Published in final edited form as:
Child Dev. 2014 July ; 85(4): 1677–1693. doi:10.1111/cdev.12235.

Time with Peers from Middle Childhood to Late Adolescence: Developmental Course and Adjustment Correlates

Chun Bun Lam,
The Hong Kong Institute of Education

Susan M. McHale, and
The Pennsylvania State University

Ann C. Crouter
The Pennsylvania State University

Abstract

This study examined the developmental course and adjustment correlates of time with peers from age 8 to 18. On 7 occasions over 8 years, the two eldest siblings from 201 European American, working- and middle-class families provided questionnaire and/or phone diary data. Multilevel models revealed that girls' time with mixed/opposite-sex peers increased beginning in middle childhood, but boys' time increased beginning in early adolescence. For both girls and boys, time with same-sex peers peaked in mid-adolescence. At the within-person level, unsupervised time with mixed/opposite-sex peers longitudinally predicted problem behaviors and depressive symptoms, and supervised time with mixed/opposite-sex peers longitudinally predicted better school performance. Findings highlight the importance of social context in understanding peer involvement and its implications for youth development.

Keywords

adolescence; adjustment; gender segregation; middle childhood; social context; time with peers

Adolescence is a developmental period when youths strive to gain independence from their families and become more engaged with their peers (Rubin, Bukowski, & Parker, 2006). It is also a period when youths begin to rethink their relationships with the opposite sex and when peer group gender segregation declines (Mehta & Strough, 2009). Although a number of cross-sectional (Buhrmester & Furman, 1987; Csikszentmihalyi & Larson, 1984) and short-term longitudinal (Richards, Crowe, Larson, & Swarr, 1998) studies have examined age-related differences in peer involvement, few long-term longitudinal data are available to document how time with peers develops as youths make the transition from childhood to adolescence. The developmental significance of peer companionship also remains a question of debate in the literature: Whereas some research reveals that adolescent delinquency and substance use almost always occur in the company of peers (Albert & Steinberg, 2011),

Correspondence should be addressed to Chun Bun Lam, Department of Early Childhood Education, The Hong Kong Institute of Education, 10 Lo Ping Road, Tai Po, New Territories, Hong Kong. may be sent to ianlam@ied.edu.hk.

other research establishes that peers provide important opportunities for promoting egalitarian relationships and prosocial behaviors (Bukowski, Buhrmester, & Underwood, 2011).

An ecological perspective (Bronfenbrenner & Crouter, 1983) directs attention to the social contexts within which peer experiences take place. Unsupervised time with peers, in particular, has been found to be associated with a range of problem behaviors (Greene & Banerjee, 2009; Osgood, Wilson, O'Malley, Bachman, & Johnston, 1996; Pettit, Bates, Dodge, & Meece, 1999). Less well understood is the potential influence of unsupervised peer involvement on adjustment in other domains of youth functioning, such as internalizing symptoms and academic achievement. A body of work suggests that gendered social contexts elicit distinct kinds of behavior (Maccoby, 1990), but whether peer group gender composition has implications for youth adjustment also remains underexplored.

Using long-term longitudinal data from a study of siblings, this investigation was designed to address gaps in the literature on peer involvement and peer influences by examining the developmental course of time spent with peers from middle childhood to late adolescence and the within-person associations between time with peers and youths' problem behaviors, depressive symptoms, and school performance in the following year. We focused on two mutually exclusive categories of peer time: Time with a same-sex peer or peer group, referred to as *same-sex peer time*, and time with an opposite-sex peer or a peer group that included at least one opposite-sex peer, referred to as *mixed/opposite-sex peer time*. Such a distinction was made, because voluntary involvement with opposite-sex peers – either in a dyadic or group situation – is largely inhibited in middle childhood (Maccoby, 1990; Mehta & Strough, 2009) and because, before dyadic romantic relationships emerge in later adolescence, youths often join mixed-sex peer groups that provide initial opportunities for cross-sex interactions and group dating activities (Connolly, Craig, Goldberg, & Pepler, 2004; Connolly, Furman, & Konarski, 2000). Considering that experiences with opposite-sex peers within the context of a mixed-sex peer group may serve as the foundation for experiences with opposite-sex peers outside such supportive social structures, we operationalized mixed/opposite sex peer time as any activity that included at least one peer of the opposite sex.

Developmental Course of Time with Peers

The process of individuation in adolescence includes negotiating independence from parents and developing egalitarian relationships with peers (Rubin et al., 2006). The individuation process also coincides with the transition into puberty, which often marks an increased sensitivity to and interest in the opposite sex (Maccoby, 1990; Mehta & Strough, 2009). Indeed, evidence suggests that youths become more involved with their peers, especially opposite-sex peers, across adolescence. Based on questionnaire data from children (2nd and 5th graders) and young adolescents (8th graders), for example, Buhrmester and Furman (1987) showed that adolescents spent more time with opposite-sex peers than did children and that, compared to children and boys, older girls spent more time with same-sex peers. Using an experience sampling approach, Csikszentmihalyi and Larson (1984) found that older youths spent more time in the company of peers. Moreover, 9th and 10th graders most

often met in same-sex settings, but 11th and 12th graders most often met in settings that included an opposite-sex peer. Richards et al. (1998) collected experience sampling data from 5th and 8th graders and demonstrated that time with one opposite-sex peer increased linearly over a 4-year period, especially for girls, but that time with same-sex peers remained relatively unchanged. The two-wave design of Richard et al.'s study, however, did not allow for an examination of possible curvilinear patterns of change. A handful of studies that used three or more waves of longitudinal data showed that the proportion of self-reported opposite-sex friends increased linearly across adolescence and that such an increase was more pronounced for girls than for boys (Connolly et al., 2000; Poulin & Pedersen, 2007). However, the focus of these studies was on peer group structure rather than on peer group involvement. Further, the reliance on youths' self-reports to measure friendship networks means that the results might be subject to perception bias (Haynie, Steffensmeier, & Bell, 2007) and recency or primacy effects (Eagle, Pentland, & Lazer, 2009).

Using five waves of phone diary data from an *accelerated longitudinal study* of siblings, wherein two cohorts of different aged siblings were repeatedly assessed over a comparatively short period of time (Duncan, Ducan, & Hops, 1996), the first aim of the present study was to examine the developmental course of time with same-sex peers and with mixed/opposite-sex peers from middle childhood to late adolescence. In addition to its many other advantages (e.g., time efficiency, reduction in attrition rates and project costs), an accelerated longitudinal design has been shown to be as powerful as a true longitudinal design for detecting longitudinal changes and within-person variation (Duncan et al., 1996). By using multilevel modeling (MLM), we were able to combine segments of more limited longitudinal data from each cohort of siblings and cover the years from age 8 (i.e., the youngest age observed in secondborns) to age 18 (i.e., the oldest age observed in firstborns). Given that the individuation process (Rubin et al., 2006) and the breakdown of peer group gender segregation (Maccoby, 1990; Mehta & Strough, 2009) begin in early adolescence and gain momentum in middle and late adolescence, we expected that time with mixed/opposite-sex peers would change in a quadratic manner, remaining low in middle childhood and increasing gradually from early to late adolescence. Further, based on the limited longitudinal research available (Connolly et al., 2000; Poulin & Pedersen, 2007; Richards et al., 1998), we expected that such changes would be more pronounced for girls than for boys. Predictions about time with same-sex peers were less clear: If the development of peer involvement is characterized by an expansion of complementary relationships rather than replacement of preexisting ones (Buhrmester & Furman, 1987; Richards et al., 1998) and/or if interactions with same-sex peers play a facilitative role in the emergence of cross-sex friendships (Connolly et al., 2000; 2004), time with same-sex peers may also increase across adolescence (Rubin et al., 2006). However, if trade-offs occur between involvement with mixed/opposite-sex versus same-sex peers and groups (Csikszentmihalyi & Larson, 1984), time with same-sex peers may follow an opposite pattern of change, remaining high in middle childhood and declining gradually from early to late adolescence.

When studying the effects of chronological age on youths' time with peers, it is important to consider other individual and contextual factors that may affect the mean levels of peer involvement (Larson & Verma, 1999). Given some prior research showing that laterborns

tend to be more agreeable and peer-oriented than firstborns (Dunn, 2007) and that youths' peer relationships and socioemotional competence vary as a function of socioeconomic factors (Bradley & Corwyn, 2002), we controlled for birth order and family socioeconomic status.

Adjustment Correlates of Time with Peers

Peer relationships have great potential to contribute to healthful development, as they afford opportunities for youths to practice egalitarian social exchanges and acquire behavioral and emotional competencies (Bukowski et al., 2011). On the other hand, peer relationships can be a major source of risks, especially when peers exhibit anti-social attitudes and behaviors, such as rule breaking and delinquency (Albert & Steinberg, 2011). An ecological perspective posits that the consequences of a developmental process are often dependent on the social context (Bronfenbrenner & Crouter, 1983). One contextual factor that has received considerable research attention is the presence of a supervising adult in peer activities. As elaborated by Osgood et al. (1996), time spent with peers can increase the likelihood of deviant behaviors by making these behaviors more stimulating and easier to carry out. The lack of an immediate authority figure may further increase the chance of deviance by reducing the social pressure to behave in a prosocial manner and minimizing expectations of punishment. Consistent with such views, studies based on questionnaire data have shown that middle (Greene & Banerjee, 2009) and high (Osgood et al., 1996) school students who spent more unsupervised time with peers reported more delinquency and substance use. Findings based on phone diary data also indicated that unsupervised peer involvement in grade 6 was predictive of problem behaviors in grade 7 (Pettit et al., 1999). Less is known about whether unsupervised time with peers has negative implications for emotional and school functioning, but conduct problems, psychological distress, and academic difficulties often co-occur and tend to share common causes (Angold, Costello, & Erkanli, 1999). Moreover, self reports of friends' deviant behaviors have been found to predict increases in depressive symptoms and decreases in school performance in both early and late adolescence (Battin-Pearson et al., 2000; Fergusson, Wanner, Vitaro, Horwood, & Swain-Campbell, 2003; Fuligni, Eccles, Barber, & Clements, 2001). For these reasons, we expected that unsupervised involvement with peers would be linked to problem behaviors, internalizing symptoms, and declines in academic performance.

Although structured activities – activities that are routinely scheduled and organized around building skills and involve at least distal guidance of adults – have been found to convey psychosocial benefits to youths (Mahoney, Larson, Eccles, & Lord, 2005), it is unclear whether supervised time with peers, in itself, has a positive influence on youth adjustment. The presence of an adult does not necessarily mean that scaffolding of activities or facilitation of peer interactions will be provided to optimize youth learning and well-being, but parents, coaches, and other adults are often expected to play an active or supportive role in youth development (Scales, 2003). These adults can also serve as role models for positive social behaviors and involvement in constructive activities and promote youth identification with established social values (Larson & Verma, 1999). Therefore, we expected that adult supervised peer time would predict more positive youth functioning and fewer adjustment problems.

One intriguing and yet underexplored question is: Does time with mixed/opposite-sex peers have different implications than time with same-sex peers for youth adjustment? There are a number of reasons to expect that the answer is yes. First, analyses of social network data showed that, among young adolescents (8^{th} graders), same-sex peer groups were more stable (i.e., retained more of the same members over time) than mixed-sex peer groups, and that such instability was positively linked to group-level delinquency and negatively linked to group-level attachment to conventional institutions (Kreager, Rulison, & Moody, 2010). Moreover, middle school students who listed an opposite-sex peer as one of their three best friends (Arndorfer & Stormshak, 2008) and high school girls (but not boys) who received and gave more friendship nominations to opposite-sex peers (Haynie et al., 2007; Mrug, Borch, & Cillessen, 2011) exhibited greater increases in problem behaviors over time. Second, possibly due to unfamiliarity with the interaction styles of the opposite-sex (Grover, Nangle, Serwik, & Zeff, 2007) and an emerging interest in romantic relationships (Mehta & Strough, 2009), adolescents reported feeling more excited and being more attentive in the company of an opposite-sex peer versus same-sex peer group (Richards et al., 1998). It is well-established that arousal and motivation intensify experiences – whether pleasant or unpleasant – and magnify their influences on individuals (Domjan, 2010). Applying such findings to peer involvement, we would expect that time with mixed/opposite-sex peers may be particularly arousing and thus powerful in affecting youth adjustment, both favorably and adversely.

In an effort to advance understanding of the adjustment implications of peer time, the second aim of this study was to use a *time-lagged design* to examine the within-person associations between unsupervised and supervised time with mixed/opposite-sex and same-sex peers and youths' problem behaviors, depressive symptoms, and school performance. The use of time-varying predictors extends prior work, because it links within-person variation (i.e., deviations from youths' *own* norms) in peer involvement to within-person variation in youth adjustment; by treating each respondent as her or his own control, within-person associations eliminate stable, third variables as alternative explanations and provide for stronger inferences (Raudenbush & Bryk, 2002). Albeit with a control for stable between-person differences, a model that links contemporaneous information about time-varying predictors and time-varying outcomes effectively converts a longitudinal design into a cross-sectional one and introduces interpretive problems of endogeneity, such as reciprocal or reverse causation (Singer & Willett, 2003). A time-lagged design helps address this issue by linking prior status on the predictors to current status on the outcomes, thereby providing evidence for temporal precedence. It is important to note, however, that even using a time-lagged design with a control for stable between-person differences, within-person associations may still be affected by other time-varying factors. Given our goal of developing a contextual (versus dispositional) explanation of youth adjustment, a major confound pertains to the active role of youths in selecting their peers and creating their own social environments (Rutter, 2007). For this reason, we included youths' self-reports of their social competence as a lagged, time-varying control to rule out the possibility that these self-perceptions both explained youths' prior status on peer involvement and predicted current status on youth adjustment.

Net of these controls, and based on previous research on adult supervision (Greene & Banerjee, 2009; Osgood et al., 1996; Pettit et al., 1999) and peer group gender composition (Arndorfer & Stormshak, 2008; Haynie, et al., 2007; Richards et al., 1998), we expected unsupervised time, particularly time with mixed/opposite sex peers, to negatively predict, and supervised time, particularly time with mixed/opposite sex peers, to positively predict youth adjustment. We also examined potential gender differences in the implications of peer involvement and tested for interactions between time with peers and youths' gender, but proposed no specific hypotheses, given that gender differences in peer influences have been documented in some studies (Haynie et al., 2007; Mrug et al., 2011), but not others (Arndorfer & Stormshak, 2008; Battin-Pearson et al., 2000; Fergusson et al., 2003; Fuligni et al., 2001).

The Present Study

In sum, this study examined the developmental course and adjustment correlates of time with peers from middle childhood to late adolescence. Guided by theories of adolescent individuation (Rubin et al., 2006) and peer group gender segregation (Maccoby, 1990; Mehta & Strough, 2009), we expected that time with mixed/opposite-sex peers would remain stable in middle childhood and increase gradually across adolescence, but that time with same-sex peers would increase or possibly show an opposite pattern, remaining stable in middle childhood and decreasing gradually across adolescence. Moreover, given that peers afford different social experiences and learning opportunities in different contexts (Bronfenbrenner & Crouter, 1983), we expected that unsupervised time with peers, especially with opposite-sex peers, would be a negative predictor of youth adjustment, but that supervised time with peers, especially with opposite-sex peers, would be a positive predictor of youth adjustment.

Method

Participants

Data were drawn from the 1st, 2nd, 3rd, 4th, 6th, 7th and 8th years (referred to as Times 1 through 7 hereafter) of a longitudinal study exploring family relationships and youth development. Recruitment letters were sent home from schools to all families with 4th and 5th graders within 16 school districts of a northeastern state. Families were eligible if parents were married and employed, and the two eldest siblings were in early adolescence or middle childhood and were 1–4 years apart in age. The number of families that fulfilled our recruitment criteria but failed to respond was not known, but over 90% of families that returned postcards and were eligible agreed to participate. We deleted two families that dropped out after Time 1, and based our analyses on the remaining 201 families. Attrition was notably low, and the retention rates across Times 2 through 7 averaged 95%. Reflecting the ethnic background of families from the state where the study was conducted (85% European American; US Census Bureau, 2000), the sample included almost exclusively European American families living in small cities, towns, and rural communities. Moreover, reflecting the educational (> 80% of adults completed high school) and financial (median income = $55,714 for married-couple families) backgrounds of the targeted population (US

Census Bureau, 2000), at Time 1, the average education level was 14.57 years (*SD* = 2.15; range = 12–20) for mothers and 14.67 years (*SD* = 2.43; range = 10–20) for fathers (where a score of 12 signified a high school graduate), and the median family income was $55,000 (*SD* = 28,613; range = 21,000–207,000). The wide ranges of parental education and family income levels, however, indicated that the sample was diverse in socioeconomic status and primarily included working- and middle-class families.

In an accelerated longitudinal design, multiple cohorts of different age are repeatedly assessed over shorter periods of developmental time, such that there are temporally overlapping measurements of various age groups (Duncan et al., 1996). In our study, the average age at Time 1 was 10.87 years (*SD* = 0.54; range = 9.45–12.59) for firstborns and 8.26 years (*SD* = 0.93; range = 6.05–10.30) for secondborns. Because of the age differences between siblings and multiple waves of data collection, between *n* = 92 and *n* = 270 youths provided phone diary data on time use at each chronological age from 8 (i.e., age 7.5–8.5) to 18 (i.e., age 17.5–18.5) years, allowing us to chart the development of peer involvement from middle childhood through adolescence. Sibling dyads were divided almost equally among the four possible gender compositions, meaning that we had roughly equal and sufficient numbers of girls (*n* = 203) and boys (*n* = 199) to test for potential gender differences in longitudinal change.

Procedure

Data were collected from mothers, fathers, and the two eldest siblings in the spring semester of the school year via two methods. First, at Times 1, 2, 3, 5, 6, and 7, trained interviewers conducted home interviews to obtain family members' subjective reports of psychosocial adjustment and personal characteristics. Family members gave informed consent/assent and received an honorarium at the beginning of the home interviews, and then were interviewed separately. At Time 4, respondents completed mailed surveys that included a subset of measures that were collected in the home interviews. Second, in the 2 to 3 weeks following the home interviews at Times 1, 2, 3, 5, and 6, trained interviewers conducted seven (5 weekdays, 2 weekend days) nightly phone interviews to obtain more objective recalls of siblings' activities during the day of the call. In each of these calls, each sibling was guided through a list of activities (e.g., washing dishes, arts and crafts, sports, going to a party) and probed for the duration and social contexts (i.e., with whom the siblings engaged in the activities) of any activities completed outside of regular school hours. We focused on voluntary (i.e., free time) activities, because they are more able to capture individual differences in peer companionship than non-voluntary (e.g., school) activities (Larson & Verma, 1999).

Measures

Youths' time with peers was measured at Times 1, 2, 3, 5, and 6 by summing the minutes youths reported spending with peers across all activities and across the seven nightly phone calls. Based on whether an adult (i.e., parents or other individuals who were 21 years or older) and whether an opposite-sex peer (i.e., non-sibling individuals who were younger than 21 years) was involved, time with peers was further divided into unsupervised and supervised time with opposite/mixed-sex versus same-sex peers. Adults were counted as

involved when youths reported that they were actively engaged in the activity, coaching/instructing, or supervising/observing youths' participation. To assess reliability, we calculated the correlations between the two siblings' reports of their shared time. The results indicated that, even with no prior training, siblings' reports were highly correlated (average r = .72), suggesting that youths' reports were reliable. This is also consistent with previous research documenting convergence between daily diary data and data from objective observations and peer reports (Larson & Verma, 1999). To correct for skewness, square root transformations were used in the analyses.

Youths' problem behaviors were measured at Times 2, 3, 4, 6, and 7 using the 18-item Risky Behavior Scale (Eccles & Barber, 1990). Youths used a 4-point scale to rate how often they had engaged in different deviant and rule breaking behaviors, such as drinking, smoking, and skipping school, in the past year. Ratings were summed, and higher scores represented more problem behaviors. Cronbach's alphas averaged α = .83 for firstborns and α = .86 for secondborns. To correct for skewness, log transformations were used in the analyses. Because the deviant and rule breaking behaviors of interest are quite rare in normative samples of young children (Conner, 2002), data on problem behaviors were not collected from secondborns at Times 2 and 3, and their scores were coded as missing at these time points. As recommended by Hedeker and Gibbons (1997), however, a pattern-mixture approach was used to test whether our substantive conclusions were sensitive to such a missing data pattern (detailed below).

Youths' depressive symptoms were measured at Times 2, 3, 4, 6, and 7 using the 10-item Children's Depression Inventory Short Form (Kovacs, 1992). For each item, youths chose one from among three statements, such as "I am sad once in a while," "I am sad many times," or "I am sad all of the time," that best described their feelings and behaviors in the past 2 weeks. Ratings were summed, and higher scores represented more depressive symptoms. Cronbach's alphas averaged α = .74 for firstborns and α = .76 for secondborns. To correct for skewness, log transformations were used in the analyses.

Youths' school performance was measured at Times 2, 3, 4, 6, and 7 using the grades in four subject areas (i.e., English, math, science, and social studies) from youths' most recent report cards. Letter grades were converted into numerical scores (A = 4.0, B = 3.0, C = 2.0, D = 1.0, F = 0). Grade scores were averaged, and higher scores represented better school performance. Cronbach's alphas averaged α = .84 for firstborns and α = .83 for secondborns. To correct for skewness, square root transformations were used in the analyses.

Youths' social competence was measured at Times 1, 2, 3, 5, and 6 using the 5-item social competence subscale from the Self-Perception Profile (Harter, 1988). Youths used a 4-point scale to rate how well such statements as "Some kids wish that more kids liked them but other kids feel that most kids do like them" and "Some kids have a lot of friends but other kids don't have very many friends" described them. Ratings were summed, and higher scores represented higher social competence. Cronbach's alphas averaged α = .75 for firstborns and α = .67 for secondborns.

Background information provided by parents at Time 1 included family members' age and ethnicity, parents' educational levels and incomes, and youths' gender and birth order.

Results

Preliminary Analysis

Table 1 shows correlations between all time use variables at Times 1, 2, 3, 5, and 6. Of 80 possible auto-correlations, 60 were significant, indicating modest to moderate stability in peer involvement across time, especially across shorter measurement intervals. Stability coefficients were generally higher in the case of same-sex than mixed/opposite-sex peer time, probably due to the fact that a significant number of siblings did not report spending any time with mixed/opposite-sex peers in an unsupervised (e.g., at Time 1, 35% of firstborns and 44% of secondborns) or supervised (e.g., at Time 1, 28% of firstborns and 36% of secondborns) contexts in earlier waves. Of 300 possible correlations between different types of peer involvement, 82 were significant. These significant correlations, however, were modest in magnitude and mostly (79 out of 82) positive, providing support for Connolly et al.'s (2000, 2004) ideas that connections with same-sex versus mixed/opposite-sex peers are distinct sets of activities (hence modest correlations) that are organized in a sequential manner and facilitate the progression from same-sex friendships to mixed-sex group affiliations and subsequent dyadic romantic relationships (hence positive correlations).

Analysis Plan

As noted, MLM allowed us to take advantage of an accelerated longitudinal study of siblings and link adjacent segments of limited longitudinal data from two cohorts of siblings (i.e., firstborns and secondborns) to estimate a common developmental course from middle childhood through adolescence. MLM also took into account the nested nature of our data (i.e., siblings from the same family were assessed repeatedly) by specifying an error variance-covariance matrix through the random effects of the model (Raudenbush & Bryk, 2002; Singer & Willett, 2003). Another major strength of such an analytic approach is that it accommodates missing data and effectively reduces biases in the estimation of parameters and standard errors (Schafer & Graham, 2002), although only about 5% of our data were missing. We estimated a series of 3-level models using the MIXED procedure in SAS 9.0 (SAS Institute Inc., Cary, NC). Level 1 (within-individual) included time-varying variables (i.e., youths' age, time-varying predictors, and time-varying control); Level 2 (between-individual) included time-invariant variables that differed between siblings (i.e., youths' gender and birth order, cross-time averages of time-varying predictors); Level 3 (between-family) included one time-invariant variable that was common to both siblings: Mothers' and fathers' educational levels were averaged and included as a general index of family socioeconomic status (Bradley & Corwyn, 2002).

We conducted the analyses in two parts. We first examined the developmental course of unsupervised and supervised time with mixed/opposite-sex and same-sex peers from age 8 to 18 and tested whether the trajectories were different for girls and boys. We began by testing the linear and quadratic effects of youths' age on time with peers. Youths' age was

centered at 13 years (the mean age across all youths and across all time points), such that the intercept estimated the sample mean for youths at age 13. To identify the best error structure (that most effectively captured the interdependency of the data), we compared a series of nested models that differed only in the random effects of interest. We used deviance tests (instead of parameter estimates as in the case of fixed effects) to determine the statistical significance of the random effects (Raudenbush & Bryk, 2002). Because the difference between two nested models in their deviances (i.e., −2 log likelihood) is chi-squared distributed, it indicated whether adding the random variance components constituted a better error structure. Next, we controlled for youths' birth order and parents' educational levels, and tested the interactions between youths' age and gender. The reference group for birth order was firstborns and that for gender was girl. Parents' education levels were centered at 12 years (i.e., high school graduate).

The second part of the analyses examined the time-lagged, within-person associations between peer involvement and youth adjustment. We began by examining the developmental course of the three indices of youth adjustment. Specifically, we tested the effects of youths' age on problem behaviors, depressive symptoms, and school performance and the interactions between these polynomial terms and youths' gender. Next, we controlled for youths' birth order and parents' educational levels (as time-invariant controls) and youths' social competence (as a time-varying control), and tested whether within-person variation in time with peers longitudinally predicted within-person variation in youth adjustment. Given our interest in the unique contribution of each type of peer involvement to youth adjustment and previous research suggesting that the potential problems with multicollinearity can be largely offset with a large sample size ($N > 300$; Mason & Perreault, 1991), all time use variables were simultaneously entered into the model. Because the time use variables were measured a year prior to each of the five measurements of the adjustment variables, they were included as lagged, time-varying predictors. To distinguish within- from between-person variation, each of the four time-varying predictors was indicated by two variables: At Level 1, the predictor was indicated by a time-varying, group-mean centered (i.e., centered at each individual's own cross-time average) variable; at Level 2, the predictor was indicated by the grand-mean centered (i.e., centered at the sample mean), cross-time average. Whereas the time-varying variable captured within-person variation and indicated how youths deviated from their own norms at each time point, the cross-time average captured between-person variation and indicated how youths' cross-time averages were different from those of the rest of the sample (Singer & Willett, 2003). Because youths' social competence was measured a year prior to each of the five measurements of the adjustment variable, it was included as a lagged, time-varying control. Youths' social competence, however, was grand-mean centered without including the cross-time average, as we did not intend to distinguish the within- and between-person effects of this factor. Finally, we tested the interactions between time with peers and youths' gender to explore whether peer involvement had different implications for girls and boys. For all analyses, we only included significant interactions in the final models, because retaining nonsignificant interactions would increase standard errors (Aiken & West, 1991).

Developmental Course of Time with Peers

Separate analyses were conducted for unsupervised and supervised time with mixed/opposite-sex and same-sex peers. Parameter coefficients can be found in Table 2.

The analysis of *unsupervised time with mixed/opposite-sex peers* revealed significant linear and quadratic effects of time. A significant main effect of gender and a significant Linear Time × Gender interaction further indicated that, at age 13 (the age at which our time variable was centered), the gender difference in unsupervised time with mixed/opposite-sex peers was significant, and the positive linear effect was significantly stronger for girls, $\gamma = 1.37$, $t = 16.26$, $p < .01$, than for boys, $\gamma = 0.68$, $t = 7.94$, $p < .01$. As Figure 1 shows, girls' unsupervised time with mixed/opposite-sex peers increased steadily beginning at age 8 and continued to increase, though at a faster pace, toward the end of adolescence. On the other hand, boys' unsupervised time with mixed/opposite-sex peers remained stable from age 8 to about age 10 and then increased. The analysis of *unsupervised time with same-sex peers* also revealed that both the linear and quadratic effects of time were significant, but the main and interaction effects involving gender were not. As Figure 1 shows, for both girls and boys, unsupervised time with same-sex peers increased from age 8 to about age 14 and then declined. It is worth noting that the *overall* linear change from age 8 to 18, estimated *without* including the quadratic effect term in the model (because its inclusion would reduce the linear effect term to the instantaneous rate of change at the age at which the time variable was centered; Singer & Willett, 2003), was positive and significant, $\gamma = 0.17$, $t = 2.53$, $p < .05$, suggesting that youths spent more unsupervised time with same-sex peers in late adolescence than in middle childhood.

Baseline null model tests revealed no estimable variance at the between-individual level (Level 2) for *supervised time with mixed/opposite-sex peers*. Thus, instead of three-level models, we used two-level models to examine its development. The analysis revealed that both the linear and quadratic effects of time were significant. A significant Linear Time × Gender interaction indicated that, at age 13, the positive linear effect was significantly stronger for girls, $\gamma = 1.21$, $t = 10.84$, $p < .01$, than for boys, $\gamma = 0.83$, $t = 7.27$, $p < .01$. As Figure 2 shows, girls' supervised time with mixed/opposite-sex peers increased steadily from about age 9 and continued to increase, though at a faster pace, toward the end of adolescence, but boys' supervised time with mixed/opposite-sex peers remained stable from age 8 to about age 10 and then increased. The analysis of *supervised time with same-sex peers* also revealed significant linear and quadratic effects of time, although the main and interaction effects involving gender were not significant. As Figure 2 shows, for both girls and boys, supervised time with same-sex peers increased steadily from age 8 to about age 14 and then declined. Again, the *overall* linear change of supervised time with same-sex peers from age 8 to 18, estimated *without* including the quadratic effect term in the model, was significant, $\gamma = 0.22$, $t = 2.93$, $p < .01$, suggesting that youths spent more supervised time with same-sex peers in late adolescence than in middle childhood.

Adjustment Correlates of Time with Peers

Separate analyses were conducted for each adjustment variable. Results for the developmental course of problem behaviors (Solmeyer, McHale, & Crouter, 2013),

depressive symptoms (Kim, McHale, Crouter, & Osgood, 2007), and school performance (Dotterer, McHale, & Crouter, 2009) were reported elsewhere, and are not discussed here. Instead, we focused on the between- and within-person effects of time with peers on youth adjustment. Parameter coefficients can be found in Table 3.

The analysis of *problem behaviors* revealed significant between-person effects of unsupervised time with mixed/opposite-sex and same-sex peers as well as supervised time with mixed/opposite-sex peers: The cross-time average of unsupervised time with peers was positively linked to and the cross-time average of supervised time with mixed/opposite-sex peers was negatively linked to the cross-time average of problem behaviors. The within-person effect of unsupervised time with mixed/opposite-sex peers was also significant: On occasions when youths spent more unsupervised time with mixed/opposite-sex peers *than usual*, youths also engaged in more problem behaviors *than usual* in the following year. Because data on problem behaviors were not available from secondborns at Times 2 and 3, we used a pattern-mixture approach (Hedeker & Gibbons, 1997) to probe whether such a missing data pattern had any influence on our substantive conclusions. Specifically, we included the interactions between the between- and within-person terms for peer involvement and youths' birth order to test whether the missing data pattern moderated the effects of these predictors. None of these interactions reached significant, and thus they were removed from the final model.

The analysis of *depressive symptoms* revealed a significant between-person effect of supervised time with mixed/opposite-sex peers and a significant within-person effect of unsupervised time with mixed/opposite-sex peers: The cross-time average of supervised time with mixed/opposite-sex peers was negatively linked to the cross-time average of depressive symptoms, and on occasions when youths spent more unsupervised time with mixed/opposite-sex peers *than usual*, they also experienced more depressive symptoms *than usual* in the following year.

The analysis of *school performance* revealed significant between-person effects of unsupervised time with mixed/opposite-sex and same-sex peers as well as supervised time with mixed/opposite-sex and same-sex peers: The cross-time average of unsupervised time with peers was negatively linked to and the cross-time average of supervised time with peers was positively linked to the cross-time average of school performance. The within-person effect of supervised time with mixed/opposite-sex peers was also significant: On occasions when youths spent more supervised time with mixed/opposite-sex peers *than usual*, they also had better school performance *than usual* in the following year.

For each adjustment variable, we included the interactions between unsupervised and supervised time with peers and youths' gender to explore whether peer involvement had different implications for girls versus boys. None of these interactions reached significance, and thus they were removed from the final models.

Discussion

Using long-term longitudinal data from a study of siblings, the aims of this research were to examine the developmental course and adjustment correlates of time with peers from age 8 to 18. Our results demonstrated that, although boys' time with mixed/opposite-sex peers did not change until early adolescence, girls' time with mixed/opposite-sex peers increased beginning in middle childhood, indicating that peer group gender segregation (Maccoby, 1990; Mehta & Strough, 2009) faded earlier and faster among girls than among boys. For both girls and boys, time with same-sex peers showed an overall linear increase but peaked in mid-adolescence, suggesting that youths in general became more engaged with same-sex peers (Rubin et al., 2006) and that youths may seek same-sex peer involvement to obtain a stable point of reference at the transition to more frequent cross-sex interactions (Connolly et al., 2000; 2004). Moreover, within-person variation in unsupervised time with mixed/opposite-sex peers positively predicted within-person variation in youths' problem behaviors and depressive symptoms in the following year, and within-person variation in supervised time with mixed/opposite-sex peers positively predicted within-person variation in youths' school performance in the following year. Consistent with an ecological perspective (Bronfenbrenner & Crouter, 1983), depending on the social contexts within which peer interactions take place, peers may afford distinct social experiences and learning opportunities, which can adversely (Albert & Steinberg, 2011) or favorably (Bukowski et al., 2011) affect youth adjustment.

Developmental Course of Time with Peers

One widely observed developmental phenomenon is that children avoid unnecessary interactions with opposite-sex peers (Maccoby, 1990). Especially in middle childhood and for boys, even a slight interest in playing with opposite-sex peers can be punished by peer rejection and/or harassment (Mehta & Strough, 2009). Gender segregation begins to break down in adolescence, when romantic involvement is legitimized and gradually becomes normative (Carver, Joyner, & Udry, 2003). Despite the pervasiveness of peer group gender segregation in childhood, only limited evidence exists to show that older adolescents spend more time with opposite-sex peers (Buhrmester & Furman, 1987; Csikszentmihalyi & Larson, 1984) and that cross-sex interactions increase linearly over time (Connolly et al., 2000; Poulin & Pedersen, 2007; Richard et al., 1998). Our study expanded upon this work by using MLM – which allowed us to incorporate five waves of longitudinal data collected from two cohorts of different aged siblings in the same model (Duncan et al., 1996) – to test for possible curvilinear change patterns from middle childhood to late adolescence. Instead of more commonly used questionnaires, we also employed a daily diary approach – which has been shown to be less susceptible to perception and memory biases (Larson & Verma, 1999) – to measure youth time use. Our results indicated that time with mixed/opposite-sex peers was characterized by a quadratic pattern of change. However, although girls' involvement with mixed/opposite-sex peers showed a positive linear increase in middle childhood, boys' involvement with mixed/opposite-sex peers did not change until early adolescence. This is not structurally impossible, because adolescent girls tend to have opposite-sex friends who are older than they are (Poulin & Pedersen, 2007). This also is not completely surprising, given that boys often face stronger social pressure to be gender

typical (Mehta & Strough, 2009) and that girls, on average, are developmentally more advanced than boys when compared at the same age (Rubin et al., 2006). More generally, our finding that girls began to spend increasingly more time with opposite-sex peers starting at age 8 suggests that, at least for girls, peer group gender segregation may not be as rigid as some researchers have proposed. Given the positive links between unsupervised time with mixed/opposite-sex peers and adjustment problems, however, girls' comparatively high levels of and rapid increases in unsupervised peer time beginning in middle childhood may have important implications for parents and practitioners: Strategies that promote adult involvement, including direct participation in and coaching and monitoring of youth activities, may constitute an important focus of parent education, prevention programs, and school policy.

Consistent with the idea that adolescents are motivated to gain independence from their families and develop more egalitarian relationships with their peers (Rubin et al., 2006), time with same-sex peers showed an overall increase from middle childhood to late adolescence. The peak of same-sex peer involvement was observed at about age 14, however, suggesting that same-sex peer interactions, despite remaining a central core of social activities throughout adolescence (Buhrmester & Furman, 1987; Richards et al., 1998), may be of particular importance to youths in early to middle adolescence. As argued by Connolly et al. (2000; 2004), although adolescent social development often follows a progression from same-sex friendships to mixed-sex group activities and then to dyadic romantic relationships, such a progression is fluid enough to allow for coexistence of complementary relationships and continuity of stages. At the transition to more frequent cross-sex interactions, youths in middle adolescence may treat their same-sex peers (probably in both same-sex and mixed-sex settings) as a reference group (Connolly et al., 2000; 2004) that provides opportunities to meet new friends and advises on how to interact with opposite-sex peers (Grover et al., 2007). A reference-group interpretation seems particularly plausible, given the positive associations between time with mixed/opposite-sex and same-sex peers documented in our and other (Grover et al., 2007) studies and that about 50% of a representative sample of youths in the US reported having had a romantic partner by age 15 (Carver et al., 2003) – a year after youths in our sample spent most time with their same-sex peers. On a methodological level, these results also highlight the importance of careful *spacing* of measurements in developmental research to capture curvilinear changes in youth development: Had we only collected data in early and late adolescence, for example, only the overall increasing trend in time with same-sex peers would have been apparent, and we would have missed the peak of same-sex peer interactions in mid-adolescence. This pattern is informative, however, as it speaks to the complementary nature of preexisting (with same-sex peers) and emerging (with mixed/opposite-sex peers) relationships in adolescent social development.

Adjustment Correlates of Time with Peers

A number of studies have shown that unsupervised peer involvement is conducive to delinquency and substance use (Greene & Banerjee, 2009; Pettit et al., 1999) and that affiliations with deviant peers may contribute to emotional distress and academic declines (Fergusson et al., 2003; Fuligni et al., 2001). On the other hand, much evidence indicates

that structured activities, which by definition involve some direction and supervision from an adult, can facilitate positive youth development (Mahoney et al., 2005). Reflecting these more typically studied individual differences, our analyses found that the cross-time average of unsupervised time with peers was positively linked to the cross-time average of problem behaviors and negatively linked to the cross-time average of school performance, and that the cross-time average of supervised time with peers was negatively linked to the cross-time averages of problem behaviors and depressive symptoms and positively linked to the cross-time average of school performance.

The unique contribution of our study, however, lies in the discovery that, on occasions when youths spent more unsupervised time with their peers *than usual*, they also engaged in more problem behaviors and experienced more depressive symptoms *than usual* in the following year and that, on occasions when youths spent more supervised time with their peers *than usual*, they also showed better school performance *than usual* in the following year. These within-person associations represented an extension of prior work, because they focused on longitudinal relationships and excluded multiple alternative explanations. By considering the possible influences of stable individual differences (i.e., focusing on within-person variation; Singer & Willett, 2003), youths' active roles in selecting their peers (i.e., controlling for time-varying social competence; Rutter, 2007), and common method variance (i.e., using different methods to measure time use and youth adjustment), our study provided for much stronger inferences about the potential influence of peer involvement on youth adjustment. Despite these methodological and statistical strengths, however, definitive conclusions about causal relations cannot be made based on correlational data (Cook & Campbell, 1979). Experimental or intervention studies that use randomized designs to manipulate peer group gender composition and adult supervision are required to disentangle the causal paths underlying the associations documented here. Yet, from the perspectives of parents and program providers, the continuing presence of adults in youth activities may be an important factor to consider. Given the growing needs of adolescents for autonomy (Rubin et al., 2006), the strategy to increase adult involvement in youth activities should be chosen judiciously: Adults who know how and when to be present without being interfering, for example, may be selected as trainers and/or facilitators of youth activities.

Our study also adds to the literature by illustrating the role of peer group gender composition in understanding the implications of peer interactions. Consistent with earlier reports that youths with more opposite-sex friends engage in more rule breaking behaviors (Arndorfer & Stormshak, 2008; Haynie et al., 2007; Mrug et al., 2011), our results suggested that within-person variation in time with mixed/opposite-sex (but not same-sex) peers longitudinally predicted within-person variation in problem behaviors and depressive symptoms. One possible explanation for such findings is that, compared to same-sex peer groups, mixed-sex peer groups are more unstable and provide lower levels of social control for their members (Kreager et al., 2010). During the early years of gender segregation, girls and boys tend to have distinct experiences with their same-sex peers and develop different interaction styles (Maccoby, 1990). Not surprisingly, initial cross-sex interactions can be volatile and difficult to understand for some adolescents (Grover et al., 2007). Programs designed to educate youths about how gender-typical interaction styles may affect cross-sex relationships may

have the potential to strengthen the cohesiveness and internal control of mixed-sex peer groups.

Another possible explanation is that, when interacting with opposite-sex compared to same-sex peers, adolescents feel more aroused and attentive (Richards et al., 1998) and thus are more susceptible to peer influences (Domjan, 2010). This explanation is supported by our findings that, depending upon whether or not an adult was present, involvement with mixed/opposite-sex peers was predictive of *both* positive and negative outcomes. Because little prior research is available for comparison, our results should be treated as hypothesis generating. Further validation work is needed to test whether involvement with mixed/opposite-sex peers is more powerful than involvement with same-sex peers in affecting other positive (e.g., self-esteem, prosocial behaviors) and negative (e.g., risky sexual behaviors, hostility and aggression) outcomes. On the most general level, our findings point to the importance of contextualizing the study of youth development (Bronfenbrenner & Crouter, 1983): Like many other developmental processes, the impact of peer involvement is not uniform, but dependent on multiple dimensions of the social context, such as the presence of an adult and the presence of opposite-sex peers. As further discussed below, a new direction for research in this area is to move beyond a focus on a particular companion (e.g., an adult) or group of companions (e.g., peers) to more closely examine the relational nature of the social contexts within which peer activities take place.

Consistent with some earlier studies (Battin-Pearson et al., 2000; Fergusson et al., 2003; Fuligni et al., 2001), we found few gender differences with regard to the developmental significance of peer companionship. This should not be interpreted to mean that the same social influence processes are operative among girls and boys, however. Unsupervised time with mixed/opposite-sex peers, for example, may increase girls' problem behaviors by exposing them to the more deviant norm of older male friends (Haynie et al., 2007; Poulin & Pedersen, 2007) and increase boys' problem behaviors by motivating them toward hypermasculine behaviors in an effort to attract girls' interest (Arndorfer & Stormshak, 2008). More research is needed to explore the mechanisms that link peer involvement to youth adjustment.

Limitations, Directions for Future Research, and a Final Note

Our study had a number of limitations. First, although our sample reflected some population characteristics of married-couple families from the state where the study was conducted (US Census Bureau, 2000), it was ethnically homogeneous and was not representative of the diversity of youths in the US. Given that how youths spend their time varies greatly across cultures (Larson & Verma, 1999), our findings need to be replicated in more diverse samples. Moreover, our reliance on data from families with at least two children means that our findings may not be generalizable to children without siblings. As siblings often provide distinct opportunities for children to practice their social skills with same-aged mates (Dunn, 2007), the development and correlates of peer involvement among youths raised in different family constellations deserve separate investigations. Many of our hypotheses were also derived under the assumption that our respondents were romantically attracted to the opposite-sex. Because patterns of peer group gender segregation and emotional excitability

are different for sexual minority versus heterosexual youths (Mehta & Strough, 2009), future researchers should explore how sexual minority youths' experiences with opposite- and same-sex peers change over time and how these experiences may contribute to youth development.

Second, our time use measure did not tap into the structural dimensions of youth activities. Although social context and activity structure are conceptually distinct, in practice they are often confounded (Mahoney et al., 2005). Future studies should include more fine-grained measures of youth activities, such as the extent to which they are routinized, whether they provide opportunities to develop skills and evaluate performance, and the degree and quality of adult supervision and guidance, in order to separate the effects of social context from activity structure. An additional concern about our time use measure is that we did not have enough information to determine the relational nature of youths' interactions with peers. In particular, we were not able to distinguish between platonic versus romantic interactions with opposite-sex peers. Although adolescent romantic relationships often evolve from cross-sex friendships (Connolly et al., 2000; 2004), romantic relationships may present unique rewards and challenges to adolescents and contribute to adjustment in ways different than cross-sex friendships (Grover et al., 2007). Future researchers should differentiate between these two forms of cross-sex relationships and explore their distinct and overlapping roles in understanding youth development. Relatedly, we defined a peer as a non-sibling individual who was younger than 21 years. Although such a definition provided some objectivity to our measure, youths in our sample may perceive, for example, an 18-year-old in a different way at Time 1 (e.g., as a babysitter) versus at Time 6 (e.g., as a friend). Further investigations that use a broader range of measures of time use, including youths' own relational classifications of their companions, may provide a more nuanced picture of the links between peer involvement and youth adjustment.

Finally, our interest in understanding how peer group gender segregation ebbs and flows during adolescence (Maccoby, 1990; Mehta & Strough, 2009) and the fact that mixed-sex peer groups often provide initial opportunities for cross-sex interactions in early adolescence and, in a sequential manner, contribute to dyadic romantic relationships in late adolescence (Connolly et al., 2000; 2004) directed us to focus on the most generic gender composition of youth activities (e.g., whether one peer of the opposite-sex is present). However, a dyadic situation in which an adolescent is with just one opposite-sex peer may be different from a group situation in which an adolescent is with a large number of same-sex peers and just one opposite-sex peer, which may be different from another group situation with a relatively equal split of girls and boys. A more differentiated approach to operationalizing peer group gender composition, such as one that takes into account the group size and the proportion of same-sex and opposite-sex peers involved, will be needed to fully illuminate the meanings and implications of gendered social contexts for youths. Due to the complexity of our models, we also only examined youths' gender as one possible predictor of the development of peer involvement. As can be seen in Table 2, our analyses of the development of unsupervised and supervised time with mixed/opposite-sex and same-sex peers yielded highly significant random effects, indicating that substantial variance was left unexplained in each type of time use, even taking into account the fixed effects of youths' gender. A body of literature has emerged on the intersection between family and peer interactions

(Brown & Bakken, 2011; Dunn, 2007). An important question awaiting further investigations is how family dynamics, such as marital, parent-child, and sibling relationships, may affect the development of youths' peer involvement. Similarly, we only examined youths' gender as one possible moderator of the influence of peer interactions. Other important moderators that were not considered in this research include what activities youths engage in with their peers (Larson & Verma, 1999) and when these activities take place (Mehta & Strough, 2009). Future researchers should explore whether the influence of peer companionship may vary as a function of the types (e.g., active leisure versus media use) of the activities conducted and the developmental stages (e.g., childhood versus adolescence) of the youths involved.

In the face of these limitations, our use of multiple-wave, phone diary data and lagged, time-varying predictors and our efforts to exclude multiple alternative explanations provide new insights about the developmental course and adjustment correlates of peer involvement. On an applied level, our findings also highlight the vulnerability of youths, especially girls who experience comparatively rapid increases in unsupervised peer time from middle childhood into adolescence, and the importance of engaging adults in promoting youth adjustment in the contexts of peer activities.

Acknowledgments

The authors are grateful to the undergraduate and graduate assistants, staff, and faculty collaborators for their help in conducting this study, as well as the participating families for their time and insights about family relationships. This work was funded by a grant from the National Institute of Child Health and Human Development (R01-HD32336) to Ann C. Crouter and Susan M. McHale, Co-Principal Investigators.

References

Aiken, LS.; West, SG. Multiple regression: Testing and interpreting interactions. Thousand Oaks, CA: Sage; 1991.

Albert, D.; Steinberg, L. Peer influences on adolescent risk behavior. In: Bardo, MT.; Fishbein, DH.; Milich, R., editors. Inhibitory control and drug abuse prevention: From research to translation. New York: Springer; 2011. p. 211-226.

Angold A, Costello EJ, Erkanli A. Comorbidity. Journal of Child Psychology and Psychiatry and Allied Disciplines. 1999; 40:57–87.10.1111/1469-7610.00424

Arndorfer C, Stormshak EA. Same-sex versus other-sex best friendship in early adolescence: Longitudinal predictors of antisocial behavior throughout adolescence. Journal of Youth and Adolescence. 2008; 37:1059–1070.10.1007/s10964-008-9311-x [PubMed: 20808710]

Battin-Pearson S, Newcomb MD, Abbott RD, Hill KG, Catalano RF, Hawkins JD. Predictors of early high school dropout: A test of five theories. Journal of Educational Psychology. 2000; 92:568–582.10.1037/0022-0663.92.3.568

Bradley RH, Corwyn RF. Socioeconomic status and child development. Annual Review of Psychology. 2002; 53:371–399.10.1146/annurev.psych.53.100901.135233

Bronfenbrenner, U.; Crouter, AC. The evolution of environmental models in developmental research. In: Mussen, PH.; Kessen, W., editors. Handbook of child psychology: Vol. 1. History, theory, methods. 4. New York: Wiley; 1983. p. 357-414.

Brown BB, Bakken JP. Parenting and peer relationships: Reinvigorating research on family–peer linkages in adolescence. Journal of Research on Adolescence. 2011; 21:153–165.10.1111/j.1532-7795.2010.00720.x

Buhrmester D, Furman W. The development of companionship and intimacy. Child Development. 1987; 58:1101–1113.10.2307/1130550 [PubMed: 3608659]

Bukowski, WM.; Buhrmester, D.; Underwood, M. Peer relationships as a developmental context. In: Underwood, M.; Rosen, L., editors. Social development. New York: Guilford; 2011. p. 153-179.

Carver, K.; Joyner, K.; Udry, RJ. National estimates of adolescent romantic relationships. In: Florsheim, P., editor. Adolescent romantic relationships and sexual behavior: Theory, research, and practical implications. Mahwah, NJ: Erlbaum; 2003. p. 23-56.

Connolly J, Craig W, Goldberg A, Pepler D. Mixed-gender groups, dating, and romantic relationships in early adolescence. Journal of Research on Adolescence. 2004; 14:185–207.10.1111/j.1532-7795.2004.01402003.x

Connolly J, Furman W, Konarski R. The role of peers in the emergence of heterosexual romantic relationships in adolescence. Child Development. 2000; 71:395–408.10.1111/1467-8624.00235

Connor, DF. Aggression and antisocial behavior in children and adolescents: Research and treatment. New York: Guilford; 2002.

Cook, TD.; Campbell, DT. Quasi-experimentation: Design and analysis for field settings. Skokie, IL: Rand McNally; 1979.

Csikszentmihalyi, M.; Larson, R. Being adolescent: Conflict and growth in the teenage years. New York: Basic Books; 1984.

Domjan, M. The principles of learning and behavior. Belmont, CA: Wadsworth; 2010.

Dotterer AM, McHale SM, Crouter AC. The development and correlates of academic interests from childhood through adolescence. Journal of Educational Psychology. 2009; 101:509–519.10.1037/a0013987 [PubMed: 22238475]

Duncan SC, Duncan TE, Hops H. Analysis of longitudinal data within accelerated longitudinal designs. Psychological Methods. 1996; 1:236–248.10.1037/1082-989X.1.3.236

Dunn, J. Siblings and socialization. In: Grusec, JE.; Hastings, PD., editors. Handbook of socialization: Theory and research. New York: Guilford; 2007. p. 309-327.

Eagle N, Pentland A, Lazer D. Inferring friendship network structure by using mobile phone data. Proceedings of the National Academy of Sciences of the United States of America. 2009; 106:15274–15278.10.1073/pnas.0900282106 [PubMed: 19706491]

Eccles, J.; Barber, B. Unpublished manuscript. The University of Michigan; 1990. The risky behavior scale.

Fergusson DM, Wanner B, Vitaro F, Horwood LJ, Swain-Campbell NR. Deviant peer affiliations and depression: Confounding or causation? Journal of Abnormal Child Psychology. 2003; 31:605–618.10.1023/A:1026258106540 [PubMed: 14658741]

Fuligni A, Eccles J, Barber B, Clements P. Early adolescent peer orientation and adjustment during high school. Developmental Psychology. 2001; 37:28–36.10.1037/0012-1649.37.1.28 [PubMed: 11206430]

Greene K, Banerjee SC. Examining unsupervised time with peers and the mediating role of association with delinquent peers on adolescent smoking. Nicotine and Tobacco Research. 2009; 11:371–380.10.1093/ntr/ntp003 [PubMed: 19307446]

Grover RL, Nangle DW, Serwik A, Zeff KR. Girl friend, boy friend, girlfriend, boyfriend: Broadening our understanding of heterosocial competence. Journal of Clinical Child and Adolescent Psychology. 2007; 36:491–502.10.1080/15374410701651637 [PubMed: 18088208]

Harter, S. Manual for the Self-Perception Profile for Adolescents. Denver, CO: University of Denver; 1988.

Haynie DL, Steffensmeier D, Bell KE. Gender and serious violence: Untangling the role of friendship sex composition and peer violence. Youth Violence and Juvenile Justice. 2007; 5:235–253.10.1177/1541204007300358

Hedeker D, Gibbons RD. Application of random-effects pattern mixture models for missing data in longitudinal studies. Psychological Methods. 1997; 2:64–78.10.1037/1082-989X.2.1.64

Kim JY, McHale SM, Crouter AC, Osgood DW. Longitudinal linkages between sibling relationships and adjustment from middle childhood through 0adolescence. Developmental Psychology. 2007; 43:960–973.10.1037/0012-1649.43.4.960 [PubMed: 17605528]

Kreager DA, Rulison K, Moody J. Delinquency and the structure of adolescent peer groups. Criminology. 2011; 49:95–127.10.1111/j.1745-9125.2010.00219.x [PubMed: 21572969]

Kovacs, M. Children's Depression Inventory manual. North Tonawanda, NY: Multi-Health Systems, Inc; 1992.

Larson R, Verma S. How children and adolescents spend time across the world: Work, play, and developmental opportunities. Psychological Bulletin. 1999; 125:701–736.10.1037/0033-2909.125.6.701 [PubMed: 10589300]

Maccoby EE. Gender and relationships: A developmental account. American Psychologists. 1990; 45:513–520.10.1037/0003-066X.45.4.513

Mahoney, JL.; Larson, RW.; Eccles, JS.; Lord, H. Organized activities as development contexts for children and adolescents. In: Mahoney, JL.; Larson, RW.; Eccles, JS., editors. Organized activities as contexts of development. Mahwah, NJ: Erlbaum; 2005. p. 3-22.

Mason CH, Perreault WD. Collinearity, power, and interpretation of multiple regression analysis. Journal of Marketing Research. 1991; 28:268–280.10.2307/3172863

Mehta CM, Strough J. Sex segregation in friendships and normative developmental contexts across the lifespan. Developmental Review. 2009; 29:201–220.10.1016/j.dr.2009.06.001

Mrug S, Borch C, Cillessen AH. Other-sex friendships in late adolescence: Risky associations for substance use and sexual debut? Journal of Youth and Adolescence. 2010; 40:875–88.10.1007/s10964-010-9605-7 [PubMed: 21088876]

Osgood WD, Wilson JK, Bachman JG, O'Malley PM, Johnston LD. Routine activities and individual deviant behavior. American Sociological Review. 1996; 61:635–655.10.2307/2096397

Pettit GS, Bates JE, Dodge KA, Meece DW. The impact of after-school peer contact on early adolescent externalizing problems is moderated by parental monitoring, perceived neighborhood safety, and prior adjustment. Child Development. 1999; 70:768–778.10.1111/1467-8624.00055 [PubMed: 10368921]

Scales, PC. Other people's kids: Social expectations and American adults' involvement with children and adolescents. New York: Kluwer Academic/Plenum; 2003.

Singer, JD.; Willet, JB. Applied longitudinal data analysis: Modeling change and event occurrence. New York: Oxford University Press; 2003.

Solmeyer AR, McHale SM, Crouter AC. Longitudinal associations between sibling relationship qualities and risky behavior across adolescence. Developmental Psychology. 2013 Advance online publication. 10.1037/a0033207

Poulin F, Pedersen S. Developmental changes in gender composition of friendship networks in adolescent girls and boys. Developmental Psychology. 2007; 43:1484–1496.10.1037/0012-1649.43.6.1484 [PubMed: 18020826]

Raudenbush, SW.; Bryk, AS. Hierarchical linear models. Thousand Oaks, CA: Sage; 2002.

Richards MH, Crowe PA, Larson R, Swarr A. Developmental patterns and gender differences in the experience of peer companionship during adolescence. Child Development. 1998; 69:154–163.10.1111/j.1467-8624.1998.tb06140.x [PubMed: 9499564]

Rubin, KH.; Bukowski, W.; Parker, J. Peer interactions, relationships, and groups. In: Eisenberg, N., editor. Handbook of Child Psychology: Social, emotional, and personality development. 6. New York: Wiley; 2006. p. 571-645.

Rutter M. Proceeding from observed correlation to causal inference: The use of natural experiments. Perspectives on Psychological Science. 2007; 2:377–395.10.1111/j.1745-6916.2007.00050.x

Schafer JL, Graham JW. Missing data: Our view of the state of the art. Psychological Methods. 2002; 7:147–177.10.1037/1082-989X.7.2.147 [PubMed: 12090408]

Singer, JD.; Willett, JB. Applied longitudinal data analysis: Modeling change and event occurrence. New York: Oxford University Press; 2003.

US Census Bureau. Census 2000 gateway. 2000. Retrieved from http://www.census.gov/main/www/cen2000.html

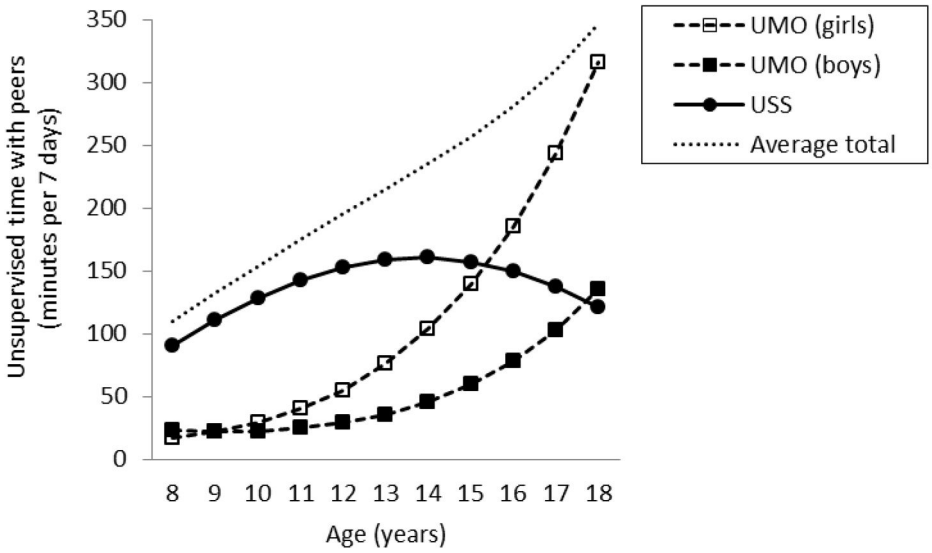

Figure 1.

Developmental course of unsupervised time with mixed- or opposite-sex peers (UMO) and same-sex (USS) peers

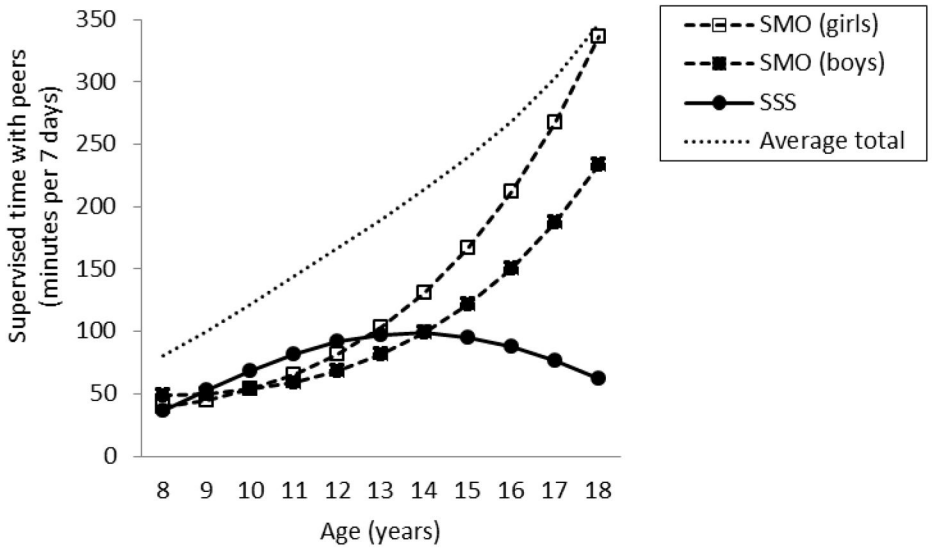

Figure 2.

Developmental course of supervised time with mixed- or opposite-sex peers (SMO) and same-sex (SSS) peers

Table 1

Correlations Among Time Use Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. T1 UMO	-	.13	**.18**	.12	.10	.04	.01	.07	−.04	.07	**.31**	.06	.02	**.18**	−.06	.02	.11	**.22**	.12	**.25**
2. T2 UMO	**.22**	-	**.35**	.10	**.15**	**.16**	**.15**	**.19**	.06	.07	.04	**.15**	.00	−.02	.02	.04	.06	.03	**.19**	.14
3. T3 UMO	**.19**	**.23**	-	**.25**	**.27**	**.17**	**.19**	**.20**	−.02	.12	.01	.10	.12	.04	.11	.03	.02	−.04	.11	.04
4. T5 UMO	**.26**	**.19**	.08	-	**.54**	.15	**.17**	**.22**	**.15**	.12	−.01	.06	.05	**.22**	**.24**	**.20**	**.19**	.10	.02	.12
5. T6 UMO	**.23**	**.17**	**.26**	**.49**	-	**.19**	**.20**	**.26**	.12	**.19**	−.14	−.02	.01	.12	.15	.03	**.16**	.08	.10	.06
6. T1 USS	.09	**.14**	.14	**.22**	.13	-	**.42**	**.37**	.15	**.16**	−.01	.01	.00	.03	.01	**.16**	**.17**	.14	**.22**	**.23**
7. T2 USS	**.14**	.09	.07	**.28**	**.21**	**.30**	-	**.32**	.11	**.20**	.02	−.02	.10	.13	**.20**	.03	**.28**	**.15**	**.18**	.14
8. T3 USS	.03	.10	.11	**.24**	**.26**	**.18**	**.32**	-	**.17**	**.16**	.03	−.02	−.01	.03	.03	**.21**	.12	**.21**	.09	.08
9. T5 USS	.06	.09	.05	**.17**	**.18**	**.25**	**.29**	**.29**	-	**.46**	.04	.08	−.05	−.08	−.09	.02	.11	.05	**.24**	.10
10. T6 USS	.04	.05	.02	.02	**.18**	**.16**	**.16**	**.21**	**.22**	-	.02	.06	−.06	.05	−.14	.09	.09	.12	.10	.11
11. T1 SMO	**.22**	.01	.10	.00	**.16**	.02	.03	**−.14**	−.01	−.04	-	**.27**	**.22**	.14	.02	**.17**	**.18**	.14	.11	.12
12. T2 SMO	.09	.11	−.04	.00	.00	**−.15**	−.08	−.08	−.10	.09	**.22**	-	**.27**	.14	.14	.09	**.29**	.11	**.22**	**.34**
13. T3 SMO	.09	.03	−.03	−.05	−.03	−.06	−.06	**−.25**	−.12	−.07	**.29**	**.23**	-	**.16**	.09	**.17**	**.19**	.04	**.18**	.10
14. T5 SMO	.13	.13	.02	**.28**	**.20**	−.01	.14	.05	−.14	−.03	.06	.12	.12	-	**.36**	.14	.10	.13	.13	**.26**
15. T6 SMO	.08	.01	.10	**.17**	**.22**	−.01	.01	.02	−.15	−.05	−.01	**.19**	.05	**.36**	-	.09	**.16**	.07	−.02	.10
16. T1 SSS	−.13	−.08	.08	−.02	.00	**.25**	.11	**.16**	.10	**.16**	.05	.05	−.01	−.03	−.04	-	**.22**	**.21**	.10	.10
17. T2 SSS	.07	−.08	.01	.02	.07	**.18**	**.19**	.09	**.15**	**.26**	**.20**	**.18**	.13	.06	.02	**.31**	-	**.27**	**.19**	**.30**
18. T3 SSS	**.14**	.12	.06	.09	.11	**.19**	**.15**	**.20**	.08	**.17**	.10	**.19**	.10	.06	−.01	**.31**	**.35**	-	**.24**	**.29**
19. T5 SSS	**.23**	−.05	.09	.04	.08	.13	.13	.06	.10	**.16**	.08	.15	.15	.00	−.04	**.16**	**.28**	**.30**	-	**.44**
20. T6 SSS	.03	−.14	−.01	−.07	.01	−.03	.08	.01	−.14	**.24**	.04	.06	.08	.04	−.03	.14	**.24**	**.16**	**.52**	-

Note. Correlations for firstborns are below the diagonal and correlations for secondborns are above the diagonal.

T1, T2, T3, T5, T6 = Times 1, 2, 3, 5, and 6, respectively; UMO = unsupervised time with an opposite-sex peer or a peer group that includes at least one opposite-sex peer; USS = unsupervised time with a same-sex peer or peer group; SMO = supervised time with an opposite-sex peer or a peer group that includes at least one opposite-sex peer; SSS = supervised time with a same-sex peer or peer group.

Bold entries reflect correlations that are significant at $p < .05$.

Table 2

Parameter Coefficients (γ) and t-Ratios for Multi-Level Models of Unsupervised and Supervised Time With Mixed- or Opposite-Sex and Same-Sex Peers

	UMO		USS		SMO		SSS	
Fixed effects	***t*-ratio**		***t*-ratio**		***t*-ratio**		***t*-ratio**	
Intercept	8.34	17.94***	12.77	22.11***	9.85	16.57***	10.03	16.96***
Linear effect	1.37	16.26***	0.15	2.23*	1.21	10.84***	0.18	2.50*
Quadratic effect	0.09	5.76***	−0.09	−4.86***	0.09	4.31***	−0.12	−5.75***
Gender	−2.72	−6.98***	−0.14	−0.33	−0.96	−2.18*	−0.30	−0.67
Linear x Gender	−0.69	−6.49***	-	-	−0.38	−2.78**	-	-
Birth order	0.74	2.12*	−0.17	−0.43	0.36	0.97	−0.00	−0.01
Parental education	−0.11	−1.08	−0.15	−1.04	0.39	2.59*	0.10	0.70

	UMOS	USS	SMO	SSS
Random effects	**Variance components**	**Variance components**	**Variance components**	**Variance components**
Level 1	32.94***	43.16***	51.71***	43.85***
Level 2				
Intercept	3.07***	4.34***	-	9.01***
Intercept-Linear	-	0.83***	-	2.33***
Linear	-	0.40***	-	0.65***
Level 3				
Intercept	7.86***	11.51***	15.41***	11.12***
Intercept-Linear	1.46***	-	1.62***	-
Linear	0.34***	-	0.72***	-

Note. UMO = unsupervised time with an opposite-sex peer or a peer group that includes at least one opposite-sex peer; USS = unsupervised time with a same-sex peer or peer group; SMO = supervised time with an opposite-sex peer or a peer group that includes at least one opposite-sex peer; SSS = supervised time with a same-sex peer or peer group.

*$p < .05$;

**$p < .01$;

***$p < .001$.

Table 3

Parameter Coefficients (γ) and t-Ratios for Multi-Level Models of Problem Behaviors, Depressive Symptoms, and School Performance

	Problem behaviors		Depression		School grades	
Fixed effects	***γ***	***t*-ratio**	***γ***	***t*-ratio**	***γ***	***t*-ratio**
Age effects, gender, and interaction terms						
Intercept	3.076	193.62***	0.890	16.55***	3.306	81.31***
Linear effect	0.049	13.24***	0.084	5.63***	−0.077	−9.51***
Quadratic effect	-	-	0.004	1.70	0.002	1.25
Cubic effect	-	-	−0.002	−3.51***	0.002	3.30**
Gender	0.086	5.88***	−0.200	−3.89***	−0.133	−3.88**
Linear x Gender	−0.012	−2.45**	−0.098	−4.71***	-	-
Quadratic x Gender	-	-	−0.005	−1.20	-	-
Cubic x Gender	-	-	0.003	2.84**	-	-
Time with peers						
BP UMO	0.009	4.69***	0.003	0.51	−0.010	−2.30*
BP USS	0.003	2.05*	0.000	0.03	−0.017	−4.29***
BP SMO	−0.003	−2.11*	−0.011	−2.19*	0.016	4.24***
BP SSS	0.000	0.28	−0.007	−1.51	0.008	2.34*
WP UMO	0.002	2.98**	0.008	3.24**	0.002	1.34
WP USS	0.001	1.14	0.002	1.06	−0.001	−0.48
WP SMO	−0.000	−0.26	0.002	0.85	0.003	2.19*
WP SSS	−0.001	−1.73	−0.002	v0.77	0.001	0.73
Controls						
Birth order	0.013	0.98	−0.008	−0.19	−0.054	−1.62
Parental education	−0.010	−2.51*	−0.032	−2.64**	0.067	6.98***
Social competence	−0.001	−0.49	−0.032	−5.94***	0.001	0.40

Note. BP = between-person; WP = within-person; UMO = unsupervised time with an opposite-sex peer or a peer group that includes at least one opposite-sex peer; USS = unsupervised time with a same-sex peer or peer group; SMO = supervised time with an opposite-sex peer or a peer group that includes at least one opposite-sex peer; SSS = supervised time with a same-sex peer or peer group.

*$p < .05$;

** $p < .01$;

*** $p < .001$.