

# A Prospective Study of Intraindividual and Peer Influences on Adolescents' Heterosexual Romantic and Sexual Behavior

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Theories and empirical studies of adolescent sexual behavior have identified the contributions of personal attributes and social experiences; however, it is rare that models have clarified developmental pathways to adolescent sexual behavior that include (1) factors assessed prior to and early in adolescence and (2) dyadic experiences in adolescence that provide the opportunity for sexual behavior (i.e., dating). Using data from a prospective study, structural equation modeling was used to test a model predicting adolescent sexual behavior at age 19, denoted by the number of lifetime sexual partners. Predictors examined were sociability and impulsivity assessed at 30 months of age, physical characteristics and experiences with peers measured at age 12–13, the age of first romantic relationship, and frequency of alcohol use at age 16. The pathway to greater sexual involvement was marked by some desired personal attributes (e.g., sociability) and peer experiences (e.g., higher quality friendships). These associations were mediated, however, by earlier initiation of romantic relationships and more frequent use of alcohol in middle adolescence. Earlier initiation of romantic relationships and more frequent alcohol use were predicted by greater sociability and less impulsivity in childhood, higher quality friendships and greater peer acceptance in early adolescence, and a more mature appearance and physical attractiveness (among females) at age 13. The findings imply a complex pathway that leads to a greater accumulation of sexual partners by age 19. This pathway begins in childhood and includes individual qualities, peer acceptance, romantic relationships, and alcohol use.

**KEY WORDS:** sexual partners; peer relationships; dating; longitudinal; alcohol use.

## INTRODUCTION

Romantic and sexual interests become increasing salient and common during adolescence. In Western industrialized cultures, young people typically begin heterosexual dating in early or middle adolescence (Furman, Brown, & Feiring, 1999; Phinney, Jensen, Olsen, & Cundick, 1990; Zimmer-Gembeck, 1999) and many have their first experience of sexual intercourse before finishing secondary school (Kann et al., 1998; Katchadourian,

1990). At the same time, there are individual differences in the timing of first sexual intercourse, the number of sexual partners that adolescents report, and the development of dating and romantic relationships, such as the onset of first romantic activities or first long-term romantic relationship (Bingham & Crockett, 1996; Kann et al., 1998; Zimmer-Gembeck, 1999; Zimmer-Gembeck, Siebenbruner, & Collins, 2001).

Theory and findings from empirical research alike implicate biological (e.g., hormones, pubertal maturation) and social factors (e.g., peer acceptance) in these individual differences (Collins & Repinski, 1995; Halpern, Udry, Campbell, & Suchindran, 1993; Halpern, Udry, & Suchindran, 1997; Miller & Benson, 1999; Udry, 1988). Yet, a more specific understanding of the antecedents of romantic and sexual involvement is needed to advance developmental theories of sexual behavior by focusing on childhood and early adolescent characteristics that can

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assist in our understanding of the emergence of later patterns of sexual behavior (Udry, Kovenock, Morris, & Van den Berg, 1995).

It is often recognized that adolescent sexual behavior depends on dyadic relations that include multiple forms of intimate interaction (e.g., companionship, support) and provide the opportunity for sexual behavior, but many studies have not explicitly included romantic involvements as a potential link in a pathway to sexual behavior. There has also been limited acknowledgement in studies of adolescent sexual behavior that the peer group is an environmental context that may promote a range of behaviors, such as dating and alcohol use (Dunphy, 1963; Eder, 1985; Kandel, Davies, & Baydar, 1990; Zani, 1993). Researchers who have proposed a biosocial model, for example, have identified personal attributes correlated with adolescent sexual behavior, such as hormones (testosterone), physical maturation/puberty, and temperament and personality, as well as social experiences correlated with sexual behavior, such as social controls (e.g., religion, church attendance) and friends' behaviors (Halpern, Udry, Campbell, Suchindran, & Mason, 1994; Smith, Udry, & Morris, 1985; Udry, 1988; Udry et al., 1995; Udry & Talbert, 1988). These correlates do not usually have uncomplicated associations with adolescent sexual behavior, but seem to influence behavior via mediating variables. Yet, romantic friendships and integration in the peer group have not been included in these pathways as mediators and may be necessary links between personal attributes and adolescent sexual behavior.

The multiple influences contributing to the development of both romantic relationships (dating behavior) and sexuality were identified in one study of pathways to sexual activity in adolescence (Feldman, Rosenthal, Brown, & Canning, 1995). One pathway, suggested by problem behavior theory (Donovan & Jessor, 1983; Jessor, Costa, Jessor, & Donovan, 1983), linked early adolescent peer rejection and individual misconduct to sexual activity. In this view, early initiation of sexual intercourse clusters with early transitions to other common adult-like behaviors. Many studies have examined the problem social experiences and individual conduct problems associated with sexual behaviors that may place adolescents at increased risk of sexually transmitted infections and unwanted pregnancy (e.g., inconsistent contraceptive use, early onset of sexual behavior) (for reviews, see Kotchick, Shaffer, Forehand, & Miller, 2001; Miller, Benson, & Galbraith, 2001). In a companion study, we examined factors associated with abstinence, and moderate and high risk sexual behavior at age 16 (i.e., consistency of contraceptive use and numbers of sexual partners; Siebenbruner, Zimmer-Gembeck, & Egeland, 2004).

More relevant for the current study, a second pathway was also reported by Feldman et al. (1995), which linked peer acceptance in early adolescence with later dating, alcohol use, and sexual activity. Few research studies have further investigated this second pathway. In the current study, a model was proposed that expanded upon this second pathway (labeled a "peer acceptance pathway") to test additional intraindividual characteristics and positive peer experiences that predict romantic behavior in early/middle adolescence and sexual behavior at age 19. Data from a longitudinal study that followed children from birth were used.

Sexual behavior at age 19 was the outcome of interest, because the initiation of sexual intercourse by this age has occurred for the vast majority of young people living in the United States with current estimates of rates of sexually active youth at age 18 or 19 usually approaching 85%, regardless of gender (Kann et al., 1998). A peer acceptance pathway may also identify important predictors of romantic and sexual behavior overlooked when the focus is on problem behaviors. For example, prior to, or concurrent with, the initiation of sexual intercourse, young people increasingly affiliate with mixed-sex groups of peers, from steady romantic relationships, and rely on friends and partners for support and companionship (Dunphy, 1963; Furman et al., 1999; Richards, Crowe, Larson, & Swarr, 1998). In addition, alcohol use becomes more common as young people get older, increasing from approximately 40% of grade 9 students to 55% of grade 12 students reporting alcohol use in the past month on U.S. national surveys (Centers for Disease Control, 2001). This use of alcohol is often part of peer group activities (Dolcini & Adler, 1994; Feldman et al., 1995). Because of the proposed importance of the peer group and dyadic relationships in the current study, alcohol use was also examined.

### Proposed Model and Hypotheses

Our conceptual model, shown in Fig. 1, furthers the investigation of a peer acceptance pathway linking earlier intraindividual and peer influences to later heterosexual dating, alcohol use, and sexual behavior. Specifically, the model proposed includes hypothesized links between intraindividual biological and social characteristics (prior to age 13), alcohol use (at age 16), the age of initiation of romantic relationships, and the number of sexual partners in adolescence (by age 19). Similar to previous work in this area (Udry et al., 1995), there is an underlying assumption in the proposed model that the antecedents of sexual behavior have continuity into adolescence, and the child enters adolescence with a history that partly shapes his/her

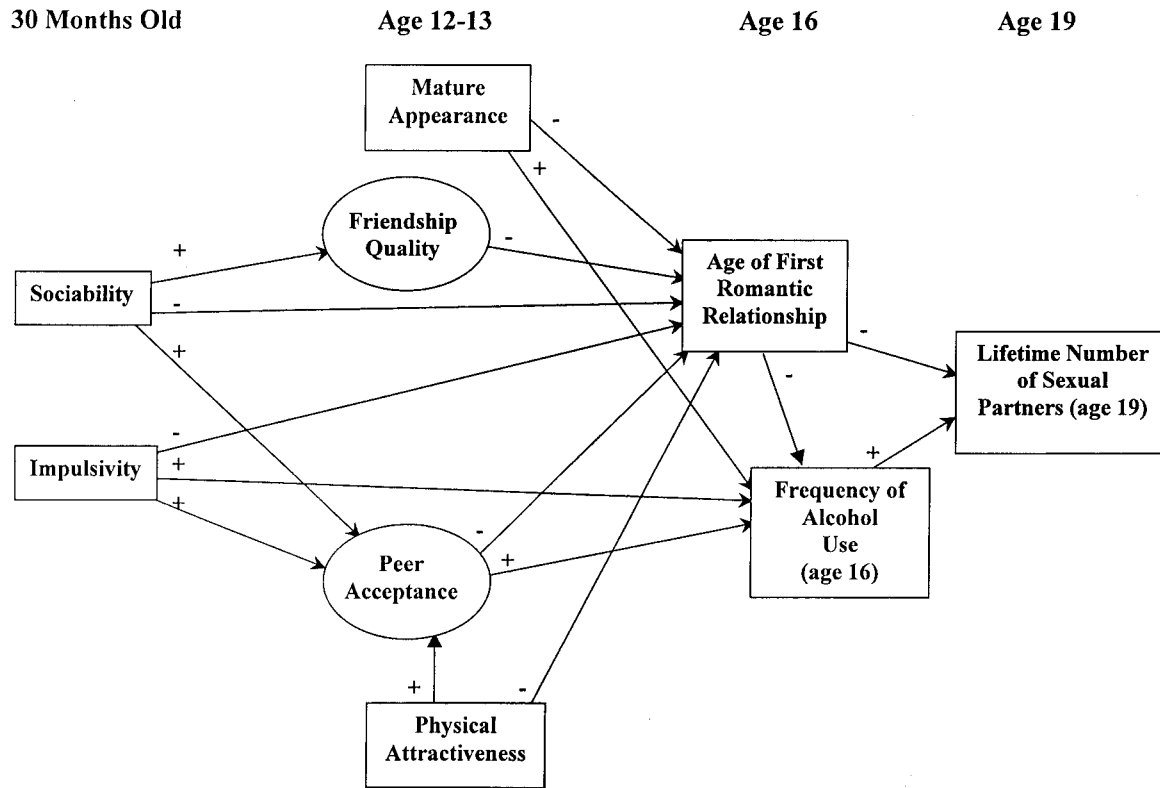


Fig. 1. A proposed path model from individual and social factors in childhood and adolescence to sexual behavior at age 19.

future experiences. For example, temperamental and personality attributes measured in childhood have been found to be quite stable into adolescence and adulthood (Caspi & Silva, 1995; Kagan & Moss, 1962).

Potential gender differences in this model must also be addressed. Although rates vary depending on historical period and region, at every age during periods of adolescence prior to age 19, a slightly higher percentage of males than females report a history of sexual intercourse (Moore, Miller, Gleib, & Morrison, 1995). More importantly, the sexual experiences of males and females can be quite different (Hyde & Oliver, 2000; Koch, 1993). It was less clear whether model paths (i.e., associations between model elements) would be moderated by gender. Nevertheless, gender differences in model paths were considered and tested when evidence was available.

We describe the hypotheses presented in this model (Fig. 1) in six parts. We also provide evidence for the hypothesis that three paths in the model would differ when comparing males and females.

(1) We hypothesized that early individual differences in sociability would contribute to peer relation-

ships in the second decade of life; a more sociable temperament in early childhood would be associated with greater peer acceptance, higher friendship quality, and earlier onset of romantic relationships in adolescence. For both males and females, behavioral styles that appear in childhood, such as sociability and impulsivity, impact social development by shaping actions in the social environment and responses from others (Buss & Plomin, 1984). Sociability in childhood has been linked previously to peer acceptance and qualities of interpersonal relationships during adolescence and adulthood (Aboud & Mendelson, 1998; Morison & Masten, 1991; Newman, Caspi, Moffitt, & Silva, 1997), and “mature” personality, marked by items such as “makes friends easily” and “older children follow her lead,” has been associated with earlier onset of sexual intercourse among females (Udry et al., 1995).

(2) We expected that individual differences in early childhood impulsivity would be associated with earlier onset of romantic relationships and more

frequent alcohol use at age 16. Impulsivity involves seeking rewards, contact with the environment, novel experiences, and excitement (Buss & Plomin, 1984). Some consider impulsivity to be part of a cluster of action-oriented personality traits, including sensation-seeking and extroversion (Barrett & Patton, 1983). Some level of impulsivity likely has positive effects on peer relationships by increasing recognition, prominence, and leadership among peers (MacDonald, 1996). Yet, impulsivity also has been associated with the frequency of alcohol use during adolescence (Bates & Labouvie, 1995; Colder & Chassin, 1997) and may be predictive of sexual behavior. In a recent study (Rosenthal, Smith, & de Visser, 1999), restraint, a construct that included the ability to control impulses, was lower among early initiators (15 or younger) of sexual intercourse than late initiators, and in a separate study (Udry et al., 1995), personality measured between ages 9 and 11, denoted by items such as showing off and being a daredevil (labeled "domineering"), has been associated with the age of sexual intercourse among females (Udry et al., 1995).

- (3) We proposed that more attractive adolescents would be more accepted by peers, and establish romantic relationships earlier. Physical attractiveness has been associated with greater peer acceptance and popularity in both sexes (Feingold, 1990; Franzoi, Davis, & Vasquez-Suson, 1994). We also expected one association to be qualified by gender with the physical attractiveness of females more predictive of the onset of romantic relationships than the attractiveness of males. Feingold (1990) reported that attractiveness was more predictive of romantic popularity among women than men.
- (4) Peer acceptance and friendship quality were expected to directly influence the onset of romantic relationships. In Dunphy's (1963) classic ethnographic study, involvement with mixed-sex peer groups was a precursor to the development of romantic involvement. Because early dating is linked to group activity and social expectations of the peer group (Connolly & Goldberg, 1999; Roscoe, Diana, & Brooks, 1987; Zani, 1993), it is likely that acceptance by peers is associated with earlier age of romantic relationship onset for both males and females (Collins, 2003). For example, using a sociometric rating technique, Franzoi et al. (1994) reported that

popular students dated more frequently than neglected, rejected, and average students.

The expectation that higher friendship quality in early adolescence would predict earlier onset of romantic relationships was based on the developmental perspective of Collins and Sroufe (1999) and Furman and Wehner's (1994) theory of romantic views. Both theories highlight the progression of relationships throughout life and the importance of the quality of relationships with friends in the formation of romantic relationships. In addition, Sullivan's (1953) classic theory proposes that intimacy with friends and increasing sexual interests give rise to the initiation of romantic relationships.

- (5) We hypothesized that adolescents who look older in early adolescence would form romantic relationships earlier. Hormonal changes that occur during puberty can directly influence involvement in dating and sexual behavior, especially among boys (Miller & Benson, 1999; Udry & Campbell, 1994). There is also evidence that young people who appear more physically mature prompt changing responses from the social environment that include increased opportunities for romantic and sexual involvement (Graber, Britto, & Brooks-Gunn, 1999; Phinney et al., 1990).

Given some evidence that associations between physical maturation and sexual behavior may be stronger among males, gender differences were hypothesized (Udry & Billy, 1987). Mature appearance was expected to be a stronger predictor of the onset of romantic relationships and, in turn, the number of sexual partners among males. A number of researchers have reported that females' sexual activity is more influenced by social controls than pubertal maturation (Rosenthal et al., 1999; Udry & Billy, 1987).

Additionally, young people who looked more mature in early adolescence were expected to use more alcohol in middle adolescence. Two studies of females found that those who matured earlier had a greater frequency of drunkenness (Costa, Jessor, Donovan, & Fortenberry, 1995; Stattin & Magnusson, 1990). Andersson and Magnusson (1990) reported a similar relationship between early maturation and alcohol use among males, but also found that late maturing males used more alcohol than average maturing males.

- (6) Finally, we proposed that young people who were more accepted by peers in early adolescence and those who began forming romantic relationships earlier would use more alcohol at age 16. Peer acceptance in grade 6 and later dating behavior have been associated with alcohol use (Feldman et al., 1995). We hypothesized the same paths in this study. We further hypothesized a direct association between the age of the first romantic relationship and number of sexual partners, and a direct association between alcohol use at age 16 and number of sexual partners. We expected a direct association between the age of onset of romantic relationships and the number of sexual partners reported at age 19 because much sexual activity during adolescence and throughout adulthood occurs within the context of romantic relationships. About 75% of 15- to 19-year old females reported that they were going steady with their first sexual partner (National Center for Health Statistics, 1997). Young people who begin to form steady romantic relationships earlier tend to initiate sexual intercourse earlier and have more sexual partners during adolescence (Miller, McCoy, & Olson, 1986; Thornton, 1990). In addition, once initiated, romantic involvement and sexual behavior tends to continue (Tubman, Windle, & Windle, 1996; Zimmer-Gembeck, 1999).

It was also expected that alcohol use would partially mediate the association between romantic involvement and sexual behavior. In other words, we hypothesized that adolescents who formed their first romantic relationships earlier would use alcohol more frequently, and predicted that the use of alcohol, in turn, would be associated with a greater number of sexual partners. Most research on links between alcohol use and sexual activity are focused on a more deviant developmental pathway, including substance use problems and delinquent behavior (e.g., see Capaldi, Crosby, & Stoolmiller, 1996; Tubman et al., 1996). These studies found significant relations between substance use and engaging in sexual intercourse. Yet, consuming low to moderate quantities of alcohol fairly infrequently is prevalent among adolescents and has been viewed by some as a normative adolescent activity (Newcomb & Bentler, 1988). For example, alcohol may be part of social activities and special events, such as parties (Feldman et al., 1995; Kandel, Kessler, & Margulies, 1978; Stattin, Gustafson, & Magnusson, 1989). In addition, using alcohol on dates has been associated with sexual activity (Cooper & Orcutt, 1997). Small and Luster (1994) found that young people

who were sexually active, compared to their nonsexually active peers, were more likely to use alcohol.

One gender difference was also hypothesized. A stronger association between onset of romantic relationships and the number of sexual partners was expected among females as compared to males. In a national survey conducted in the United States, females were more likely than males to report that their first experiences of sexual intercourse occurred with steady romantic partners (National Center for Health Statistics, 1997).

## METHOD

### Participants

Participants were drawn from a longitudinal study of firstborn children of mothers living in poverty (original  $N = 267$ ; see Egeland & Brunnequell, 1979). Women were receiving prenatal care in the Minneapolis Health Department between 1975 and 1977. Women were recruited for the study during their third trimester of pregnancy. When the children were 2-years old, the retention rate was 79% ( $N = 212$ ). At age 30-months, 189 participants remained. By grade 6, approximately 65% of participants remained in the study and about the same proportion of participants have been included in follow-up assessments since that time. The primary reason for participant attrition was residential mobility.

The mother's age at delivery ranged from 12 to 34 years ( $M = 20.5$ ;  $SD = 3.6$ ). Sixty-two percent of the mothers were unwed and 43% had not completed high school. Seventy-nine percent of the mothers were Caucasian, 15% African American, and 7% Latino American, Native American or Asian. Fifty-eight percent of children had two White parents. By the time children were 16-years old, 84% of mothers had completed 12 years of education or more and 12% had completed 16 years of education or more.

The current study included 155 participants (70 females and 85 males, 58% of inception cohort) followed from birth to age 19, who were assessed at all waves included in this study. In general, the attrition rate did not appear to compromise the internal validity of the current study as the longitudinal sample represented the demographic characteristics of the participants prior to attrition. There were no differences between the longitudinal sample and those who were absent from one or more assessments when comparing demographic characteristics of the family: mothers' age at birth, prenatal socioeconomic status, and mothers' prenatal education level. Nevertheless, there were small differences when comparing race/ethnicity of families maintained in the longitudinal

sample and those who were not maintained. More White mothers were maintained in the study,  $\chi^2(2) = 5.9, p = .02$ . Overall, 85% of participants in the longitudinal sample had White mothers and 66% had two White parents. Finally, the longitudinal sample also did not differ from those participants who were absent from later assessments when comparing measures from the earliest assessment used in the current study (children's temperamental characteristics at 30 months of age); mean levels of children's sociability and impulsivity, both  $F_s < 1$ .

## Measures

Data have been collected repeatedly from multiple informants throughout the participants' lives. Measures used in the current study were obtained when participants were 30-months old, in grade 6, and age 13, 16, 17, 19, and 20–21 years. Means,  $SD$ s, and simple correlations between all measured variables are shown in Table I.

### Maternal Report of Temperament

The Buss and Plomin (1975) EASI temperament assessment was administered when participants were 30-months old. This 20-item questionnaire assessed emotionality, activity level, sociability, and impulsivity. Possible scores ranged from 5 to 25. High scores indicated high emotionality, activity level, sociability, and impulsivity. Buss and Plomin (1975) reported an average test–retest reliability of .82 (range, .75 to .91) across subscales. Sociability and impulsivity scores (five items each) were

used in the current study. An example sociability item was “My child likes to be with others.” An example impulsivity item was “My child is impulsive.” When these subscales were submitted to factor analyses, each subscale encompassed two factors. In each case, positively worded items loaded highly ( $> .6$ ) on the first factor and negatively worded items loaded highly ( $> .6$ ) on the second factor. However, scales were maintained as originally designed because the items tapped the range of behaviors of interest in this study and items had good face validity. Sociability and impulsivity had moderate reliability,  $\alpha = .52$  and  $.72$ , and were not significantly correlated (see Table I).

### Physical Characteristics

Participants were observed in videotaped interactions with one or both parents (usually the mother) when they were 13-years old to rate physical attractiveness and appearance of physical maturity. Seven independent coders (3 males, 4 females) rated all adolescents after viewing segments of videotapes. Coders attended two training meetings to become familiar with the rating criteria, view videotapes, rate mature appearance and physical attractiveness, and discuss ratings to come to consensus. Coders then rated all available videotaped images of child participants. The ordering of videotapes was randomly determined for each coder.

*Appearance of Physical Maturity.* Appearance of physical maturity was rated by assessing each adolescent's observable physical development. Ratings of mature appearance ranged from 1 = *very immature appearance* to 6 = *very mature appearance*. Voice and physical

Table I. Means, Standard Deviations, and Correlations Among All Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>M</i> ( <i>SD</i> )	18.0 (2.6)	15.6 (3.2)	3.0 (1.0)	3.4 (1.2)	4.9 (1.3)	5.2 (1.1)	4.8 (1.3)	55.3 (29.2)	60.1 (7.6)	3.1 (1.2)	15.8 (1.1)	2.0 (2.2)	2.0 (1.2)
1. Sociability, 30 months	—												
2. Impulsivity, 30 months	.02	—											
3. Physical maturity, age 13	.11	.05	—										
4. Physical attractiveness, age 13	.17*	-.01	.05	—									
5. Friendship intimacy, grade 6	.10	.10	.22**	.07	—								
6. Friendship satisfaction, grade 6	.05	.18*	.04	.00	.56**	—							
7. Friendship global quality, grade 6	.21**	.10	.08	.10	.70**	.71**	—						
8. Peer acceptance, grade 6	.05	-.13	.09	.28**	-.05	-.18*	-.06	—					
9. Unpopular, grade 6	.05	.08	.04	-.28**	.06	.21**	.10	-.59**	—				
10. Social competence with peers, grade 6	.05	-.08	-.02	.26**	.04	-.07	-.03	.77**	-.58**	—			
11. Age first romantic relationship	-.13	.14	-.21**	-.08	-.22**	-.23**	-.16*	.00	-.05	-.02	—		
13. Alcohol use, age 16	.06	.00	.01	.09	.14	.07	.01	.11	-.07	.16*	-.17*	—	
14. Lifetime number of sex partners, age 19	.02	.04	.08	.13	.12	.13	.08	-.02	.01	-.02	-.17*	.30**	—

\* $p < .05$ . \*\* $p < .01$ .

characteristics, adult facial features, breast development, and body proportion were considered. Most adolescents were observed standing and sitting. A measure of interrater reliability, the intraclass correlation coefficient (McGraw & Wong, 1996; Shrout & Fleiss, 1979), was used to estimate agreement among the seven ratings of physical maturity. The intraclass correlation coefficient is a ratio of between rater variance to total variance and has an upper bound of 1. The intraclass correlation between the seven ratings was adequate (.64,  $p < .01$ ). Mature appearance scores were calculated by averaging the ratings of all coders.

*Physical Attractiveness.* The rating of physical attractiveness ranged from 1 = *in comparison to other young people, this adolescent appears much less attractive* to 7 = *in comparison to other young people, this adolescent appears much more attractive*. The intraclass correlation coefficient for physical attractiveness was adequate (.54,  $p < .01$ ). This coefficient was primarily lower as a result of males' lower agreement when rating male participants; however, the average rating of attractiveness by females coders was highly similar in ranking to the average rating of attractiveness by male coders,  $r(N = 155) = .74$ ,  $p < .001$ . Therefore, physical attractiveness scores were calculated as the average of all seven ratings. Appearance of maturity and physical attractiveness were not significantly correlated (see Table I).

### Friendship Quality

Adolescents were interviewed in their homes in the sixth grade. A portion of the interview elicited adolescents' perceptions, attitudes, and behavior regarding friendships. A series of rating scales were developed to summarize audiotaped information gathered about best friendships. Friendship intimacy, satisfaction, and global quality were used in the current study as three indicators of a latent construct labeled "friendship quality." Two randomly selected graduate students (out of a pool of 5) who were masked to the history of participants rated all participants on all friendship constructs, and ratings were averaged. Spearman-Brown estimates of conference score reliabilities were computed based on intercorrelations among pairs of coders for the entire sample. These coefficients ranged from .83 to .85 for the three scales used in the current study.

*Intimacy.* The intimacy rating assessed the level of intimacy expressed by adolescents regarding their primary friendship. Ratings were made from the audiotape of adolescents' narrative answers to questions about their sharing of thoughts and emotions with their best friends. State-

ments about desire or appreciation for such sharing and trust in friends were considered. Scores ranged from 1 = *low intimacy* to 7 = *high intimacy*.

*Satisfaction.* This scale assessed the extent of enjoyment and satisfaction with best friendships. Raters considered how much fun adolescents reported to have with their friends and complaints about behaviors of their friends. Scores ranged from 1 = *low satisfaction* to 7 = *high satisfaction*.

*Quality.* This scale assessed the overall quality of the primary friendships. This was a global rating that considered many aspects of friendship including consistency, reciprocity, age-appropriateness, enjoyment, intimacy, and closeness. Scores range from 1 = *low quality* to 7 = *high quality*.

### Teacher Reports of Peer Acceptance

*Peer Acceptance.* In grade 6, teachers ranked each child according to her/his level of peer acceptance in relation to the other children in the classroom. Each teacher was asked to read a description and rank each child numerically on a scale of 1 to  $n$ , where  $n$  was the number of children in the class, and 1 was the highest rank of the characteristic. Peer competence was defined as a "child being well liked by others and having clearly identifiable, mutual friends. Additionally, others respect her/him, and follow her/his ideas."

*Unpopular.* When participants were in grade 6, teachers completed the Teacher's Report Form (TRF; Achenbach & Edelbrock, 1986). The TRF consisted of 113 items that assess a number of problems including social difficulties. Scores were converted to  $T$  scores based on a large, representative U.S. national sample. Two-week test-retest reliabilities of the TRF have been reported to range between .64 and .98 for girls (ages 12–16) and .74 and .92 for boys (ages 12–16). The  $T$  score of the Unpopular narrow-band was used in the current study. The Unpopular narrow-band included eight items that teachers rated on a 3-point scale from 0 = *not true* to 2 = *very true or often true*.

*Social Competence with Peers.* In grade 6, teachers rated children on social competence with peers by answering the following question: "Within your classroom, how would you rate (*student*)'s overall social and emotional behavior with peers?" Responses ranged from 1 = *poor* to 5 = *excellent*.

Correlations between the three indicators of friendship quality and the three indicators of peer acceptance are shown in Table I. Indicators of friendship quality were significantly intercorrelated, as were measures of peer

acceptance; however, measures of friendship quality most often were not significantly correlated with teacher reports of peer acceptance.

#### *Age of First Romantic Relationship, Alcohol Use, and Sexual Behavior*

Participants completed audiotaped interviews and written questionnaires when they were ages 16, 17, and 19. Interviews included an extensive protocol on dating and romantic relationships. Questionnaires completed by participants at ages 16 and 19 included a revised version of the Adolescent Health Survey (Blum, Resnick, & Bergeisen, 1989) to assess risk factors for physical and/or emotional ill health, including alcohol use and sexual behavior.

*Age of First Romantic Relationship.* Using information about history of dating, boyfriends/girlfriends, steady/regular romantic relationships, and length of past and current romantic relationships that were collected during the interviews at age 16, we estimated the age of onset of romantic relationships for all participants. For those who had not started dating at age 16, we used the reported age of onset collected as part of a questionnaire completed when participants were age 19, 20, or 21. Overall, 79% of participants reported a current or past romantic relationship at age 16, 6% initiated romantic relationships before age 14, and 98% had a romantic relationship by age 19.

*Frequency of Alcohol Use.* The present study used two survey questions completed at age 16 that assessed amount of alcohol use. "How often do you use the following: beer/wine? hard liquor (rum, whiskey, mixed drinks, etc.)?" Possible responses included never = 0, once = 1, less than monthly = 2, monthly = 3, weekly = 4, and daily = 5. Responses to these two questions were summed to indicate the amount of alcohol use at age 16 (range, 0 to 10).

*Number of Sexual Partners by Age 19.* The questionnaire completed at age 19 asked adolescents to report their lifetime history of sexual intercourse partners. Possible responses included none = 0, one = 1, 2–5 = 2, 6–10 = 3, 11–20 = 4, and more than 20 = 5. Twenty percent reported one sexual partner by age 19, 44% reported two to five partners, 14% reported six to 10 partners, 9% reported 11 to 20 partners, and 5% reported 20 or more sexual partners. In sum, 92% had a history of sexual intercourse.

#### **Overview of the Analytic Strategy**

We used structural equation modeling (SEM; Jöreskog & Sörbom, 1993; Kaplan, 2000) to test the hypothesized model. There were multiple indicators of

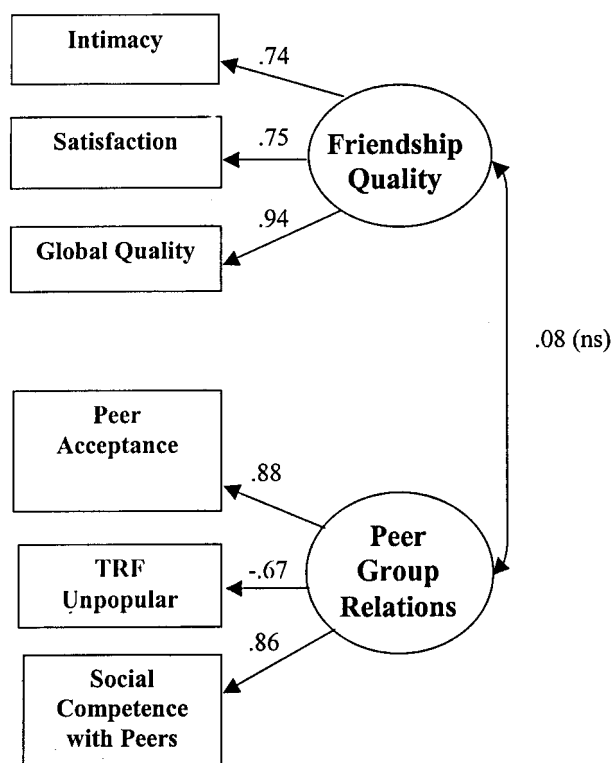


Fig. 2. Results of the fit of the friendship and peer acceptance measurement model.

friendship quality and peer acceptance available. Hence, we first examined the fit of the measurement model (Fig. 2). Model fit was assessed with commonly used fit indices, including the  $\chi^2$  test statistic and associated level of significance, the Comparative Fit Index (CFI) and the Normed Fit Index (NFI; Bentler & Bonett, 1980), which compared the specified model to a model with complete independence, and the Root Mean Square Error of Approximation (RMSEA; Browne & Cudeck, 1993) that provided an estimate of error due to approximate fit of the model. The CFI and NFI are more acceptable as they approach 1 and values over .9 are considered indication of good model fit. RMSEA values below .05 are considered acceptable, values between .05 and .08 are considered indicative of fair fit, and values between .08 and .10 are considered an indication of mediocre fit (Kaplan, 2000). Another measure of fit that has been proposed is the  $\chi^2$  test statistic divided by the degrees of freedom. There is no clear agreement about what value represents a good fit but suggested ratios of 2 or 3 have been common (Bollen, 1989). Finally, we freed paths representing all hypothesized associations and then deleted nonsignificant paths to present a more parsimonious model.

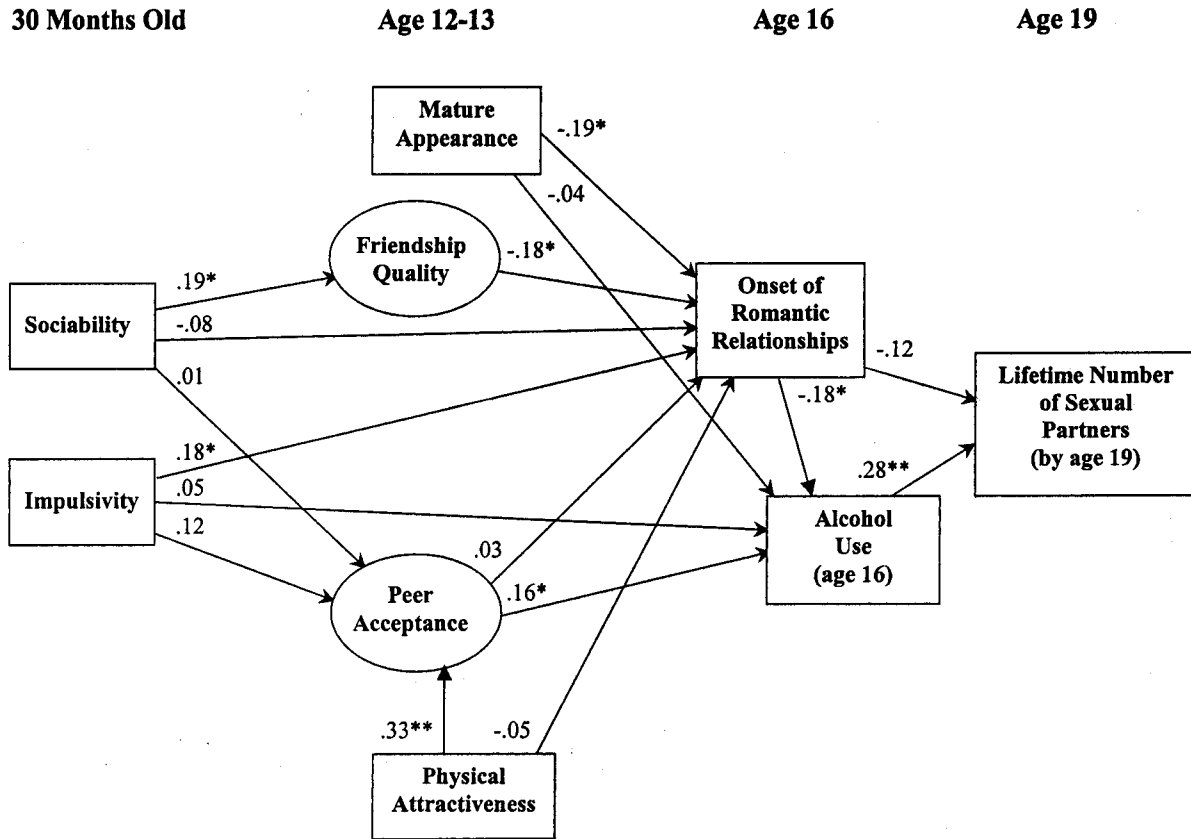


Fig. 3. The results of fitting data to the hypothesized path model predicting sexual behavior at age 19 from earlier individual and social factors. Numerical values are standardized path coefficients.

**RESULTS**

**Measurement Model**

We had three variables as indicators of friendship quality and three variables as indicators of peer group relations in grade 6. This measurement model is shown in Fig. 2. All loadings were above an absolute value of .65. The measurement model fit the data well:  $\chi^2(8, N = 155) = 15.8, p = .05, CFI = .98, NFI = .96, RMSEA = .08$ .

**Structural Model**

The hypothesized model also fit the data well based on most fit indices:  $\chi^2(56, N = 155) = 75.9, p = .04, CFI = .96, NFI = .87, RMSEA = .05$ . The ratio of the  $\chi^2$  to the degrees of freedom was 1.4. Critical ratios were used to determine significance of model paths (*t* values

above an absolute value of 1.96). As can be seen in Fig. 3, eight of the hypothesized paths were significant and seven were not.<sup>4</sup>

*Sociability and Impulsivity*

Sociability at 30 months of age predicted friendship quality in grade 6, but did not predict peer acceptance in

<sup>4</sup>In addition, model modification indices were examined. These indices are commonly available in structural equation modeling software and provide information for making decisions about modifying specified models. Modifications are made by adding paths that have a likelihood of improving the fit of the model. Two paths were suggested by modification indices: a path from sociability at age 30 months to physical attractiveness at age 13, and between appearance of physical maturity at age 13 and friendship quality in grade 6. Both path coefficients were significant when estimated. However, modification indices did not suggest any additional paths linking individual and social characteristics to lifetime number of sexual partners at age 19. Hence, there appeared to be no significant direct influence of personal and social attributes measured prior to age 16 on sexual behavior at age 19.

grade 6 or age of first romantic relationship. Individuals who were more sociable at 30 months of age received higher ratings of friendship quality in grade 6. Childhood impulsivity predicted age of first romantic relationship, but did not predict peer acceptance in grade 6 or alcohol use at age 16. Opposite of prediction, children who were more impulsive tended to form romantic relationships later.

#### *Appearance of Physical Maturity and Physical Attractiveness*

Adolescents who looked older when they were 13-years old began forming romantic relationships earlier, but did not use more alcohol in middle adolescence. Adolescents who were more physically attractive at age 13 were more accepted by peers, but there was no direct effect of attractiveness on age of first romantic relationship in the full sample.

#### *Friendship Quality and Peer Acceptance*

Friendship quality in grade 6 had a direct effect on the age of first romantic relationship. Individuals with higher quality friendships began forming romantic relationships earlier, however, there was no direct effect of peer acceptance on the age of first romantic relationship, but adolescents who were more accepted by their peers used alcohol more frequently at age 16.

#### *Romantic Relationships and Alcohol Use*

There was no direct effect of the age of first romantic relationship on the lifetime number of sexual partners at age 19, but those who had their first romantic relationships at younger ages used alcohol more frequently at age 16. In turn, alcohol use predicted total number of sexual partners at age 19. Those who used alcohol more frequently at age 16 had a history of more sexual partners by the age of 19. Overall, the direct effects of age of onset of romantic relationships and alcohol use accounted for 11% of the variance in the number of sexual partners by age 19.

#### **Gender Differences**

Because the gender-specific sample sizes were not large (85 males and 70 females) and we limited analyses to those with the most empirical justification, we examined the three hypothesized gender differences using multiple linear regression models. We examined interactions

of independent variables with gender after centering variables to reduce collinearity among independent variables (Cohen & Cohen, 1983).

Attractiveness was marginally more strongly associated with the onset of romantic relationships among females than among males ( $\beta = -.57$ ,  $p = .10$  for the interaction effect). Among females, the association between physical attractiveness and age of first romantic relationships was negative and marginally significant ( $\beta = -.25$ ,  $p < .10$ ). Among males, the association between physical attractiveness and age of first romantic relationship was not significant ( $\beta = .10$ , *ns*). Females who were more physically attractive were somewhat more likely to form romantic relationships earlier, but physical attractiveness of males was not associated with age of first romantic relationships.

The association between appearance of physical maturity and age of first romantic relationship did not differ by gender. There was also no gender difference when comparing the association between age of first romantic relationship and the number of sexual partners.

#### **DISCUSSION**

This prospective study with multiple informants demonstrated that having a higher number of lifetime sexual partners by age 19 was associated with earlier initiation of romantic relationships, but this pathway was indirect via more frequent use of alcohol in middle adolescence. Additionally, the timing of first romantic relationship and alcohol use at age 16 were, at least partly, the result of somewhat complicated paths including sociability and impulsivity at 30 months of age, early physical maturation, physical attractiveness (among females), and higher quality friendships and increased peer acceptance in early adolescence. The relations of the earlier to the later indicators were largely indirect. There were no direct effects of individual and social characteristics of childhood and early adolescence on the number of sexual partners reported at age 19; rather, all associations were mediated by involvement in romantic relationships and alcohol use.

Findings of this study are similar to Feldman et al.'s (1995) findings that peer acceptance in grade 6 had direct effects on dating behavior and alcohol use four years later, and that dating behavior and alcohol use were directly associated with the number of sexual partners. Yet, the present results differed from these earlier findings in two ways. First, we found no direct association between peer acceptance and romantic involvement (age of onset). Second, there was no direct relation between the age of first romantic relationship and number of sexual partners

at age 19. These differences between the two studies probably reflect the dissimilar strategies used to measure involvement in romantic activities. In Feldman et al.'s study, dating behavior was measured by summing multiple items reflecting level of involvement with dating in groups, alone and going steady, whereas our measure was simply the age at which each adolescent formed his/her first steady romantic relationship.

Results of the current study are also consistent with the findings of Udry et al. (1995). Udry et al. found that temperamental characteristics similar to those measured in the current study, but measured in later childhood (age 9 to 11), were associated with age of first intercourse among females. Yet, some temperamental characteristics were no longer associated or associations were reduced in magnitude after accounting for family characteristics and church attendance in a multiple regression model. These results suggest both direct and indirect effects of child temperamental characteristics on adolescent sexual behavior. Overall, both studies indicate that personal attributes that have been found to be fairly continuous (Caspi & Silva, 1995) can affect patterns of sexual behavior, either directly or indirectly, in earlier and later stages of adolescence.

Generally, the analyses supported many of the hypothesized antecedents of the onset of romantic relationships and alcohol use during middle adolescence. First, as predicted, quality of friendship in grade 6 had a direct effect on the age of first romantic relationship. Young people who had more intimate friendships in early adolescence formed their first romantic relationships sooner. Perhaps young people with more intimate and satisfying friendships formed expectations that relationships would be positive and satisfying and, thus, feel competent to form intimate relationships with the other sex sooner (Collins, 2003; Furman & Wehner, 1994). Additionally, Eder (1985) reported that female friends influenced involvement in romantic relationships by discussing and encouraging interests in the other sex. Higher quality friendships with more intimate interactions also may have influenced the development of romantic relationships by providing a context within which to discuss and explore romantic interests.

In contrast, there was no direct effect of teacher-reported peer acceptance in early adolescence on the age of first romantic relationship. Yet, greater peer acceptance was associated with more alcohol use at age 16, which, in turn, predicted the number of sexual partners by age 19. Results are consistent with Bingham and Crockett's (1996) finding that adolescents' high quality peer relationships were associated with earlier onset of sexual intercourse.

The absence of an association between peer acceptance and age of first romantic relationship may be a result of the use of teacher reports of peer acceptance. This mea-

sure was designed as an indicator of general peer acceptance in the classroom setting, but there is the possibility that this measure did not represent acceptance in particular peer crowds or cliques in or out of school. Future research should examine whether peer acceptance or crowd belonging based on classmate- or self-reports predicts the age of first steady romantic relationship. For example, expectations for when and how to initiate romantic relationships have been found to vary across peer crowds (Brown, 1999).

Consistent with previous findings, there was a direct association between appearance of physical maturity and age of first romantic relationship among males and females (Capaldi et al., 1996; Graber et al., 1999; Phinney et al., 1990). Yet, gendered dating behaviors exist in the United States in which males typically approach, and females more often respond. Also, there are gender differences in predictors of sexual behavior (Smith et al., 1985; Udry, 1988). Therefore, it is likely that male dating behaviors are partly influenced by hormonal changes that motivate approach, whereas female behaviors are more likely a result of changing appearance that might result in being approached by others.

We expected that children who were more impulsive at 30-months old would form romantic relationships sooner. Inconsistent with this expectation, children who were more impulsive tended to form their first romantic relationships later. Previous research has found that adolescents with low levels of restraint are more likely to have experienced sexual intercourse (Rosenthal et al., 1999). In contrast, Newman et al. (1997), in a prospective study, found that children who were undercontrolled at age 3 (defined as impulsive, overactive, and emotionally labile) had the lowest levels of relationship intimacy at age 21. It may be that highly impulsive children have difficulties with forming steady dating relationships.

Additionally, impulsivity was not associated with alcohol use as we had predicted. Previous research has reported that impulsivity is related to alcohol use (Bates & Labouvie, 1995; Colder & Chassin, 1997). The association between impulsivity in childhood and alcohol use during adolescence may be more complicated, involving interactions among multiple temperamental and social characteristics that occur somewhat later in childhood (e.g., see Cloninger, 1987).

Inconsistent with our predictions, childhood sociability had no direct effect on the age of first romantic relationship, but individuals who were more sociable as children (about age 3) tended to have more intimate and satisfying relationships with friends. Friendship quality, in turn, was linked to earlier formation of steady romantic relationships. This earlier involvement with romantic

partners was associated with more frequent alcohol use at age 16 and a history of more sexual partners by age 19. It is important to note that sociability measured at age 3 may have reflected the influence of relationship experiences prior to this age, rather than being a measure of temperamental quality uncounfounded with experience. Either way, sociability was associated with higher quality friendship in early adolescence, but was also associated with alcohol use at age 16 and more sexual partners by age 19.

Females who were more physically attractive at age 13 had their first romantic relationships marginally earlier than other females, whereas attractiveness was unrelated to age of first romantic relationship among males. This finding must be interpreted with caution, however, as results were marginal and within gender sample sizes were fairly small. Given the nature of gender roles regarding dating and romantic behavior, it is likely that attractive females are more likely to be approached earlier by the other sex, whereas the attractiveness of males may be inconsequential to the prediction of the timing of their first romantic relationships. Future research should continue to examine this issue. Otherwise, no associations in our model were restricted to one sex.

Before concluding, a few additional limitations of this study must be addressed. Data came from a relatively small sample size across and within genders, limiting the number of constructs examined and restricting tests of gender differences, as well as precluding analyses by racial/ethnic groups and not providing needed diversity of sexual orientation. Ideally, family factors, other social experiences, and measures of hormones should also be included in the model (Halpern et al., 1997; Udry et al., 1995; Udry & Talbert, 1988). Future research with a larger sample of participants is needed before drawing firm conclusions and generalizing study results, especially given the evidence that dating and sexual behavior varies by gender and race/ethnicity (Costa et al., 1995; Moore et al., 1995; Phinney et al., 1990). Nevertheless, the advantage of this study was the longitudinal data that included multiple questionnaire and interview measures, and a variety of respondents.

We selected to model age of first romantic relationship as predicting amount of alcohol use at age 16 because most young people had first romantic relationships by age 16. Nevertheless, romantic involvement and alcohol use were most likely mutually influential or may be jointly influenced by other adolescent experiences (e.g., peer crowd involvement, increased autonomy).

Finally, this model accounted for a small to moderate amount of variance in lifetime number of sexual partners. Although this clearly suggests that additional factors are

influential, the use of measures from multiple respondents must also be considered. Few of the measures in the current study relied on self-report. Instead, multiple informants supplied information including parents (usually the mother), interview/observer ratings, and teacher reports. Shared method variance was reduced overcoming the limitation of many past investigations that have relied on one respondent for all or most measures.

In sum, this study found a pathway to a history of more sexual partners in late adolescence (age 19) that was marked by some desired individual qualities (e.g., sociability and attractiveness) and peer experiences (high quality friendships), and other behaviors that adults may regard as less desirable among adolescents, but are common among adults (i.e., romantic interests and alcohol use). Applying these findings suggests that young people who are sociable, have a more mature appearance, and have positive peer relations and begin forays into dating relatively early could benefit from assistance to responsibly manage their relationships and developing sexuality. Future research might focus on expanding this model to include other factors, such as family characteristics and life events or activities. It will also be important to investigate whether different paths to romantic and sexual activity result in unique individual and social developmental outcomes in young and later adulthood.

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