, R. J., Liebert, D. E., Weintraub, S., & Neale, J. M. (1976). The Pupil  
8 Evaluation Inventory: A sociometric technique for assessing children's social behavior.  
9 *Journal of Abnormal Child Psychology*, *4*, 83–97.
- 10 Prinstein, M. J., & Aikins, J. W. (2004). Cognitive moderators of the longitudinal association  
11 between peer rejection and adolescent depressive symptoms. *Journal of Abnormal Child  
12 Psychology*, *32*, 147–158.
- 13 Prinstein, M. J., & Cillessen, A. H. N. (2003). Forms and functions of adolescent peer aggres-  
14 sion associated with high levels of peer status. *Merrill-Palmer Quarterly*, *49*, 310–342.
- 15 Rose, A. J., Swenson, L. P., & Waller, E. M. (2004). Overt and relational aggression and  
16 perceived popularity: Developmental differences in concurrent and prospective relations.  
17 *Developmental Psychology*, *40*, 378–387.
- 18 Schwartz, D., Gorman, A. H., Nakamoto, J., & McKay, T. (2006). Popularity, social acceptance,  
19 and aggression in adolescent peer groups: Links with academic performance and school  
20 attendance. *Developmental Psychology*, *42*, 1116–1127.
- 21 Soberman, L. (1994). *Psychometric validation of a brief teacher screening instrument*. Unpub-  
22 lished doctoral dissertation, University of Oregon, Eugene.
- 23 Stanger, C., & Lewis, M. (1993). Agreement among parents, teachers, and children on inter-  
24 nalizing and externalizing behavior problems. *Journal of Clinical Child Psychology*, *22*,  
25 107–115.
- 26 Stormshak, E. A., Bierman, K. L., Bruschi, C., Dodge, K. A., & Coie, J. D. (1999). The relation  
27 between behavior problems and peer preference in different classroom contexts. *Child Devel-  
28 opment*, *70*, 169–182.
- 29 Terry, R. (2000). Recent advances in measurement theory and the use of sociometric techniques.  
30 In A. H. N. Cillessen, & W. M. Bukowski (Eds.), *Recent advances in the measurement of  
31 acceptance and rejection in the peer system*. San Francisco: Jossey-Bass.
- 32 Vaillancourt, T., & Hymel, S. (2007). Aggression and social status: The moderating roles of sex  
33 and peer-valued characteristics. *Aggressive Behavior*, *32*, 396–408.
- 34 Véronneau, M.-H., & Vitaro, F. (2007). Social experience with peers and high school gradua-  
35 tion: A review of theoretical and empirical research. *Educational Psychology*, *27*, 419–445.
- 36 Wang, S. S., Houshyar, S., & Prinstein, M. J. (2006). Adolescent girls' and boys' weight-related  
37 health behaviors and cognitions: Associations with reputation- and preference-based peer  
38 status. *Health Psychology*, *25*, 658–663.
- 39 Wentzel, K. R. (1991). Relations between social competence and academic achievement in early  
40 adolescence. *Child Development*, *62*, 1066–1078.
- 41 Wentzel, K. R. (2003). Sociometric status and adjustment in middle school: A longitudinal  
42 study. *Journal of Early Adolescence*, *23*, 5–28.
- 43 Wentzel, K. R., & Caldwell, K. (1997). Friendships, peer acceptance, and group membership:  
44 Relations to academic achievement in middle school. *Child Development*, *68*, 1198–1209.
- 45 Wertheimer, R. R. (1957). Consistency of sociometric status position in male and female high  
46 school students. *The Journal of Educational Psychology*, *48*, 385–390.
- 47 Wright, J. C., Giammarino, M., & Parad, H. W. (1986). Social status in small groups:  
48 Individual-group similarity and the social 'misfit.' *Journal of Personality and Social Psy-  
49 chology*, *50*, 523–536.
- 50 Zakriski, A. L., & Prinstein, M. J. (2001). Sociometric status of child inpatients in clinical and  
51 normative peer groups: Is peer status in a clinical setting a useful measure of adjustment?  
52 *Applied Developmental Psychology*, *22*, 157–173.

53  
54 **Author Notes**

55 This project was supported by grant DA 07031 from the National Institute on Drug Abuse to Thomas J.  
56 Dishion.

SNP Best-set Typesetter Ltd.	
Journal Code: SODE	Proofreader: Emily
Article No: 473	Delivery date: 14 March 2008
Page Extent: 14	Copy editor: Cholo

## AUTHOR QUERY FORM

Dear Author,

During the preparation of your manuscript for publication, the questions listed below have arisen. Please attend to these matters and return this form with your proof.

Many thanks for your assistance.

Query References	Query	Remark
1	Au: This section was turned into the Abstract. Is this correct?	
2	Au: Cillessen & Mayeux, 2005 has not been found in the reference list. Should the year of publication for this and other similar citations in the text be 2004? If not, please supply full details.	
3	Au: Should GPA be spelled out?	
4	Au: Please check if the heading 'Variations in the Voting Population: . . . ' is correct.	
5	Au: Should the Vaillancourt & Hymel, 2006 here be changed to Vaillancourt & Hymel, 2007 so as to match the reference list?	
6	Au: De Bruyn and Cillessen 2006a and 2006b were not found in the reference list, as only an entry for 2006 was given. Please supply full details for both citations.	
7	Au: Epstein 1983: Please provide the publisher and location.	
8	Au: Parker et al 2006: Please provide the publisher and location.	
9	Au: No single-asterisk footnote symbol was given in Table 1.	