

Developmental Changes in Gender Composition of Friendship Networks in Adolescent Girls and Boys

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This article describes both normative changes and individual differences in the gender composition of girls' and boys' friendship networks across adolescence and predicts variations in these changes. It also examines changes in the characteristics (context, age difference, closeness, and support) of same- and other-sex friendships in the network. Girls and boys ($N = 390$) were interviewed annually from Grades 6 to 10 (76% retention). Growth in the proportion of other-sex friends was significantly more pronounced for girls and was related to different predictors for girls and boys. Moreover, over time, girls had other-sex friends that were increasingly older than themselves, and most of these friendships took place outside of the school, which was not the case for boys. Growth in the proportion of other-sex friends was more pronounced for secondary than for best friends. Finally, both girls and boys reported receiving higher levels of help from girls than from boys. These findings suggest that other-sex friendships might place some of the girls on a problematic developmental trajectory.

Keywords: other-sex friendships, friendship networks, growth curve analysis, adolescence transitions

Gender is a powerful organizer of peer relationships throughout development. As young as 3 years of age, children clearly show a strong preference for same-sex play partners (Serbin, Moller, Gulko, Powlishta, & Colburne, 1994). This preference results in a segregation of the sexes that dictates the architecture of peer relationships during early and middle childhood. Studies have shown that children devote most of their time to same-sex peers (Maccoby & Jacklin, 1987). In addition, more than 95% of childhood friendships are formed with a peer of the same sex (Kovacs, Parker, & Hoffman, 1996). Boys and girls are thus seen as growing up in two separate and distinct social worlds (Maccoby, 1998). In early adolescence, this gender boundary gradually fades away and other-sex friendships begin to emerge more frequently (Feiring, 1999; Shrum, Cheek, & Hunter, 1988). However, the normative changes in the gender composition of friendship networks during the key transition period of early adolescence and the possibility of individual differences in the timing and the rates of these changes have never been examined. Moreover, the characteristics of these emerging other-sex friendships and how such characteristics change over time are not well understood.

Other-sex friendships in early adolescence have been an object of interest in developmental research primarily because they are considered a stage-developmental pathway to romantic relationships (Connolly, Craig, Goldberg, & Pepler, 2004; Dunphy, 1963). However, other-sex friendships have their own developmental significance. Further, other-sex friendships are not limited to the early adolescence period. They also exist later in adolescence (Kuttler, La Greca, & Prinstein, 1999) and in adulthood (Reeder, 2003), well after the emergence of romantic relationships.

Other-sex friendships also represent unique opportunities both for healthy development (Sippola, 1999) and adverse development (Stattin & Magnusson, 1990). Other-sex friendships are important for healthy development because they offer youth opportunities to develop the interpersonal skills necessary for success in the mixed-sex social and work environments that they will encounter in young adulthood and beyond (Sippola, 1999). More generally, other-sex friendships may aid youth in learning how to interact productively with individuals with interests, experiences, and backgrounds that differ from their own. On the other hand, other-sex friendships could also represent a context for risk and have negative implications for development (Stattin & Magnusson, 1990). For example, Lacasse, Purdy, and Mendelson (2003) found that having a relatively greater proportion of other-sex friends in adolescence is linked to experiencing some form of potentially offensive sexual behaviors.

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The Emergence of Other-Sex Friendships in Early Adolescents' Social Network

The first research question addressed in this article concerns the normative changes and individual differences in the gender composition of girls' and boys' friendship networks across adolescence. According to the available data, developmental changes in the gender composition of friendship networks from childhood to adolescence are observed. For instance, Shrum et al. (1988) ob-

served a gradual increase in other-sex friendships beginning in junior high school and continuing throughout high school. Connolly, Furman, and Konarski (2000) found an increase in the proportion of other-sex friends in youths' networks from Grade 9 to Grade 11. Feiring (1999) also found similar results among children aged 9 to 18 years.

These studies, however, did not examine intraindividual changes in the development of other-sex friendships as they reported only mean differences across age. Thus, questions still remain regarding the extent to which development of other-sex friendships varies across individuals or groups of youths. Similar to many other features of human development, the transition from an almost exclusively same-sex friendship network to a mixed-sex network in adolescence characterizes the experience of most individuals, but some might initiate other-sex friendships earlier or later than others. Some might experience the transition to a mixed-sex network at a faster pace and others more slowly. Thus, an appropriate developmental study of the emergence of other-sex relationships in youths' friendship networks should not only describe individuals' developmental changes but also capture individual differences in these changes over time. Such differences can only be identified through a longitudinal study with repeated assessments of networks and an appropriate coverage of the key transition period of early adolescence, during which growth in the proportion of other-sex friendships in youths' networks is expected. Such an analysis of change should focus on linear trends because studies reporting mean levels across age revealed that changes in the gender composition of friendship networks seem to be relatively linear (Connolly et al., 2000; Shrum et al., 1988).

What could explain why certain individuals initiate the transition from a same-sex to a mixed-sex friendship network earlier than others and experience this transition at a faster pace? Several contextual factors—such as being exposed to a coeducational versus a single-sex school (Caspi, 1995) or having an older other-sex sibling who may grant access to other-sex peers—could contribute to these variations. However, individual factors might also make some youths more likely to develop other-sex friendships earlier than their peers. Specifically, the literature suggests that becoming physically mature earlier than most others, achieving a high social status in the peer group, and displaying antisocial behavior could accelerate this transition. The conceptual and empirical justifications for each of these individual characteristics are presented below.

First, pubertal maturation, which refers to the psychosexual changes related to puberty, is commonly used to account for the decline of gender segregation (Kon, 1981; Maccoby, 1998). However, substantial variability is observed in the timing of pubertal changes (Graber, Petersen, & Brooks-Gunn, 1996) and early maturing individuals, especially girls, might be more likely to affiliate with other-sex peers in middle adolescence (Stattin & Magnusson, 1990). Although the reasons for early maturing girls' greater affiliation with other-sex friends has not been clearly explicated in the empirical literature, it is possible that these girls are physically more attractive to boys or that a greater interest in other-sex relationships co-occurring with their early physical maturation leads the girls to pursue relationships with boys, especially older boys who are at the same level of physical maturity as the girls.

Second, relationship formation among early adolescents is not independent of other processes that take place in the peer group

(Rubin, Bukowski, & Parker, 1998). Group processes, such as social status among peers, should thus be taken into account in the study of other-sex friendships. In his classic description of the various stages of structural changes in the friendship network from unisexual to heterosexual cliques during adolescence, Dunphy (1963) noted that the upper status members of the unisexual cliques were the ones who initiated interactions with other-sex peers. Thereafter, these high-status individuals were imitated by the other group members. Thus, according to this model, youths who initiate the formation of other-sex friendships earlier than the others should be more popular (e.g., have higher social preference ratings among their peers) than other youths. This idea received empirical support in a cross-sectional study conducted with a sample of early adolescents (Bukowski, Sippola, & Hoza, 1999), but has never been tested longitudinally.

Antisocial behavior is a third individual characteristic that could contribute to the acceleration of the transition from a same-sex to a mixed-sex friendship network. According to Moffitt (1993), early adolescence is characterized by a maturity gap in which individuals begin to evidence biological maturity but have not yet acquired adult status in society. During this period, youth perceive antisocial behavior as a sign of independence. Such behavior becomes normative—even valued—because of its apparent association with adult status. Antisocial individuals become more central in the peer group and more attractive, especially to other-sex peers (Bukowski, Sippola, & Newcomb, 2000). Thus, antisocial individuals should develop friendships with members of the other sex earlier. A link between antisocial behavior and accelerated relationships with the other sex has been found in previous studies. Specifically, antisocial youth engage in romantic relationships and sexual activity at a younger age (Dishion, Poulin, & Medici-Skaggs, 2000; French & Dishion, 2003; Magnusson, Stattin, & Allen, 1985).

Characteristics of Relationships With Same- and Other-Sex Friends

The second major focus of this study is to examine developmental changes in various characteristics of youths' relationships with same- and other-sex friends. Four characteristics are considered here, including (a) the context in which these friendships emerge, for example, school versus out-of-school, (b) the age of the friends, (c) the level of help received from the friends, and (d) the status of the friends in the network, for example, best versus secondary.

Prior empirical research on the contexts in which same- and other-sex friendships emerge and on the issue of the relative ages of the youths and their other-sex friends is scarce. In several of the published studies, same- and other-sex friendship nominations were constrained to school peers only and, in several cases, to same-age peers (e.g., grademates). This procedure might induce a strong bias in the gender composition of the youths' friendship networks. Other-sex friendships might be more likely to form with peers of different ages and from out-of-school. Indeed, one explanation put forward by researchers to account for sex segregation in childhood is the group pressure against the violation of the gender boundary, especially among boys (Maccoby, 1998). Relationships that form in the out-of-school contexts, where fewer same-sex options are available, such as the neighborhood, may be less likely

to conform to the pressure to maintain sex segregation (Maccoby, 1998). Further, recent research has emphasized the importance of considering out-of-school contexts in the study of early adolescent peer relations (Kiesner, Poulin, & Nicotra, 2003; Mahoney, 2000).

Regarding the issue of age differences among friends, Stattin and Magnusson (1990) found that early maturing girls are more likely to form other-sex friendships with older peers, which would not be apparent if the assessment of friendship networks is limited to grademates. The development of friendships with older adolescents could be particularly marked in early adolescence when youths transition to high school and have more opportunities to form friendships with older peers (Berndt, Hawkins, & Jiao, 1999).

Same- and other-sex friendships might also develop in different ways. For most youths, the inclusion of other-sex peers in the network begins in early adolescence, when they already have several years of relationship history with same-sex friends. As Maccoby (1998) pointed out, in early adolescence, the two sexes gradually have to learn how to live together. Consequently, changes in the characteristics of the other-sex friendships could be expected during these years. As they grow older, girls and boys gain more emotional and cognitive maturity and become more involved in their relationships with each other, all of which should result in an increase in the significance of their other-sex friendships. One way to examine the significance of emerging relationships in an individual's network is to consider the extent to which the individual turns to these new friends when he or she needs help. In a study involving direct comparisons between adolescents' same- and other-sex friendships, Kuttler et al. (1999) found that both male and female adolescents reported more companionship in their same-sex friendships than their other-sex friendships. However, this study also found that girls reported receiving more help from their same-sex friends compared to their other-sex friends whereas boys reported receiving the same level of help irrespective of the sex of their friends. Thus there are both similarities and differences in the way same- and other-sex friendships are experienced by girls and boys.

Another characteristic of the friendship network is the status of each friend within the network. For example, best friends are more stable and are more influential than secondary friends (Degirmencioglu, Urberg, Tolson, & Richard, 1998; Hussong, 2002; Urberg, Degirmencioglu, Tolson, & Halliday-Scher, 1995). Thus, developmental changes in the gender composition of the network might operate differently according to the status of friendships within the network. A careful examination of the integration of other-sex peers at different status levels would certainly enlighten our understanding of the developmental significance of these friendships.

The Current Study

In this study, we followed a normative sample of male and female adolescents over a 5-year period (Grades 6 to 10) and interviewed them annually regarding the composition and characteristics of their friendship networks. This age period includes the transition from elementary school (Grade 6) to secondary school (Grades 7–10) in Quebec, Canada. Most youths experience substantial changes in their friendship networks during the transition to the larger secondary schools (Berndt et al., 1999; Hardy, Bukowski, & Sippola, 2002). As a result of this transition, they are exposed to a larger, more diverse pool of potential friends, includ-

ing older friends. Because the focus of this study was on friendships that emerge outside the context of the family or romantic relationships, friendships with cousins, siblings, and romantic partners were not included in our conceptualization of the friendship network. Sippola (1999) has emphasized the importance of distinguishing among platonic and romantic friendships in research on other-sex relationships.

Our first goal was to describe both normative changes and individual differences in the gender composition of girls' and boys' friendship networks across adolescence. Using latent growth curve analysis (Duncan, Duncan, Strycker, Li, & Alpert, 1999), we examined the initial levels and rates of change in the proportion of other-sex friends in the youths' friendship networks. Because previous work in this area has found no evidence of higher order patterns of change in other-sex friendships, our analyses focused on linear trends. We also sought to explain individual variation in the growth of girls' and boys' other-sex friendship networks with predictors measured in Grades 6 and 7. We expected that becoming physically mature earlier, achieving a high social status in the peer group, and displaying antisocial behavior would be positively related to increases in other-sex friendship.

Our second goal was to examine changes in the characteristics of the youths' relationships with other-sex versus same-sex friends. In the present study, no constraints were imposed regarding friendship nominations. In other words, participants could nominate friends from any context (in school or out of school) or age group. Thus, we could test the hypotheses that other-sex friendships are more likely than same-sex friendships to (a) take place outside of the school context and (b) involve peers from different age groups. We also predicted that the level of support that youths perceive in their friendships with other-sex friends would increase throughout adolescence. Regarding the status of the friends in the network, we expected that growth in the proportion of other-sex friendships would be more pronounced at the secondary-friend level than at the best-friend level. Finally, given the consistency with which prior research has identified sex differences in the characteristics and functions of same-sex friendships and, in some instances, of other-sex friendships (e.g., Benenson, 1990; Bukowski et al., 1999; Kuttler et al., 1999; Maccoby, 1990; Rose & Rudolph, 2006), our study focused on sex differences when examining changes in characteristics of same- and other-sex friends.

Method

Participants

This longitudinal study began with 390 sixth grade students (58% girls; mean age = 12.38 years; $SD = 0.42$) who were enrolled in eight elementary schools from a large French-speaking school district in Canada. Parents provided written consent for their child's participation. Approximately 75% of the available student population participated in this study. The sample was 90% European Canadian, 3% Haitian Canadian, 3% Middle Eastern Canadian, 2% Asian Canadian, and 2% Latino; 72% of the participants lived with both biological parents. The sample was largely middle class, with a mean family income between \$45,000 and \$55,000 (Canadian). Mothers and fathers had completed an average of 13.10 ($SD = 2.68$) and 13.20 ($SD = 3.20$) years of

schooling, respectively. Of the original sample, 294 (76%) were still involved in the study in Grade 10. The remaining participants did not differ from the rest of the sample on demographic characteristics, the study variables in Grade 6, or Grade 7 pubertal timing. Specifically, we conducted an attrition analysis in which sex, the Grade 6 predictors, and Grade 7 pubertal timing were used to predict missingness on the other-sex friendship proportion scores at each grade in a logistic regression framework. The results suggest that differential attrition did not occur. In only one of the five tests was a predictor significantly related to missingness. In Grade 8, boys were more likely to be missing than girls, $\beta = .64$, standard error (SE) = .31, $p < .05$, $OR = 1.89$. No other significant associations between the predictors and missingness were observed.

Procedures

In elementary school (Grade 6), questionnaires were completed in the classroom. Graduate research assistants were in charge of the questionnaire administration. Teachers had 2 weeks to complete the questionnaire on youth antisocial behavior. In high school (Grades 7 to 10), similar procedures were followed. Again, questionnaires were completed in the school setting under the supervision of research assistants. Participants were spread out in over 30 schools, however, and some assessments had to be conducted individually at the participant's home (approximately 10 cases per year) or the questionnaires had to be sent by mail (approximately 5 per year). In Grades 7, 8, 9, and 10, participants received a \$20 gift certificate (to a movie theater, music store, or sports store) for their participation.

Measures

The adolescent's friendship network. First, participants were asked to write down the complete name (first and last names) of up to 10 friends. No constraints were imposed regarding the context in which these friendships took place. The friends could be from the school, the neighborhood, an after-school activity, or another context. The number of friends was limited to 10 in order to be consistent with procedures used by other adolescent friendship-network researchers (e.g., Degirmencioglu et al., 1998; Kuttler et al., 1999; Ryan, 2001; Urberg et al., 1995). Second, participants were asked to mark an *X* next to their three best friends on the list.

For some of the analyses, this information was used to break down each participant's network into two levels of friends: (a) best friends and (b) secondary friends (the remaining friends in the network).

In a third step, participants were asked to answer a series of questions for each of the nominated friends. The items used in the present article are (a) the friend's gender; (b) the age of the friend; (c) the level of help received from this friend (determined in response to the question, "Does this person help you when you need it?" rated on a 1 to 5 scale); and (d) the nature of the relationship. For this last question, eight alternatives were provided and the youth were asked to choose the ones that best describe the relationship: (a) "friend from school;" (b) "friend from the neighborhood;" (c) "friend from sports or leisure;" (d) "childhood friend;" (e) "friend of the family;" (f) "cousin;" (g) "brother or sister," and (h) "boyfriend or girlfriend." For the present article, the friends who were designated by the participants as belonging to one of the last three categories (e.g., cousin, brother/sister, boyfriend/girlfriend) were removed from the network and not considered in the current analyses. These friendships represented less than 5% of the total nominations. For the current analyses, the remaining types of relationships were grouped in two summary categories: (a) friends from school and (b) friends from out of school. A friend was coded as from school if the "friend from school" response was marked, even if the participant indicated that the friend was also from the neighborhood or another context.

Several variables were created from this friendship network inventory. First, the total number of friends in the network, the number of same-sex friends, the number of other-sex friends, and the proportion of the friendship network comprised of other-sex friends were computed (see Table 1). Second, for each participant and at each wave of data collection, the following four variables were computed separately for same- and other-sex friends: (a) mean age of the friends in months, (b) mean level of help or support, (c) number of school friends, and (d) number of out-of-school friends. Finally, in order to investigate the distinction between best friends and other friends, four additional variables were computed for each participant at each wave of data collection: (a) the number of same-sex best friends, (b) the number of other-sex best friends, (c) the number of same-sex secondary friends, and (d) the number of other-sex secondary friends.

Table 1
Mean Number of Same- and Other-Sex Friends by Sex and Grade

Sex and Type of Friendship	Number of Friends (Standard Deviation in Parentheses)				
	Grade 6	Grade 7	Grade 8	Grade 9	Grade 10
Girls					
Same sex	7.35 (2.12)	6.76 (2.18)	6.79 (2.06)	6.22 (2.15)	6.00 (2.27)
Other sex	1.65 (1.68)	1.90 (1.71)	2.32 (1.79)	2.68 (1.86)	2.63 (1.90)
<i>n</i>	227	205	171	179	178
Boys					
Same sex	6.56 (2.32)	6.07 (2.34)	6.76 (2.12)	6.45 (2.15)	6.22 (2.0)
Other sex	1.32 (1.53)	1.16 (1.54)	1.31 (1.50)	1.57 (1.65)	1.80 (1.69)
<i>n</i>	163	153	111	114	116
Total					
<i>N</i>	390	358	282	293	294

Pubertal timing. Pubertal timing was assessed in Grade 7 using the Pubertal Development Scale (Petersen, Crockett, Richards, & Boxer, 1988); 355 students (91% of the original sample) had data on this variable. On a scale ranging from 1 (*have not begun*) to 4 (*development completed*), the youths indicated the extent to which they had experienced pubertal growth in several domains during the past 12 months. The total Pubertal Development Scale scores were averaged within each gender. Internal consistency was acceptable for both boys ($\alpha = .63$) and girls ($\alpha = .68$). The pubertal timing classification was created according to the procedure recommended in the literature (see Ge, Kim, et al., 2001; Graber et al., 1996). We classified girls and boys by dividing the sample into early maturing, on-time, and late-maturing groups. Youths whose scores were more than one standard deviation above or below the mean of their own sex were classified as early or late maturing, respectively. Youths whose pubertal timing scores fell within one standard deviation of the mean of their own sex were classified as maturing on time. Following this classification procedure, 32 boys and 26 girls were classified as early, 85 boys and 157 girls as on-time, and 32 boys and 26 girls as late maturers. In the analyses, this classification was treated as a continuous variable with 0 = early, 1 = on time, and 2 = late. To be consistent with prior research (e.g., Ge, Conger, & Elder, 2001; Ge, Kim, et al., 2001) pubertal status was used as a continuous variable in the analyses.

Antisocial behavior. Assessment of youth antisocial behavior in Grade 6 was based on teacher report. The teacher rating scale was comprised of 10 items including Dodge and Coie's (1987) 6-item proactive/reactive aggression and 4 other indicators of antisocial behavior. Response options ranged from 1 (*never*) to 5 (*almost always*). The internal consistency for the antisocial behavior scale was high ($\alpha = .95$), and a mean was calculated across the 10 items.

Social preference among same- and other-sex classmates. Sociometric nominations were conducted within each Grade 6 classroom. Participants were provided with a list of their classroom peers who were part of the study. They were asked to nominate "Those you would invite to your birthday party or that you like to

play with the most" (liked-most nominations; LM) and "Those you would not invite to your birthday party or that you like to play with the least" (liked-least nominations; LL). No restrictions were imposed regarding the gender and the number of classmates that could be nominated. The number of LM minus LL nominations received from same-sex classroom peers and other-sex classroom peers was computed for each participant. These scores were then standardized within each classroom and across gender. Same-sex and other-sex social preference scores (LM and LL) were calculated for each participant, based on Coie and Dodge's (1983) procedure.

Results

Bivariate Associations

First, bivariate correlations among the other-sex proportion scores and predictor variables, including sex, age in Grade 6, pubertal timing, and social preference as rated by boys and girls, were examined (see Table 2). The other-sex friendship proportion scores were positively intercorrelated across all grades. Sex was also related to the other-sex friendship proportion scores at all grades except Grade 6. In every other year, being female was associated with having a higher proportion of other-sex friends in the network. Few bivariate associations were observed between the other predictors and the other-sex friendship proportion scores. The Grade 6 proportion score was positively related to age, aggression and, at the trend level, social preference as rated by boys. Other trend-level correlations include a negative correlation between the Grade 8 proportion score and aggression, a positive correlation between the Grade 8 proportion score and social preference as rated by boys, and a positive correlation between the Grade 9 proportion score and age at Grade 6.

Among the predictors, sex and aggression were correlated such that boys were rated as more aggressive in Grade 6. Age and pubertal timing were also positively related. Children who were older in Grade 6 were more likely to be early maturing. Boy- and girl-rated social preference were also positively related. Finally,

Table 2
Bivariate Associations Among Study Variables

Variable	Proportion of Other-Sex Friends in Network					Predictors ^a					
	Grade 6 (a)	Grade 7 (b)	Grade 8 (c)	Grade 9 (d)	Grade 10 (e)	Sex ^b (f)	Age (g)	Pubertal Timing (h)	Aggression (i)	Social Preference: Boys (j)	Social Preference: Girls (k)
a	1.00										
b	0.36**	1.00									
c	0.36**	0.53**	1.00								
d	0.24**	0.44**	0.61**	1.00							
e	0.26**	0.32**	0.46**	0.56**	1.00						
f	-0.07	-0.17**	-0.26**	-0.28**	-0.21**	1.00					
g	0.14**	0.08	0.09	0.10	0.07	-0.03	1.00				
h	-0.02	0.02	0.03	0.01	-0.03	-0.01	0.14**	1.00			
i	0.10**	-0.04	-0.11*	-0.02	0.03	0.30**	0.02	0.07	1.00		
j	0.10*	0.05	0.11*	0.05	0.08	0.00	-0.02	0.07	-0.11*	1.00	
k	0.03	0.06	0.05	0.04	0.05	0.00	-0.05	-0.02	-0.09*	0.37**	1.00

Note. ^aAll predictors were measured at Grade 6 except for pubertal timing, which was measured at Grade 7. ^b1 = boys, 0 = girls.
* $p < .10$. ** $p < .05$.

trend-level negative correlations were observed between aggression and each of the social preference scores.

Growth Curve Analyses

A series of linear latent growth curve analyses were used to answer the study's main questions. Linear latent growth modeling was suited to the current study's goals because it allows for the identification of both the average level of, and change in, a particular phenomenon of interest. In addition, using this analytic strategy, the researcher can determine the extent to which individuals vary from the mean pattern of change and any individual or contextual characteristics that predict such variation (Willet, Singer, & Martin, 1998). In linear latent growth modeling, the within-person model expresses the outcome as a linear function of time. In the current analyses, time was centered at Grade 7, the year at which the youths were in the first year of high school. The students experienced a school transition just prior to this grade. Thus, this age was of particular interest to us. The level-two model specifies that the parameters in the level-one model are random effects with specified means. Individual difference variables, such as sex, can then be used to explain variation around those means.

First, we characterized the proportion of other-sex friends reported by the youths across Grades 6 to 10, testing specifically for sex differences in the parameter estimates. Second, we tested a series of additional predictors of the intercept and the slope of the growth in the proportion of other-sex friends in the friendship network. We also examined whether these predictors were independent of the effects of sex on the growth curve parameters or if they interacted with sex to predict those parameters. Third, we sought to identify any changes in the same- and other-sex friends and friendship characteristics (i.e., in-school and out-of-school friends, age of the friends, the level of help, and best versus secondary friends) over time. Again, we also focused on whether these changes differed by sex. All analyses used a full information maximum likelihood method (Arbuckle & Wothke, 1999) that is robust to the level of missingness in the current data set. For all the latent growth models reported in this study, Mplus 3.13 structural equation modeling software (Muthén & Muthén, 2004) was used.

Network Composition

The mean number of same- and other-sex friends in the network for girls and boys at each grade are presented in Table 1. Because the total number of friends tended to be stable in this sample but the number of other-sex friends changed over time, we examined the proportions of the networks comprising other-sex friends using a linear latent growth curve analysis.¹ Proportion scores at adjacent time points were correlated based on modification indices suggesting this would improve the fit of the model. The inclusion of these correlations did indeed improve the fit of the model but did not affect the parameter estimates reported below.

The unconditional analysis fit the data well, $\chi^2(6) = 10.45, p = ns$, comparative fit index (CFI) = .99, Tucker-Lewis Index (TLI) = .98, root mean square error of approximation (RMSEA) = .04. The results indicate that the mean proportion of other-sex friends in the youth's friendship networks in Grade 7 was .19, $SE = .01, Z\text{-statistic} = 27.22, p < .001$, confidence interval (CI) = 0.17, 0.20. In addition, this proportion increased by

.03 ($SE = .003, Z = 8.00, p < .001, CI = 0.02, 0.04$) each year. Adding sex as a covariate of the intercept and slope also yielded a model that fit the data well, $\chi^2(9) = 13.59, p = ns$, CFI = .99, TLI = .98, RMSEA = .04. Sex was related significantly to both the intercept and slope. The parameter estimates indicate that the proportion of girls' friendship networks comprising boys is .21 ($SE = .01, Z = 23.65, p < .001, CI = 0.20, 0.23$). This proportion increases by .03 each year ($SE = .004, Z = 8.21, p < .001; CI = 0.03, 0.04$). So, by Grade 10, the proportion of boys in the girls' networks averaged .33. The path between sex and the intercept indicates that the proportion of girls in Grade 7 boys' friendship networks is .16 ($\beta = -.05, SE = .01, Z = -3.89, p < .01, \beta = -.23, CI = -0.08, -0.03$). This proportion also increases at a slower rate for boys as compared to girls (.01 each year for boys versus .03 for girls; $\beta = -.02, SE = .01, Z = -3.16, p < .01, \beta = -.27, CI = -0.03, -0.01$). Only 19% of the Grade 10 boys' friendship networks were girls. The R^2 value indicates that sex explained 5.4% of the variance in the intercept and 7.1% of the variance in the slope. Significant variance remained in both the intercept ($\beta = .01, SE = .001, Z = 6.27, p < .001, \beta = .95, CI = 0.01, 0.02$) and slope ($\beta = .001, SE < .001, Z = 2.70, p < .05, \beta = .93, CI = 0.000, 0.002$) that could be explained by other factors.

Predictors of Network Composition

A linear growth curve analysis was conducted in order to determine the effects of a variety of individual predictors on the proportion of other-sex friends in the adolescents' networks. These predictors were explored both as variables that could explain variance in the other-sex growth parameters independent of sex (i.e., as main effects) and as variables that might explain the observed sex differences in these parameters (i.e., in interaction with sex). In addition to sex, predictors included age, Grade 7 pubertal timing, Grade 6 teacher-rated antisocial behavior, and Grade 6 social preference scores from male and female classroom peers.

The analysis resulted in a good fit to the data, $\chi^2(43) = 64.09, p < .05$, CFI/TLI = .95/.93, RMSEA = .04. No significant main effects or interactions with age were observed. However, significant associations of the intercept or slope with sex, antisocial behavior, pubertal timing, and social preference scores—either alone or in interaction with sex—were observed. At the individual level, girls who were rated as more antisocial by their sixth grade teachers had more male friends in seventh grade ($\beta = .04, SE = .01, Z = 3.25, p < .01, \beta = -.31, CI = 0.02, 0.07$). Specifically, for each unit increase in antisocial behavior, the proportion of the friendship network comprising boys increased by .04. A significant interaction between sex and Grade 6 antisocial behavior indicated that this association did not hold for boys ($\beta = -.05,$

¹ In order to control for individual differences in the size of the participants' friendship networks, this analysis was also conducted adjusting for the raw number of friends reported at the first wave of data collection. The inclusion of this control did not affect the fit of the model, the direction or magnitude of the associations between sex and the intercept and slope, or the significance of the residual variance estimates. In addition, initial network size was significantly related only to the intercept.

$SE = .02, Z = -2.79, p < .05, \beta = -.48, CI = -0.08, -0.01$). Antisocial behavior was unrelated to the slope.

A follow-up analysis was conducted in which the number and proportion of other-sex friends reported by girls at 0.5 standard deviation above the mean value on antisocial behavior were compared to those of other girls. The results indicate that, in Grade 7, more antisocial girls reported a mean of 2.58 ($SD = 1.84$) other-sex friends. The mean among less antisocial girls ($M = 1.73, SD = 1.65$) was significantly lower, $t(198) = -2.82, p < .01, CI = -1.43, -0.25$. Further, the proportion of more antisocial girls' friendship networks comprising other-sex friends was .27 ($SD = .18$), compared to .20 ($SD = .18$) among less antisocial girls, $t(198) = -2.35, p < .05, CI = -0.14, -0.01$.

Returning to the growth curve results, although pubertal timing was unrelated to the intercept, a Main Effect and Sex \times Pubertal Timing interaction was observed for the slope (see Figure 1). The slope of the other-sex friendship curve was predicted at the trend level by pubertal timing ($\beta = .02, SE = .01, Z = 1.84, p < .10$,

$\beta = .25, CI = -0.001, 0.03$). This estimate suggests that the increase in other-sex friendships among girls may be steeper for those experiencing puberty early. Further, the Sex by Pubertal Timing ($\beta = -.02, SE = .01, Z = -2.09, p < .05, \beta = -.73, CI = -0.05, -0.01$) interaction was statistically significant, indicating that the association of pubertal status with the other-sex friendship slope did not hold for boys.

For girls, social preference as rated by boys was significantly associated with having a greater proportion of boys in the Grade 7 friendship network ($\beta = .02, SE = .01, Z = 2.87, p < .05, \beta = .26, CI = 0.01, 0.03$). Specifically, for each unit increase in social preference, the proportion of the network comprising boys increased by .02. The significant Sex \times Boy-rated Social Preference interaction, which was of a similar magnitude but in the opposite direction to the main effect, indicates that this association did not hold for boys ($\beta = -.03, SE = .01, Z = -2.58, p < .05, \beta = -.35, CI = -0.05, -0.01$). A nonsignificant main effect for girl-rated social preference combined with a significant interaction between sex and girl-rated social preference ($\beta = .03, SE = .01, Z = 2.80, p < .05, \beta = .22, CI = 0.01, 0.05$) suggests that girl-rated social preference was positively associated with the proportion of other-sex friends in the boys' networks. In other words, girls rated as more popular by boys had more male friends in their networks in seventh grade compared to less popular girls. Boys rated as more popular by girls had more female friends in seventh grade than less popular boys.

The slope of the other-sex friendship curve was predicted significantly by girls' social preference ratings ($\beta = .01, SE = .003, Z = 2.22, p < .05, \beta = .26, CI = 0.001, 0.01$). This finding indicates that the increase in other-sex friendships among girls is steeper for those rated as more popular by other girls. The Sex \times Girls' Social Preference interaction ($\beta = -.02, SE = .01, Z = -3.00, p < .05, \beta = -.35, CI = -0.02, -0.01$) was also statistically significant. This indicates that the positive association between girl-rated social preference and the other-sex friendship slope did not hold for boys. Instead, a trend-level interaction between sex and boy-rated social preference ($\beta = .01, SE = .01, Z = 1.91, p < .10, \beta = .26, CI = 0.00, 0.02$) suggests that, among boys, being more popular among other boys is associated with a steeper increase in the proportion of girls in the friendship network.

The random effects estimates indicate that although the predictors explain 17.4% and 19.5% of the variance in the intercept and slope, respectively, a significant proportion of the variance in the intercept ($\beta = .01, SE = .001, Z = 8.50, p < .001, \beta = .83, CI = 0.01, 0.01$) and slope ($\beta = .001, SE = .001, Z = 3.63, p < .001, \beta = .81, CI = 0.001, 0.002$) remains unexplained by the covariates in the model.

Characteristics of Other-Sex Friends

In-school and out-of-school friends. We next investigated how the proportion of other-sex friends in adolescents' friendship networks varies by sex and context (i.e., in-school versus out-of-school). Two analyses were conducted (see Figure 2). The first examined sex as a predictor of growth in in-school other-sex friendships over time. This analysis resulted in an acceptable fit to the data, $\chi^2(11) = 18.21, p = ns, CFI/TLI = .89/.84, RMSEA = .04$. For girls, the proportion of in-school friends of the other

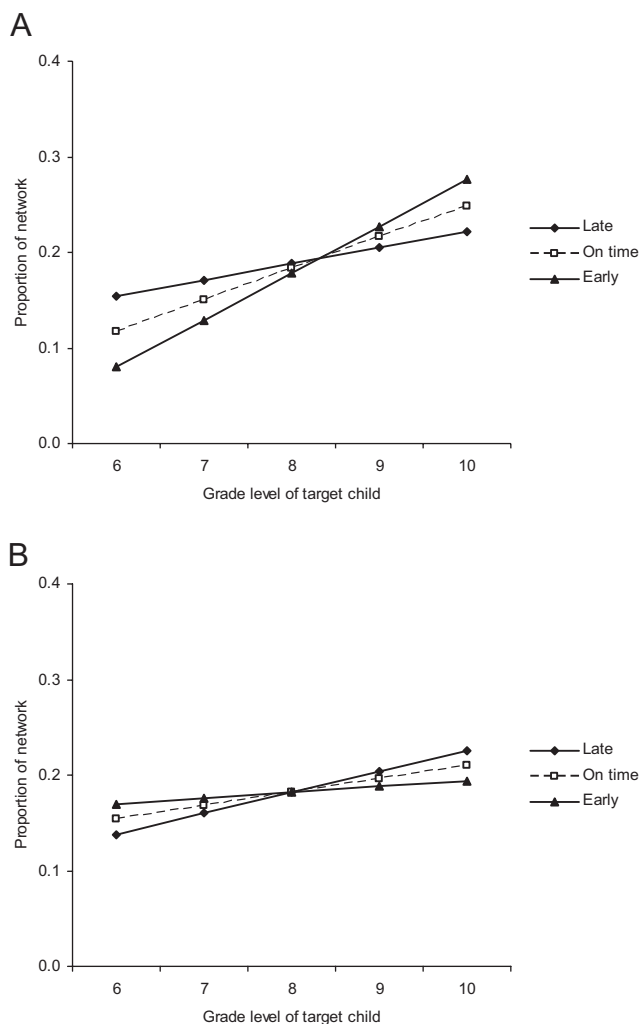


Figure 1. A: Change in the proportion of girls' friendships that are other-sex by pubertal status. B: Change in the proportion of boys' friendships that are other-sex by pubertal status.

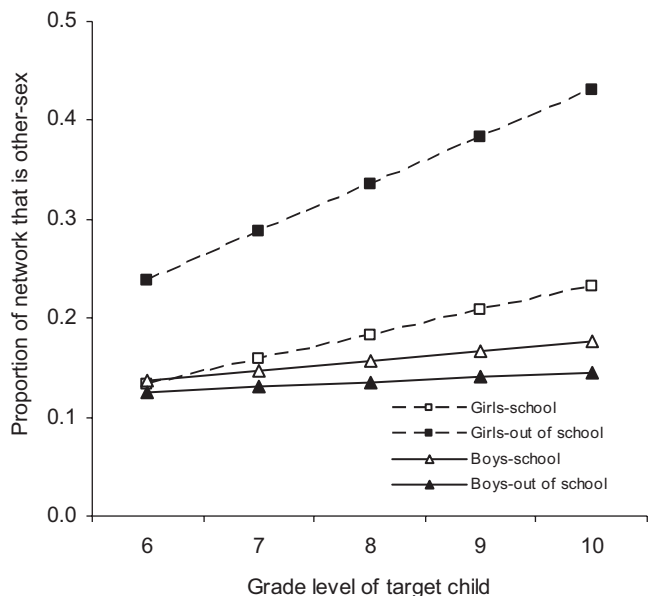


Figure 2. Proportion of boys' and girls' friendships that are other-sex by context and grade level.

gender was .16 ($SE = .01$, $Z = 16.51$, $p \leq .001$, $CI = 0.14, 0.18$) in Grade 7. This proportion increased by .02 per year ($SE = .01$, $Z = 3.27$, $p \leq .01$, $CI = 0.01, 0.03$). The relation of the sex of the target child to the intercept (estimate = $-.01$, $SE = .02$, $Z = -.53$, $p = ns$, $\beta = -.04$, $CI = -0.04, 0.02$) and slope ($\beta = -.002$, $SE = .01$, $Z = -.34$, $p = ns$, $\beta = -.04$, $CI = -0.02, 0.01$) parameters indicated that this growth curve characterized the level and rate of change of the gender composition of in-school friendship networks for both boys and girls.

The second analysis examined sex as a predictor of out-of-school other-sex friendships over time. This linear growth curve was a very good fit to the data, $\chi^2(7) = 2.61$, $p = ns$, $CFI/TLI = 1.00/1.04$, $RMSEA = .00$. (In order to improve the fit, correlations among adjacent time points were estimated. Estimating these correlations did not improve the fit of the in-school network analysis.) For girls, the proportion of out-of-school friends of the other sex was .29 ($SE = .02$, $Z = 18.77$, $p \leq .001$, $CI = 0.26, 0.32$) in Grade 7. This proportion increased by .05 per year ($SE = -.01$, $Z = 5.04$, $p \leq .001$, $CI = 0.03, 0.06$). The relation of the sex of the target child to the intercept ($\beta = -.15$, $SE = .02$, $Z = -6.62$, $p \leq .001$, $\beta = -.42$, $CI = -0.20, -0.11$) and slope ($\beta = -.04$, $SE = .01$, $Z = -3.35$, $p \leq .01$, $\beta = -.45$, $CI = -0.06, -0.02$) parameters indicated that boys have significantly fewer other-sex friends among their out-of-school friends in Grade 7 and that the rate of increase in other-sex friends is slower for boys than for girls.

Age of the friends. Two growth curve analyses were conducted—one for other-sex friends and one for same-sex friends—to determine the degree to which the mean age of boys' and girls' same and other-sex friends increase over time (See Figure 3). First, sex was examined as a predictor of the level of, and change in, the mean age in months of study youth's other-sex friends. The analysis resulted in a good fit to the data, $\chi^2(13) = 16.43$, $p = ns$, $CFI/TLI = .98/.98$, $RMSEA = .03$. The model indicates that girls'

other-sex friends at Grade 7 are 159.76 months (or 13.31 years) old ($SE = .92$, $Z = 174.57$, $p < .001$, $CI = 157.97, 161.56$)—approximately the same average age as the full sample at Grade 7 ($M = 160.64$, $SD = 5.08$). The mean age of the girls' other-sex friends increased by an average of 13.61 months per year ($SE = .45$, $Z = 30.18$, $p < .001$, $CI = 12.73, 14.50$). So, by Grade 10, when the girls were, on average, 16.38 years old, the model indicates that their male friends averaged 16.72 years old. The other-sex friends of the boys in the study, however, tended to be younger than girls' other-sex friends at Grade 7 by an average of 4.30 months ($SE = 1.53$, $Z = 2.82$, $p < .05$, $\beta = -.29$, $CI = -7.30, -1.30$) and increased in age at a slower rate ($\beta = -2.62$, $SE = .76$, $Z = -3.46$, $p < .01$, $\beta = -.35$, $CI = -4.10, -1.13$). So, the model indicates that boys' other-sex friends were approximately 12.96 years old in Grade 7 and 15.70 years old in Grade 10.

The second growth curve analysis examined growth in the age of the same-sex friends of boys and girls. The analysis was also a good fit to the data, $\chi^2(13) = 12.26$, $p = ns$, $CFI/TLI = 1.00/1.00$, $RMSEA = .00$. Seventh grade girls' same-sex friends were, on average, 154.48 months (or 12.87 years) old ($SE = .44$, $Z = 352.50$, $p < .001$, $CI = 153.62, 155.33$). (Note that this is more than 5 months younger than the girls' other-sex friends at this grade level.) The girls' same-sex friends increased in age by 12.11 months per year ($SE = .21$, $Z = 56.79$, $p < .001$, $CI = 11.69, 12.52$). The age of boys' same-sex friends did not differ significantly from that of girls' same-sex friends at Grade 7 ($\beta = .71$, $SE = .68$, $Z = 1.05$, $p = ns$, $\beta = .10$, $CI = -.62, 2.04$). There was a trend for the age of boys' same sex friends to increase less rapidly than that of girls by .61 months per year ($SE = .34$, $Z = -1.83$, $p < .10$, $\beta = -.18$, $CI = -1.27, 0.04$).

Help. Sex differences in the amount of help provided by same- and other-sex friends were tested using two latent growth curve analyses (see Figure 4). First, sex was used as a predictor of the

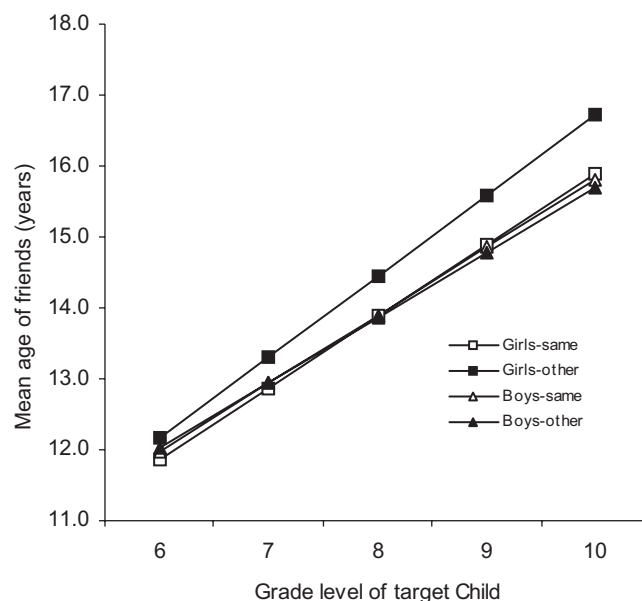


Figure 3. Age of boys' and girls' same- and other-sex friends by grade level.

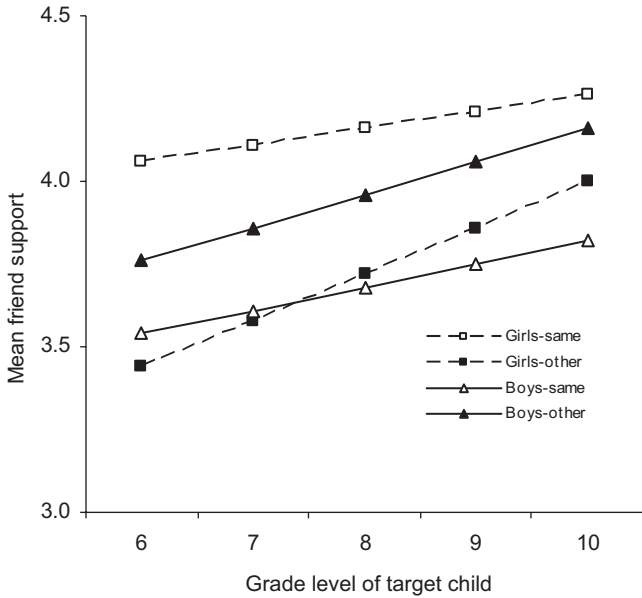


Figure 4. Support provided by boys' and girls' same- and other-sex friends by grade level.

slope and intercept of the amount of help provided by same-sex friends. The analysis provided an acceptable fit to the data, $\chi^2(12) = 23.61, p \leq .05, CFI/TLI = .97/.96, RMSEA = .05$. For girls, female friends provided high levels of help in Grade 7 ($\beta = 4.11, SE = .05, Z = 89.60, p \leq .001, CI = 4.02, 4.20$), and help increased significantly each year ($\beta = .05, SE = .02, Z = 2.81, p \leq .05, CI = 0.02, 0.09$). Boys reported receiving significantly less help from their male friends in Grade 7 ($\beta = -.50, SE = .07, Z = -7.06, p \leq .001, \beta = -.42, CI = -0.63, -0.36$), although the amount of help provided to boys by their male friends increased at the same rate as that provided to girls by their female friends ($\beta = .02, SE = .03, Z = .81, p = ns, \beta = .10, CI = 0.03, 0.08$).

Next, sex was used as a predictor of the slope and intercept of the amount of help provided by other-sex friends. The analysis resulted in a good fit to the data, $\chi^2(12) = 16.52, p = ns, CFI/TLI = .97/.96, RMSEA = .03$. For girls, male friends provided low levels of help in Grade 7 ($\beta = 3.58, SE = .07, Z = 52.68, p \leq .001, CI = 0.30, 0.60$), but help provided by male friends increased significantly each year ($\beta = .14, SE = .03, Z = 4.70, p \leq .001, CI = 0.02, 0.08$). Boys reported receiving significantly more help from their female friends than was received by girls from their male friends in Grade 7 ($\beta = .28, SE = .11, Z = 2.60, p \leq .05, \beta = .20, CI = 0.07, 0.49$), although the amount of help provided to boys by their female friends increased at approximately the same rate as that provided to girls by their male friends ($\beta = -.04, SE = .05, Z = -.73, p = ns, \beta = -.08, CI = -0.13, 0.06$).

Best versus secondary friends. Two growth curves were estimated; one for the proportion of best friends in the network comprising other-sex friends and one for the proportion of secondary friends in the network comprising other-sex friends (see Figure 5). In each analysis, sex was used as a predictor of the slope and intercept. The best friend analysis fit the data well, $\chi^2(9) =$

11.76, $p = ns, CFI/TLI = .99/.98, RMSEA = .03$. The proportion of girls' best friend networks comprising boys in Grade 7 was .12 ($SE = .01, Z = 12.25, p \leq .001, CI = 0.10, 0.14$) and this proportion increased by .02 each year during high school ($SE = .01, Z = 3.56, p < .01, CI = 0.01, 0.03$). Sex was unrelated to the intercept, indicating that the proportion of girls in the boys' Grade 7 best friend networks was approximately the same as that of boys in the girls' best friend networks ($\beta = -.02, SE = .02, Z = -.98, p = ns, \beta = -.07, CI = -0.05, 0.02$). A significant association between sex and the slope, however, indicates that the proportion of girls in the boys' best friend networks did not increase as rapidly over time ($\beta = -.02, SE = .01, Z = -2.17, p < .05, \beta = -.25, CI = -0.03, -0.001$).

The secondary friend analysis did not fit the data as well as the best friend analysis, $\chi^2(7) = 32.46, p \leq .001, CFI/TLI = .88.76, RMSEA = .10$. The parameter estimates suggest that boys comprise almost one-quarter of girls' secondary friend networks in Grade 7 ($\beta = .24, SE = .01, Z = 19.84, p \leq .001, CI = 0.22, 0.27$) and this proportion increases by .04 each year ($SE = .01, Z = 6.50, p \leq .001, CI = 0.03, 0.05$). Girls comprise a similar proportion of boys' secondary friend networks in Grade 7 ($\beta = -.01, SE = .02, Z = -.70, p = ns, \beta = -.05, CI = -0.05, 0.02$). The proportion of girls in the boys' secondary friend networks, however, does not increase over time ($\beta = -.04, SE = .01, Z = -4.123, p \leq .01, \beta = -.36, CI = -0.06, -0.02$).

Discussion

The findings from this 5-year longitudinal study provide a clear picture of the changes occurring in the gender composition of girls' and boys' friendship networks and the characteristics of those friends during the transition to adolescence. As expected, significant growth in the proportion of other-sex friendships in the network and interindividual variation in the growth parameters that could be predicted by sex, pubertal timing, antisocial behavior, and

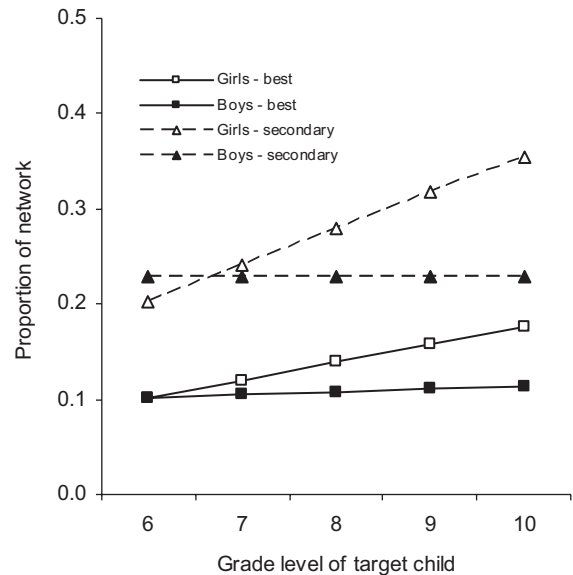


Figure 5. Proportion of other-sex friends in boys' and girls' best and secondary friend networks by grade level.

social preference were found. Significant changes in the characteristics of other-sex friends, as compared to same-sex friends, were also observed. Below, we describe the study's findings in greater detail and discuss their developmental significance.

Changes in Gender Composition of Friendship Networks

We first examined normative changes in the gender composition of the youths' friendship networks and found that the proportion of other-sex friendships increased linearly over time. Thus, as expected, the youths' friendship networks became increasingly mixed during this key developmental period. Despite this growing interest in other-sex friendships, however, same-sex friendships were still predominant. Indeed, close to 75% of the members of the youths' friendship networks in Grade 10 were of the same sex as the target youth.

Even though our 5-year longitudinal design covered a period considered to be key in the transition from same- to mixed-sex networks, it does not tell us when this transition begins and when it ends (or stabilizes). Longitudinal studies with yearly network assessments covering the middle and late childhood periods are needed to capture precisely the beginning of the youths' involvement in other-sex friendships. Furthermore, our data do not indicate whether individuals' friendship networks become fully gender-mixed as they move into late adolescence and young adulthood period or if they remain predominantly same-sex. Life transitions that typically take place during late adolescence—such as forming a stable romantic relationship, going to college, joining the work force, and leaving home—might impact the gender composition of one's friendship network, creating discontinuities with the pattern of linear change that we identified for the early to mid-adolescent period.

A significant amount of variance around the means was also found in the growth parameters, and predictors were then included in the model. The inclusion of sex in the growth model revealed that, consistent with prior research, girls in early adolescence already report a higher proportion of other-sex friends in their networks than boys do (Connolly & Johnson, 1996; Feiring, 1999). More important, this proportion increases at a significantly faster pace throughout adolescence for girls than for boys.

Three possible explanations involving perception, maturation, and socialization are provided to account for these sex differences. The first explanation is that these findings could be attributable to a perceptual bias associated with the use of a self-identified friendship networks procedure. Our findings could reflect a sex difference in the perception of other-sex friendships rather than a sex difference in actual relationships. In other words, for a given relationship between a girl and a boy, the girl might be more willing than the boy to consider that relationship to be a friendship and publicly acknowledge it as a friendship in the context of our assessment. However, other evidence suggests that this sex difference is not only a matter of perception. Indeed, research based on objective indicators of other-sex relationships that are less likely to be contaminated by this hypothetical perceptual bias, such as measures of time spent together, has shown that adolescent girls spend more time with other-sex peers than do boys (Richards, Crowe, Larson, & Swarr, 1998).

The second explanation concerns pubertal maturation and the fact that pubertal changes take place in girls before boys

(Archibald, Graber, & Brooks-Gunn, 2003). Specifically, the psychosexual changes related to puberty might result in an earlier and unilateral weakening of the gender barrier in girls, whereas boys of the same age are still immersed in their same-gender boys' culture (Kon, 1981). However, this explanation implies that as they progress through pubertal changes, boys should eventually catch up with girls and include a comparable number of other-sex friends in their networks (a delay hypothesis). Our data suggest that this is not the case. Indeed, the sex difference increases over time even though we cover a developmental period (Grades 6 to 10) that goes beyond the completion of pubertal changes. Still, it should be acknowledged that the gender composition of boys' and girls' networks may become more similar after this period.

The third and most likely explanation for this sex difference is that girls and boys might have been socialized differently in their relationships with the other sex. According to Maccoby (1998), during childhood, boys are more active in maintaining sex segregation and may thus be more reluctant than girls to initiate and form friendships with the other sex in adolescence. Others have hypothesized that in early adolescence, boys would still be more interested in group status and girls more concerned with the formation of relationships (Benenson, 1990).

Our study design also included an examination of three other predictors of the trajectories of other-sex friends in the network: pubertal timing, antisocial behavior, and peer social preference. Pubertal timing and antisocial behavior were found to be significant only for girls. Specifically, among girls, antisocial behavior in Grade 6 was positively associated with the proportion of other-sex friends in the network in Grade 7, and early pubertal maturation predicted a more rapid increase in the rate of change in other-sex friendships. Even though having male friends is a normative experience of adolescence, antisocial girls seem to be premature in that respect. Moreover, early maturing girls tend to increase the proportion of male friends in their networks at a faster rate. Thus, antisocial behavior and early pubertal maturation accelerate the changes in the gender composition of girls' friendship networks. According to Stattin and Magnusson (1990), forming relationships with male peers could explain why early maturing girls tend to engage in more problem behavior than later maturing girls.

Growth in other-sex friendship was also found to be predicted by peer status variables for girls and for boys. Not surprisingly, for both genders, social preference among other-sex classmates in Grade 6 was positively associated with the proportion of other-sex friends in the network in Grade 7. For girls, however, social preference among same-sex classmates predicted a more rapid increase in the proportion of boys in the network. This finding suggests that among girls, other-sex friendships might be regarded as a sign of autonomy and maturity. For boys, social preference among other-sex classmates was negatively associated with the slope of other-sex friendships in the network. This last finding suggests that the initial difference in the proportion of girls in the friendship network between boys rated highly by girls in Grade 6 and boys rated less positively attenuates during adolescence.

Characteristics of Same- and Other-Sex Friendships

In addition to describing the number of other-sex friends in a youth's network, a comprehensive understanding of the developmental significance of these relationships also requires a careful

examination of the friends' characteristics. Who are these other-sex friends? What are the qualitative features of these friendships? We found that other-sex friends were distinct from same-sex friends on a number of important dimensions, especially among girls. Specifically, girls form friendships with males who are older—and this age difference increases over time such that, by Grade 10, the girls' other-sex friends are about half a year older than the girls. In contrast, girls' same-sex friends are the same age as the girls throughout adolescence. Moreover, a large proportion of girls' other-sex friends tend to come from contexts other than the school; the proportion of the out-of-school friendship network that is other-sex increases at a faster rate than that of the in-school friendship network.

The findings were quite different for boys. Boys' other-sex friends are younger than girls' other-sex friends. Interestingly, there is no age difference between boys and their other-sex friends. Boys also have a lower proportion of other-sex friends in the out-of-school setting; this proportion does not change over time. There is no age difference between the boys and their same-sex friends, and this remains constant until Grade 10.

The picture that emerges from these findings is that other-sex friendships in adolescence might be a context in which girls are exposed to risk behavior. This does not seem to be the case for the boys in our sample. Not only do girls (especially antisocial and early maturing girls) have more other-sex friends in their network than boys, but these friends are older than the girls and comprise a larger proportion of the out-of-school friendship network—a setting characterized by less structure and less adult supervision. More important, all of these problematic features significantly increase during adolescence. Stattin and colleagues have argued that friendships with older boys could be a context for risky behavior in girls (Stattin, Kerr, Mahoney, Persson, & Magnusson, 2005; Stattin & Magnusson, 1990). They showed that this was especially the case in out-of-school settings, such as unstructured leisure, a context where older, normbreaking boys are likely to facilitate the girls' involvement in a variety of problem behaviors, including shoplifting, vandalizing property, and running away from home (Stattin et al., 2005).

Examining age differences in other-sex friendships and the settings in which these friendships develop is very informative. Many scholars have pointed out, however, that friendships also need to be studied from a relationship perspective (Berndt, 2005; Brown, 2004). Thus, we were interested in the status and the level of help experienced in these other-sex friendships. Regarding status, we found that most other-sex friendships are considered secondary rather than best friendships by the youths. Most best friendships are same-sex. The growth in girls' other-sex friendships primarily takes place in the secondary part of their network. Indeed, the rate of change in the girls' secondary friendships was twice that of best friendships. This suggests that these other-sex friendships are likely to be less stable and to take place in a group setting (Connolly et al., 2004). Relatively little growth was seen in boys' other-sex best and secondary friendship trajectories.

Youths also reported different levels of help in their same- and other-sex friendships, but in different ways for girls and boys. Girls reported receiving higher levels of help from their same-sex friends (i.e., girls) and boys received more help from their other-sex friends (i.e., girls). Growth analyses showed that the level of help in all types of relationships increased over time. In other

words, girls are apparently perceived as a better source of help than boys irrespective of the gender composition of the friendship. Previous studies reported such sex differences in same-sex friendships (Rose & Rudolph, 2006) and other-sex friendships (Kuttler & al., 1999). One explanation for this finding is that women are socialized to be more supportive. Our measure of help was limited to a single item, "Does this person help you when you need it?", and no distinction between instrumental or more emotional forms of help was applied. In their study, Kuttler et al. (1999) distinguished between various forms of help or support and found that girls reported more instrumental support in their same-sex than their other-sex friendships, and boys reported receiving more emotional support from their other-sex friends. Future studies should examine the developmental course of other positive aspects of friendship, such as companionship and intimacy. Negative features of other-sex friendships should also be investigated. Decades of research on peer relations have taught us that friendships have negative features, including conflicts and disagreements (Hartup, 1992). From a developmental perspective, it is possible that the level of conflict youths perceive in their other-sex friendships might decrease over time as they learn to interact with members of the other sex.

Limitations, Strengths, and Future Studies

This study is not without limitations. Reciprocity of friendship nominations was not taken into account even though reciprocity is considered a central component of friendship (Newcomb & Bagwell, 1995). Studies on friendships in which reciprocity is controlled are generally constrained to classroom or grade-level friendships. In the present study, because our interest was on adolescents' friendship networks across settings and age groups, we decided to use self-reported friendship nominations, as other researchers have (Connolly et al., 2000; Feiring, 1999). In fact, our findings suggest that constraining adolescents' friendship nominations to the school setting might induce a strong bias in the gender composition of friendship networks, given that the majority of other-sex friendships in adolescence are taking place in settings outside of the school. Another limitation concerns our assessment of friendship help. Because participants had to report for multiple friendships (up to 10), we had to limit the assessment of this construct to one item, whereas most friendship characteristics questionnaires use multiple items (Bukowski, Hoza, & Boivin, 1994; Parker & Asher, 1993).

Limiting the nominations to a maximum of 10 friends also limited our ability to address important questions. For example, are the changes in the proportion of other-sex friends in the network attributable to a replacement of preexisting same-sex relationships or to an expansion of complementary relationships? Our data tend to support the replacement hypothesis, given that the number of same-sex friends in the network decreased over time while the number of other-sex friends increased. However, our network assessment procedure did not permit a fair test of these two hypotheses; and other studies using different assessment procedures have tended to support the expansion hypothesis (Connolly et al., 2000; Richards et al., 1998). In any case, our findings clearly reflect an increase in the relative importance of other-sex relationships in the youths' social world. Finally, limiting the best friend nominations to a maximum of three friends might have been too

restrictive given the range observed in the number of best friends among adolescents (Urberg et al., 1995). An alternative approach could be to let the participants decide on the number of peers they consider as best friends within their friendship networks.

In addition, the current study was in most part descriptive. Even so, we were not able to capture the full qualitative nature of the friendship experiences of the youths in our study. We hope that future studies will build on this work to provide us with a more nuanced and holistic understanding of the experience of other-sex friendship in adolescence. Similarly, the processes through which the transformation from a predominantly same-sex to a mixed-sex peer system operate remain to be uncovered.

Finally, the current study used a fairly homogeneous sample of adolescents from a single geographic area. The current findings should also be replicated with more ethnically diverse samples in order to determine whether the development of—and meaning of—other-sex friendship is similar across cultures or varies in important ways.

Methodological strengths of this study include the use of a 5-year prospective longitudinal design and an examination of individuals' developmental trajectories. As we mentioned earlier, further studies should cover a longer developmental window in order to fully capture the initiation and termination of changes in gender composition of friendship networks. Also, in past studies, platonic friendships and romantic relationships were often confounded together in one general category of other-sex relationships. Researchers underlined the need to clearly distinguish between these forms of other-sex relationships because their developmental significance is likely to be distinct and unique (Furman & Shaffer, 1999; Sippola, 1999). In the present study, this distinction was carefully applied and the focus was specifically on platonic friendships. An additional distinction for future studies could be between "currently platonic without romantic intentions" and "currently platonic with romantic intentions." It seems that this latter type of friendship would certainly carry a different meaning than the former. Furthermore, knowing how much time was actually spent with each friend, especially the secondary friends, could help interpret whether having more other-sex friends in one's network may indeed be meaningful for one's development.

In conclusion, we have shown that the gender composition of youths' friendship networks as well as the characteristics of the other-sex friendships change during adolescence. More important, individual differences were found in the rate of these changes. The changes were more pronounced for girls, especially those who are antisocial and early maturing, and the characteristics of their other-sex friends suggest that these relationships might place some of the girls on a problematic developmental trajectory.

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