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EMPIRICAL RESEARCH

An Examination of Reciprocal Associations Between Social Preference, Popularity, and Friendship during Early Adolescence

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Abstract

Getting along with peers becomes increasingly important to health and well-being during early adolescence (10–14 years). Young adolescents may succeed with peers when they are well-liked by and popular among the larger peer group (or at the group-level of social complexity). They might also fare well with peers when they are able to form numerous mutual and high quality friendships (at the dyadic-level of social complexity). Theory emphasizes the interrelatedness of different types of peer experiences, but few longitudinal studies have examined the interplay among and between group- and dyadic-level peer experiences in the same study. As a result, it is not known whether group-level peer experiences are predictors of dyadic-level peer experiences, and/or vice versa. To address this limitation, this study examined the prospective and reciprocal relations between four indices of peer experiences, *preference* (or being highly liked and not disliked by peers), *popularity* (or having a reputation as popular), *friendship quantity* (or having many mutual friends), and *friendship or relationship quality*, during early adolescence. Participants were 271 adolescents (49% girls; $M_{age} = 11.52$ years) who completed peer nominations of preference and popularity, a self-report measure of friendship quality, and nominated friends at two waves (Wave 1: November, Grade 6; Wave 2: October, Grade 7). Structural equation modeling indicated that friendship quantity predicted increases in preference and popularity and that friendship quality predicted increases in friendship quantity. Initial popularity was associated with decreases in preference. The importance of these findings for future research is discussed along with study limitations.

Keywords Social preference · Popularity · Friendship · Peers · Early adolescence

Introduction

Over the past thirty years, it has become clear that certain types of peer experiences at both the group- (e.g., popularity, preference) and dyadic-levels (e.g., having mutual friends) of social complexity are significant and unique contributors to socio-behavioral and psychological adjustment outcomes (e.g., aggressive behavior, self-esteem), particularly during the early adolescent developmental period (10–14 years; Rubin et al. 2015). Of course, the *reasons* why these different peer experiences influence adjustment likely differ (e.g., Bukowski et al. 1993). Friendship experiences may impact adjustment vis-à-vis the satisfaction of interpersonal needs for companionship and intimacy (Poorthuis et al. 2012), while popularity and preference likely fulfill status-oriented goals and promote positive experiences with others (Eder, 1985; Sullivan, 1953). Nevertheless, theory and empirical findings clearly highlight the importance of considering *both* group- and dyadic-level peer experiences in studies of young adolescents.

Few studies however have considered popularity or preference *and* an index of friendship in the same study (for several notable exceptions, see Bukowski et al. 1996; Nangle et al. 2003). Rather, the majority of friendship studies do not also consider adolescents' levels of popularity or preference, and most studies of preference and popularity neglect adolescents' friendship experiences. Moreover, we could locate only seven studies in which popularity, preference, and an index of friendship were *all* considered (Badaly et al. 2012; Gorman et al. 2011; Litwack et al.

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2012; Meuwese et al. 2016; Poorthuis et al. 2012; Rose et al. 2004; Schoffstall and Cohen 2011). These studies revealed important information about the *concurrent* associations among the constructs (as well as their associations with adjustment outcomes) but did not evaluate potential reciprocal and longitudinal relations. Thus, many unanswered questions remain, with perhaps the most important being: Are group-level peer experiences predictors of dyadic-level peer experiences, and/or vice versa? Informed by peer relations theory and research (e.g., Rubin et al. 2015; Sullivan 1953), and utilizing a large longitudinal sample of young adolescents, the current study investigates, for the first time, the degree to which two group-level peer experiences (i.e., preference, popularity) and two dyadic-level peer experiences (i.e., friendship quantity, friendship quality) are related reciprocally over time during early adolescence.

The Study of Preference, Popularity, and Friendship

To date, young adolescents' popularity and preference experiences have received considerable theoretical and empirical attention in the peer relations literature (Cillessen 2009; Rubin et al. 2015). Preference (or social preference, sociometric popularity, likeability) reflects the degree to which the young adolescent is highly liked (and not disliked) by peers while popularity (or perceived popularity) reflects the degree to which the young adolescent is perceived by peers to be popular.

During childhood, popularity and preference are typically found to be strongly associated (e.g., $r = .67$; LaFontana and Cillessen 2002). This might be because highly preferred and popular children engage in the *same* peer-valued social behaviors due to socialization practices that encourage prosocial behaviors and discourage antisocial behaviors. However, beginning in early adolescence, when authority-defying behaviors become increasingly admired and seen as a symbol of high status (Bukowski et al. 2000; Moffitt 1993), the correlations between popularity and preference begin to not only become less substantial but may also become negative (e.g., $r = -.24$; Cillessen and Borch 2006). At this time, popularity (but not preference) becomes associated positively with socially dominant and aggressive behaviors as well as delinquency (e.g., Lease et al. 2002). Thus, with increased age, there appears to be a growing incompatibility between being preferred *and* popular (Cillessen and Mayeux 2004).

Both preference and popularity tend to be moderately stable over time, but there is some indication that the stability of popularity may be greater (Cillessen and Borch 2006). Research evaluating differences in the stability of preference and popularity has been limited in number, but popularity may be more stable as it is based on group-level reputations, which require a group consensus. Such a reputation may be more resistant to change relative to individual personal preferences and liking judgments (which lead to preference; Marks et al. 2012).

In terms of friendship experiences, most research focuses on whether young adolescents have mutual or reciprocated friends (*mutual friendship involvement*), the number of mutual friendships (*friendship quantity*), and the quality of young adolescents' friendships (*friendship quality*). The majority of young adolescents have at least one mutual friendship and many have numerous mutual friends (e.g., Parker and Asher 1993). However, there is considerable variability in the qualities of youth's friendships such that some friendships are more positive or conflict ridden than others (Rubin et al. 2015).

Each index of friendship has been related to a variety of indices of adjustment outcomes throughout childhood and adolescence, such that youth with one or many mutual and high-quality friendships tend to report high levels of psychosocial well-being (e.g., Demir and Urberg 2004; Parker and Asher 1993). However, in the present study, we focus on friendship *quantity* and *quality* in light of suggestions that: (a) preference may afford increased opportunities for friendship involvement (Bukowski et al. 1996); (b) young adolescents consider friendship quantity when judging their peers' popularity (LaFontana and Cillessen 2002); (c) preferred adolescents may have higher quality friendships than their less preferred peers (Poorthuis et al. 2012), and (d) certain friendship skills, such as conflict resolution, are theorized to promote liking and popularity among peers (Bukowski et al. 1993). In the next section, we expand on our conceptual framework and supporting research and detail specific hypotheses.

Bidirectional Associations between Social Preference, Popularity, and Friendship

Different types of peer experiences have long been theorized to be interrelated and directly influential on each other (Hinde 1987; Rubin et al. 2006, 2015; Sullivan 1953). As an example, drawing from the writings of Robert Hinde (1979, 1987), Rubin and colleagues (2006, 2015) argue that youth (of all ages) interact with their peers in ways (i.e., aggressively, friendly) that either promote or impede peer experiences at the dyadic- (i.e., friendship) and group-levels (i.e., popularity, preference) of social complexity. Most important to this study, Rubin emphasizes the *intermix* or interdependency of different types of peer experiences; for instance, he argues that peer experiences at one level can be improved or harmed by peer experiences at other levels (Rubin et al. 2015). For example, forming a new friendship may lead to opportunities for additional friendships and enhanced liking. However, attaining high popularity could

lead to the dissolution of friendships with less popular peers (Rubin et al. 2015). Put another way, peer experiences at one level are thought to create social conditions that impact peer experiences at another level (Bukowski et al. 1993).

Another relevant perspective is that of Sullivan (1953) who argued that different types of peer experiences (such as *chumships* or same-sex best friendships) can set the stage for later close relationship experiences vis-à-vis the (dis) satisfaction of social needs. This investigation and its hypotheses are informed by these theoretical perspectives suggesting that dyadic-level peer experiences may predict group-level peer experiences and vice versa. Next, we review several lines of empirical research supporting these theoretical claims.

Preference, popularity, and friendship quantity

There is some indication that preference or liking may precede *mutual friendship involvement*. This may be because being well-liked by many peers provides increased opportunities to develop new friendships (Bukowski et al. 1993, 1996). Adolescents who are well-liked by many peers may also be viewed as attractive potential friends who are likely to provide opportunities for fun and companionship (Thomas and Bowker 2013). We were not able to locate a single study that examined the bidirectional associations between friendship *quantity* and preference. However, Bukowski et al. (1996) found that *mutual friendship involvement* did not predict preference (but that preference did predict mutual friendship involvement), perhaps because preference is strongly predicted by adolescents' own social behaviors (such as prosocial behaviors), rather than their relationships with others. We reasoned that preference may lead to an increased number of friends (or increased friendship quantity), for the same reasons that preference appears to lead to mutual friendship involvement (e.g., increased opportunities with potential friends). But, due to the dearth of research on preference in relation to *friendship quantity* and the non-significant associations reported by Bukowski et al. (1996), whether friendship quantity leads to changes in preference over time is evaluated in an exploratory manner.

Might one expect that popularity and *friendship quantity* are related prospectively and reciprocally over time during early adolescence? In other words, does popularity afford opportunities for additional friendships and vice versa? Several investigators have examined the *concurrent* associations between popularity and friendship quantity, with findings showing moderate associations ($rs = .35–.49$; Gorman et al. 2011; Rose et al. 2004). These studies were not longitudinal, but it is plausible that popularity may lead to an increased number of friendships because popular youth are highly visible and thus may be obvious friendship choices. In addition, popular young adolescents possess social power that is highly desired by peers, and therefore, peers may try to achieve similar power vis-à-vis friendship formation (similar to the "basking in reflected glory" effect; Dijkstra et al. 2010). It may also be that friendship quantity leads to increased popularity given evidence that adolescents use friendship quantity when making judgments about popularity (LaFontana and Cillessen 2002). In support of these ideas, one longitudinal study found significant reciprocal associations between popularity and friendship quantity across three time points during childhood ($rs = .41–.65$; Troop-Gordon and Ranney 2014). However, our study is the first to examine such associations in an *adolescent* sample. Unlike the Troop-Gordon and Ranney (2014) study, we also included friendship quality in our models, and thus may be better able to examine the unique associations between popularity and friendship *quantity*.

Preference, popularity, and friendship quality

Preferred youth tend to have high quality friendships (e.g., Litwack et al. 2012). However, Lansford and colleagues (2006) posited that there may be a ceiling effect for friendship quality; that is, they proposed that by the time youth are highly preferred, their friendships are already high quality and thus may not increase in quality over time despite the many benefits of preference in adolescence. Therefore, it is not clear whether preference will be a predictor of friendship quality over time.

We also explore the previously untested suggestion that friendship skills (that are associated with friendship quality, such as conflict resolution skills) may afford increased opportunities to be liked *and* popular by many peers (e.g., Bukowski et al. 1993). This is possible given that friendships are commonly embedded within larger friendship networks, and thus the larger friendship network may notice and reward peers with advanced friendship skills. We are tentative in this hypothesis however as the extant literature on popularity and friendship is mixed, with some findings showing positive (concurrent) associations between the two types of peer experiences and others not (e.g., Brendgen et al. 2000; Poorthuis et al. 2012). Nevertheless, we also explore the novel hypothesis that like preference, popularity may increase opportunities to choose peers with whom to form high quality friendships (Bukowski et al. 1993).

Preference and popularity

Early ethnographic research proposed a complex relation between preference and popularity for adolescent girls (Eder 1985). The observed phenomenon, referred to as the "cycle of popularity" (Eder 1985), described a process whereby popular girls experience an initial increase in being

highly liked and heightened desirability for friendship. However, over time, these girls become more exclusive in their friendships and affiliations leading to a sharp decrease in the extent to which they were well-liked. This phenomenon has been empirically supported by two longitudinal studies in which gains in popularity in adolescent girls were associated with losses in preference over time (Cillessen and Borch 2006; Mayeux et al. 2008). Mayeux and colleagues (2008) found that preference in high school-aged boys was associated with increases in popularity over time, suggesting that the prospective associations among these peer-level experiences may differ for boys and girls.

Friendship quality and quantity

Friendship quality may lead to increased friendship quantity. Having a high quality friendship may allow young adolescents to practice social skills, which in turn, could help in the friendship formation process. However, it is not clear whether friendship quantity will predict quality. Findings from one study suggested that in adulthood, as the number of friends increases, the time and energy necessary to maintain the relationships increases, leading to potential relationship strain (Pearlin 1983). No prior research however has evaluated whether similar strain occurs during early adolescence.

Sex Differences

As suggested above, several sex differences may be evident in the prospective and bidirectional associations between preference, popularity, and friendship (e.g., Mayeux et al. 2008). There is also some indication that popularity may be more stable for girls and preference may be more stable for boys during adolescence (Cillessen and Mayeux 2004). Cillessen and Mayeux (2004) suggest that adolescent girls may place more importance on achieving and maintaining popularity while boys' larger peer networks may be especially influential on preference. In addition, it is well-documented that girls report higher friendship quality in comparison to boys, although no sex differences, to our knowledge, have been found in friendship quantity (Rose and Rudolph 2006). Thus, it is expected that sex will be a moderator of the prospective association between popularity and preference and that popularity will be more stable for girls and preference more stable for boys.

Current Study

Guided by past research and peer relations theory (Rubin et al. 2015; Sullivan 1953), the present study evaluates whether group-level peer experiences predict dyadic-level peer experiences and/or vice versa. Theory and findings from past studies suggest that preference and popularity may lead to increased opportunities to make friends and to choose friends with whom high-quality relationships are possible. There is also some suggestion that friendship skills may be noticed by, and thereby lead to, enhanced liking by and popularity within the larger peer group as well as increased opportunities to form additional friendships. Therefore, prospective and reciprocal associations are expected among all constructs (although as noted previously, we have greater confidence in some of these expectations).

In line with previous work showing that the associations between preference and popularity differ for boys and girls (e.g., Mayeux et al. 2008), it is expected that initial popularity will predict decreases in preference for girls and initial preference will predict increases in popularity for boys. Due to a dearth of research simultaneously investigating these four types of peer experiences, sex will be explored as a moderator of all associations. Finally, the stabilities of all variables will be examined with the expectation that popularity would be more stable relative to preference.

Methods

Participants

Participants were 271 young adolescents (49% girls; M_{age} at Wave 1 = 11.52 years; $SD_{age} = 0.42$) who participated in a larger longitudinal study focused on changes in peer relationships in Buffalo, NY. Recruitment involved first contacting the school principals of two public middle schools, and then after the principals agreed to participate, inviting all Grade 6 students in their schools to participate in the study. Parent informational letters were sent home with all students, and informed parental consent and adolescent assent to participate in the study was obtained from all participants (overall consent rate = 70%; 76% in one school, 64% in the other). All students who returned their consent forms (regardless of their decision to participate) received University t-shirts and folders and were entered in a raffle to win a gift certificate (see Bowker et al. 2015; Markovic and Bowker 2015, for additional study information). Fifty-nine percent of participants identified themselves as Caucasian, 21% as African American, 3% as Hispanic/Latino, 3% as Arabic, 2% as Asian, 1% as Native American, and 11% as Other/multi-racial. Data was not collected on SES, but available district-wide information indicated that both of the participating schools were located in middle class school districts (with mean income levels between $50,000 and $54,000; median income levels were

between $40,000 and $44,000). Only three participants dropped out of the study due to moving away from their schools and were therefore not included in analyses.

Procedures

Participants completed measures in their homerooms or larger classrooms (e.g., cafeterias). Participants were told that their answers were private and confidential and that they could stop participating at any time. Each data collection lasted approximately 30–45 min. Teachers were not involved in the data collections. Wave 1 (W1) data was collected in late November/early December of the Grade 6 school year. To maximize potential for change in peer experiences (which often occur after grade transitions; Pellegrini and Long, 2002), Wave 4 (data collected late September/early October, Grade 7) of the larger longitudinal study was evaluated as Wave 2 (W2) herein. In addition to the measures described below, participants also completed several other measures, including measures of social information processing, which were not of interest herein. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Measures

Preference and popularity (W1, W2)

Participants made unlimited nominations, by writing the names of same-sex and other-sex peers in their school grades, of whom they liked the most ("Someone you like the most") and liked the least ("Someone you like the least"; Coie et al. 1982). Participants also nominated peers whom they perceived to be popular ("Someone who is very popular") and not popular ("Someone who is not popular"; Cillessen and Mayeux 2004). No class lists were provided, consistent with recent published research with young adolescents (e.g., Bowker et al. 2015; Markovic and Bowker 2017). Nominations for non-participants, as well as self-nominations, were disregarded. For each participant and item, the number of nominations *received* was summed, proportionalized, and standardized within each school (Cillessen 2009). In accordance with past research (e.g., Coie et al. 1982), "like least" standardized scores were subtracted from "like most" standardized scores and restandardized (within school) to create preference scores for each participant. "Not popular" standardized scores were subtracted from "very popular" standardized scores and restandardized (within school) to create popularity scores for each participant.

Mutual friendship and friendship quantity (W1, W2)

At both time points, participants wrote the names of their same-sex "very best friend," and "second best friend," and the names of three same-sex or other-sex "good" friends from their grades and school (for a similar procedure, see Bukowski et al. 1994). Friendships were considered mutual if the nominations were reciprocated as either a "best" or "good" friendship. Approximately 76% of participants had at least one mutual friendship at W1. Mutual friendships were only possible if the friendship nominee was also participating in the study. Thus, to account for missing data, non-participant friendship nominations, and differing numbers of friendship nominations that could be determined to be mutual, *proportionalized mean* friendship quantity scores were calculated at W1 and W2, as done in past research (e.g., Litwack et al. 2012; Thomas and Bowker 2013). An exploratory *t*-test showed that boys and girls did not differ significantly in the mean number of mutual friendships or in terms of friendship quantity, $t_{197} = -1.04$, $p > .05$.

Friendship quality (W1, W2)

Participants reported on their self-perceptions of the quality of their best friendship using the 23-item Friendship Qualities Scale (FQS; Bukowski et al. 1994). Participants completed the measure in reference to their relationship with their same-sex "very best friend" and indicated how true each item was on a 5-point scale (1 = not at all true, 5 = really true). The FQS yields five subscales in the areas of companionship, help, security, conflict, and closeness with higher scores on each scale indicating higher levels of positive friendship qualities (i.e., closeness) or conflict. The conflict items were reverse-scored and mean scores across all subscales were calculated to produce an overall index of positive friendship quality at both waves (W1 $\alpha = .91$; W2 $\alpha = .93$).

Results

Descriptive Statistics

In accordance with the recommendations of Kline (2010), the skew of the variables was evaluated first. The friendship quality (but not friendship quantity) variables were found to be negatively skewed at both waves (W1 = −5.35; W2 = −3.38). Transformations did not improve the skew, and thus analyses were conducted with the skewed friendship quality data. Popularity was also found to be skewed at both waves (W1 = 3.24; W2 = 3.95), and preference was skewed at W2 (4.90). Peer nomination assessments of

Table 1 Descriptive statistics and bivariate correlations for study variables

Variables	1	2	3	4	5	6	7	8
Wave 1								
1. Preference	–	−.02	.22*	.17**	.46*	−.07	.07	.16**
2. Popularity		–	.24*	.07	−.15**	.44*	.06	.15**
3. Friendship quantity			–	.08	.25*	.28*	.32*	.18**
4. Friendship quality				–	.16**	.20**	.24*	.56*
Wave 2								
5. Preference					–	−.02	.18*	.18*
6. Popularity						–	.31*	.12
7. Friendship quantity							–	.13
8. Friendship quality								–
M	0.00	0.00	0.43	3.86	0.00	0.00	0.44	3.87
SD	1.00	1.00	0.33	0.72	1.00	1.00	0.36	0.73

*$p < .01$; **$p < .05$

preference and popularity, however, are assumed to be positively skewed (Cillessen 2009), and thus no transformations were applied.

See Table 1 for the means and standard deviations for, and bivariate correlations among, the study variables. Of note, moderate-to-strong stability was evinced for all study variables. A positive correlation was found between W1 friendship *quantity* and W2 preference, and between W2 friendship *quantity* and W2 preference. W1 friendship *quantity* was associated positively with W2 popularity. Friendship *quantity* and popularity were associated positively at each wave as were friendship *quality* and preference. In addition, W1 friendship *quality* and W2 preference were correlated positively, and W1 preference was related positively to W2 friendship quality. W1 popularity was related positively to W2 friendship *quality* and vice versa. In addition, W1 friendship *quantity* and W2 friendship *quality* were associated positively as were W1 friendship *quality* and W2 friendship *quantity*. Preference and popularity were not concurrently associated at either wave.

Path Analyses

A series of cross-lagged autoregressive models were next specified to examine the prospective and reciprocal associations between preference, popularity, friendship quality, and friendship quantity across two waves, which included a school transition (Grade 6 to 7). All participants were included in these models, including those without mutual friendships. Models were fit using Mplus version 6.12 (Muthén and Muthén 1998-2011) with robust maximum likelihood estimation. In the first model, all potential cross-lagged, autoregressive, and within-time associations among the study variables were included and allowed to co-vary. In this model, a total of 4 autoregressive paths, 4 cross-lagged paths, and 4 within-time associations were significant at $p < .05$ (see Fig. 1 for standardized path coefficients and within-time associations).

After dropping non-significant pathways, the model was re-run and revealed acceptable fit to the data: χ^2 (5) = 10.25, $p > .05$, RMSEA = 0.032, 90% CI = [.00, .08], SRMR = 0.03, and CFI = 0.99. Consistent with the correlational analyses, strong stability of constructs was found such that all stability paths were significant. In terms of cross-lagged associations, higher levels of friendship quantity at W1 predicted higher levels of preference and popularity at W2, and higher levels of popularity at W1 predicted lower levels or decreases in preference at W2. Also of note, higher levels of friendship quality at W1 predicted higher levels of friendship quantity at W2.

With regard to within-time associations, preference was associated with friendship quantity and friendship quality at W1. At W1, popularity was associated with friendship quantity. In addition, popularity and friendship quantity were associated at W2. All other within-time associations, including those between preference and popularity, were not significant (see Fig. 2). A significant portion of the variance for each W2 variable was accounted for by its predictors: W2 preference: $R^2 = 0.25$, $p = .002$; W2 popularity: $R^2 = 0.22$, $p = .001$; W2 friendship quantity: $R^2 = 0.13$, $p = .008$; and W2 friendship quality: $R^2 = 0.32$, $p < .001$.

Differences in the stability of preference and popularity was evaluated with Wald tests (Harrell 2001), but no difference was found (Wald test = .001, $p = .92$). When differences in the stability of the friendship quality and friendship quantity constructs was explored, the Wald test was significant (Wald test = 4.46, $p < .05$), such that friendship *quality* was found to be more stable relative to

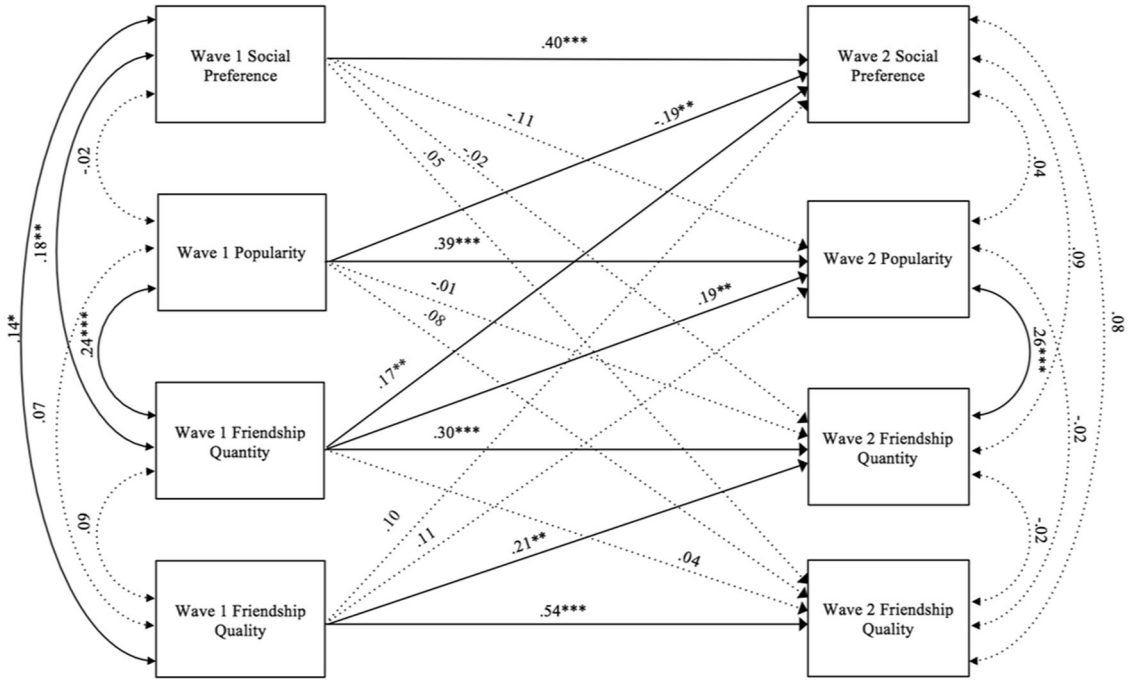

Fig. 1 Initial, fully saturated model used to test effects of Wave 1 preference, popularity, friendship quantity, and friendship quality on Wave 2 preference, popularity, friendship quantity, and friendship quality and the stabilities of these constructs over time. Path coefficients represent the standardized results. Bold lines represent significant results; dotted lines represent non-significant results. *$p < .05$; **$p < .01$; ***$p < .001$

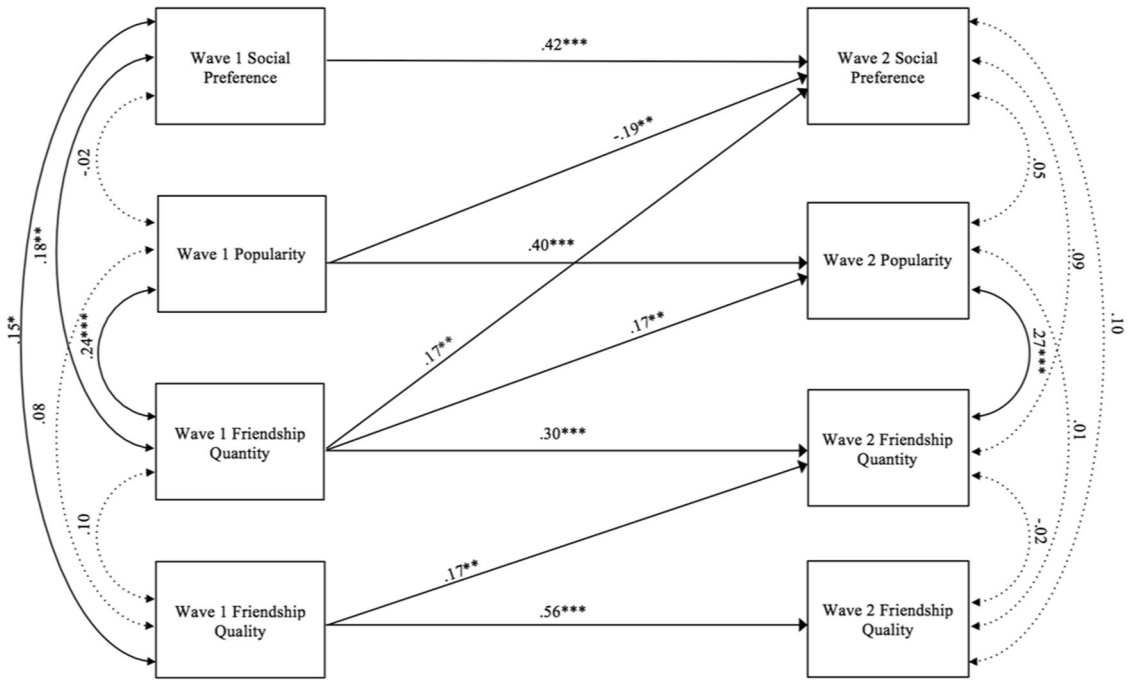

Fig. 2 Final trimmed path model used to test effects of Wave 1 social preference, popularity, friendship quantity, and friendship quality on Wave 2 social preference, popularity, friendship quantity, and friendship quality and the stabilities of these constructs over time. Path coefficients represent the standardized results. Bold lines represent significant results; dotted lines represent non-significant results. *$p < .05$; **$p < .01$; ***$p < .001$

friendship *quantity*. As a final robustness check, we re-ran all of the path models controlling for ethnicity. The findings were very similar to those without this extra control variable.

Sex Differences

Sex was examined as a moderator by comparing two versions of the final model; one in which all paths were estimated freely for both sexes (fully unconstrained model) and one in which all paths were set equal for both sexes (fully constrained model). Chi-square difference testing using the Satorra–Bentler chi-square test revealed no significant differences in any paths in the model, χ^2 (20) = 12.54, $p > .05$, suggesting the model fit equally well for boys and girls. To further evaluate potential sex differences in the longitudinal associations, each path was sequentially evaluated for sex differences by comparing a model with each path freely estimated (for both sexes) to the fully constrained model (with all paths set equal for both sexes). Of particular interest was whether the association between popularity and social preference differed for boys and girls. None of the sequentially freed paths significantly improved model fit, providing additional support for the lack of moderation by sex in this study.

Discussion

Although there has been speculation that experiences at the group-level of social complexity (such as popularity) may be influenced by experiences at the dyadic-level (such as friendship) and vice versa, there is little direct empirical longitudinal evidence on this issue. Empirical examination has been limited because few studies have simultaneously considered a broad range of peer experiences. The overarching goal of this short-term longitudinal study was to address this gap by evaluating the prospective and bidirectional associations between preference, popularity, friendship quantity, and friendship quality during early adolescence. Findings indicated that a *quantitative*, but not qualitative, index of friendship predicted changes in group-level peer experiences. Evidence of reciprocal effects, however, was not found such that neither popularity nor preference predicted changes in friendship experiences. Findings also indicated that friendship quality predicted later friendship quantity, and that popularity predicted later preference, but that the reverse direction effects for these associations were not significant. Each of these findings will be discussed in the sections that follow, along with study limitations and future directions.

Friendship Indices Predicting Later Group- and Dyadic-level Experiences

The findings from this investigation are noteworthy in their suggestion that one specific *quantitative*, but not qualitative, aspect of dyadic-level peer experiences impacts the group-level peer experiences of popularity and preference. Initial friendship quantity predicted increases in *both* preference and popularity over time, suggesting that having many mutual friends helps adolescents become more popular *and* well-liked by their peers. In other words, having many friends appears to promote increasing levels of both popularity and preference. But, the reasons for these associations likely differ. Greater friendship quantity may increase preference because adolescents with many friends may have more chances to engage in the social tasks that are associated with liking, such as generating "fun" ideas, resource sharing, and entering a group (Asher and McDonald 2009). Having many friends, however, may lead to increased popularity vis-à-vis increased perceptions of social visibility and power (Lease et al. 2002). Indeed, as noted previously, one study found that adolescents use friendship quantity as an indicator of social network centrality when judging the degree to which peers are popular (LaFontana and Cillessen 2002). Additional research, though, is needed to test these proposed differential mechanisms of influence.

Our findings further suggest that friendship *quality* may be less likely to impact later levels of popularity and preference, perhaps because friendship quality (and the behaviors related to variability in friendship quality) is less obvious, relative to friendship quantity, and thus noticed less often noticed by the *larger* peer group. However, we did find that preference was associated concurrently with friendship quality. Thus, it may be that young adolescents with high quality friendships behave in ways that are well-liked by the larger peer group, but that such skills do not uniquely foster *changes* in liking over time (perhaps due to the proposed ceiling effect; Landsford et al. (2006). Also of note, the concurrent associations between popularity and friendship quality were not significant.

Although not predictive of changes in popularity and preference, the benefits of being involved in high quality friendships *did* extend to friendship quantity. Initial friendship quality uniquely predicted increases in friendship quantity over time. As noted previously, young adolescent friendships oftentimes exist within larger friendship networks and there are many group activities involving several friendship networks. Thus, it may be that young adolescents with high quality friendships are viewed as attractive potential friends and are able to easily make new friendships with *friends* of their best friends.

Preference and Popularity Predicting Later Dyadic- and Group-level Experiences

The findings from this study are also noteworthy in their indication that preference and popularity are *not* significant predictors of changes in friendship quantity and friendship quality. Thus, an important question to ask is why friendship quantity is predictive of preference and popularity but not vice versa? Although there was indirect evidence suggesting that preference and popularity would lead to increased friendship quantity (e.g., due to increased social visibility; Dijkstra et al. 2010), popularity and preference may not lead to actual changes in friendship quantity for several reasons. First, there is evidence suggesting that highly popular adolescents may maintain their high status, in part, by increasing the exclusivity of their social networks (Dijkstra et al. 2013). Thus, despite being desired or sought after as friends, many popular youth may not actively form new friendships. Related to this idea, there is some indication that popular and preferred adolescents have highly stable friendships (e.g., Ellis and Zarbatany 2007), which might also explain the non-significant longitudinal associations from popularity and preference to friendship quantity in this study. The linkages between popularity and friendship stability appear to be especially strong in studies of young adolescents, which may explain why our findings differed from those of Troop-Gordon and Ranney (2014) who focused on children. Additional research, however, is needed to better understand these findings.

Also noteworthy are findings showing that initial popularity predicted *decreases* in preference over time for *both* girls and boys. Although a similar pattern of results has previously been reported in adolescent girls (Mayeux et al. 2008), this is the first time, to our knowledge, that popularity has been found to predict decreases in preference in *boys*. Thus, our findings suggest that the "cycle of popularity" (Eder 1985) may exist for many young adolescent boys too, perhaps because at least during early adolescence, there are more similarities than differences in the nature and determinants of peer experiences of boys and girls (Rose and Rudolph 2006).

Stability of Constructs

Preference, popularity, friendship quantity, and friendship quality all demonstrated a moderate to high degree of stability in the present sample. Unexpectedly, preference and popularity evidenced similar stabilities across the one-year interval. Our findings are not consistent with results from other studies showing stronger stability for popularity (e.g., Marks et al. 2012), suggesting that additional work is needed to better understand if contextual (e.g., the extent to which young adolescents change classes) or other factors can explain when and why similarities and differences in the stabilities of preference and popularity are evidenced. Also of note, analyses revealed that the friendship *quantity* construct was less stable than the friendship *quality* construct, perhaps because our study spanned a grade transition when losses and gains in friendships are frequent.

Limitations and Future Directions

Several study limitations should be noted. First, although the present study moves the field forward by simultaneously examining longitudinal associations among multiple indices of dyadic- *and* group-level peer experiences, the focus was limited to the popular or preferred status of individuals and did not consider the characteristics of the friends or the friends' perceptions of the quality of the relationship. Recent work suggests that the identity of mutual friends may be an important factor in a variety of social outcomes. For example, Meuwese and colleagues (2016) found that the *friends* of highly preferred and popular adolescents report higher levels of perceived friendship quality than do highly preferred and popular adolescents. Brendgen and colleagues (2000) reported a similar pattern of results. Thus, it may be that the *friends* of popular and preferred youth (but not the popular and preferred youth themselves) experience increases in friendship quality over time (Dijkstra et al. 2010).

Second, it should be emphasized that while significant, several of the effect sizes were small (Cohen 1988), suggesting that there may be other factors accounting for changes in friendship and social status that were not accounted for in the present study. For example, young adolescents' *social behaviors*, such as the degree to which they engage in aggressive and prosocial behavior, may explain when and why preference and popularity leads to changes in friendship experiences. Indeed, highly aggressive popular young adolescents may not experience increased friendship quantity over time (because they are not viewed as attractive potential friends; Thomas and Bowker 2013), but perhaps less aggressive young adolescents do. Thus, it will be important to explore social behaviors as well as other potential moderating and mediating factors to gain a comprehensive understanding of the interrelatedness of and influence between dyadic- and group-level peer experiences in early adolescence.

Finally, our primary analyses included all participants, including those without any mutual friendships. We did run exploratory analyses focused only on those adolescents with mutual friendships. In these analyses, we found that initial friendship quality predicted increases in later preference *and* popularity ($ps < .05$; output available from the first author by request). Reasons for these findings are not clear but it may be that the quality of young adolescents' friendships is

only influential on group-level peer experiences when it is mutual, perhaps due to the greater amount of time that mutual friends spend together relative to non-mutual friends. Future researchers should more carefully consider the importance of mutuality in studies of friendship in relation to popularity and preference as well as other group-level peer experiences, such as peer victimization.

Conclusion

The findings from this study reveal important new information about the degree of interrelatedness and influence among group- and dyadic-level peer experiences during early adolescence. Perhaps most important and novel are the findings that a *quantitative* index of friendship predicted increases in preference and popularity but these group-level peer experiences did not predict increases in dyadic-level friendship indices. Also noteworthy were findings that popularity predicted decreases in preference for both young adolescent girls *and* boys. We hope that our findings set the stage for the refinement of peer relations theories and models as well as further inquiry into the ways in which young adolescents' different experiences with their peers influence each other, and perhaps together, influence well-being and adjustment.

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Authors' Contributions M.S. conceived of the study, performed statistical analyses, interpreted the data, and drafted the manuscript; J.B. participated in the design of the study, was involved in the collection of data, assisted in statistical analyses and interpretation of the data, and helped to revise the manuscript. Both authors read and approved the final manuscript.

Data Sharing Declaration The dataset generated and analyzed during the current study are not publicly available but are available from the second author on reasonable request.

Compliance with Ethical Standards

Conflict of Interest This study was supported by a NICHD grant (1R03 HD056524-01) awarded to Julie Bowker. NICHD had no involvement in the study design, data collection, analyses, or interpretation of results. NICHD also had no involvement in the writing or submission of this manuscript.The authors declare that they have no conflict of interest.

Ethical Approval This study was approved by the University at Buffalo, The State University of New York Institutional Review Board (IRB).

Informed Consent Written parent consent and adolescent assent was obtained for all participants in the study.

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