

# Family Relationships and Adolescent Pregnancy Risk: A Research Synthesis

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This article summarizes two decades of research about family, and especially parental, influences on the risk of adolescents becoming pregnant or causing a pregnancy. Research findings are most consistent that parent/child closeness or connectedness, parental supervision or regulation of children's activities, and parents' values against teen intercourse (or unprotected intercourse) decrease the risk of adolescent pregnancy. Largely because of methodological complexities, research results about parent/child sexual communication and adolescent pregnancy risk are very inconsistent. Residing in disorganized/dangerous neighborhoods and in a lower SES family, living with a single parent, having older sexually active siblings or pregnant/parenting teenage sisters, and being a victim of sexual abuse all place teens at elevated risk of adolescent pregnancy. Several biological factors (timing of pubertal development, hormone levels, and genes) also are related to adolescent pregnancy risk because of their association with adolescent sexual intercourse. © 2001 Academic Press

## INTRODUCTION

A broad range of family variables affect adolescent pregnancy risk. Family influences range from hereditary or biological transmission of potentially important characteristics (e.g., early age of menarche, levels of hormones, and genes) to the contextual and structural features of families (e.g., parent's

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education, marital status, and sibling composition) to the everyday styles or practices of parenting (e.g., parental support, control, or supervision of teenagers). Thus, one important task of this article was to locate and organize existing research so that studies which had conceptualized and measured “family influences” in similar ways could be examined together. The scope of the article was to include all studies in the 1980s and 1990s which presented empirical data about family relationships and adolescent pregnancy. The article was limited to the most recent 20 years of research to provide a practical boundary back in time and also because virtually all the major findings were reported since 1980.

Regarding the dependent variables, some studies have related family variables to adolescents’ reports of ever having been pregnant or causing a pregnancy, but most research has considered family influences on the key proximal determinants—sexual intercourse and contraceptive behavior. Therefore, the studies included in this review have as their dependent or outcome variables some measure of adolescent pregnancy, sexual intercourse (e.g., age of onset or number of partners), or contraceptive behavior (e.g., use at first sex or consistency of use over time). For the purposes of organizing this article, evidence of family influences on these outcomes is grouped into three conceptual domains: research about parent/child relations (the main focus) is presented first, followed by less detailed overviews of evidence about contextual and biological influences on adolescent pregnancy risk.

## PARENT/CHILD RELATIONSHIPS

Parenting has been a central focus of child development and family research for 6 decades, and there is a wealth of theory (Darling & Steinberg, 1993; Grusec & Goodnow, 1994; Grusec & Kuczunski, 1997) and research (Rollins & Thomas, 1979; Maccoby, 1992; Maccoby & Martin, 1983; Parke & Buriel, 1998) that provides a foundation for this article. Early studies of parenting found that the dimensions of parental warmth (support) and control were related to various children’s outcomes and behaviors. Parenting research shifted to a typological approach in the 1960s, and “authoritative parenting” (defined as highly supportive with moderate control) consistently was found to be related to positive child outcomes (Baumrind, 1991). Authoritarian (high control and low warmth) or permissive parenting (indulgent or neglectful) generally were found to be related to negative child and adolescent outcomes. The concepts of parent/child connectedness, regulation, and autonomy are being used to guide current research about parent/child relations (Barber, 1997; Barber, Thomas, & Maughan, 1998). Because many investigators in recent decades have used the concepts of parental support (connectedness), control (regulation), and parent/child communication to study parenting, these three constructs are used to organize research findings about parental influences on adolescent pregnancy risk.

*Parental Support/Connectedness*

Many researchers have investigated the relation between adolescents' sexual behavior and family variables such as parental warmth, support, parent/child closeness, and child attachment to parents. There is marked consistency in this body of more than 20 studies (see Table 1); all but a few indicate that parent/child closeness is associated with reduced adolescent pregnancy risk through teens remaining sexually abstinent, postponing intercourse, having fewer sexual partners, or using contraception more consistently.

The pregnancy risk variable most commonly analyzed in this group of studies was whether teens ever had sexual intercourse (virginity status), with one study (Lauritsen, 1994) analyzing intercourse experience in the previous year only. In some studies parent/teen closeness was found to be correlated with a lower frequency of intercourse (Benda, DiBlasio, & Kashner, 1994; Jaccard, Dittus, & Gordon, 1996) or with a smaller number of sex partners (Feldman & Brown, 1993; Jaccard et al., 1996). In one early (Jessor, Costa, Jessor, & Donovan, 1983) and two recent studies (Danziger, 1995; Upchurch, Aneshensel, Sucoff, & Levy-Storms, 1999), investigators linked close parent/teen relationships with a later age of first intercourse. A longitudinal study by Miller, Sabo, Farrell, Barnes, and Melnick (1998) linked

TABLE 1  
Studies Linking Parental Support/Connectedness with Adolescent Pregnancy Risk

Author(s)/year	Main findings
Inazu & Fox (1980)	Closeness of mother/daughter relationship strongly associated with daughter not having intercourse
Jessor et al. (1983)	Low perceived compatibility between parents and friends, and low perceived parental influence relative to peers, related to early age first sex
Weinstein & Thorton (1989)	Close mother/child relationships increase effect of mothers' attitudes on teen sexual behaviors; if mother has nonpermissive attitudes, teens least likely to have sex when they have a close mother/child relation
Barnett et al. (1991)	Adolescent perception of low family strength related to daughters' pregnancy status
Whitbeck et al. (1992)	Parental support related to teen not having intercourse experience, through mediating variables of teen depression (F) and alcohol use (M)
Christopher et al. (1993)	Parental warmth not related to level of teen sexual behavior (ordinal scale)
Feldman & Brown (1993)	Quality of parent/child relations and positive child rearing practices inversely related to sons' number of sex partners 4 years later (M)
Whitbeck et al. (1993)	Parental support inversely related to daughters' intercourse 1 year later, through mediators of teen depression and association with sexually active peers (F)

TABLE 1—*Continued*

Author(s)/year	Main findings
Benda et al. (1994)	Attachment to parents inversely related to frequency of teen intercourse (mediated by beliefs that unmarried sex is wrong and association with sexually active peers)
Jenson et al. (1994)	Teen caring about parents' feelings inversely associated with teen ever having had intercourse
Lauritsen (1994)	Attachment to family related to not having intercourse last year (M only)
Luster & Small (1994)	Parental support is related to lower sexual risk taking (not having multiple partners and using contraception) for both male and female teens
Small & Luster (1994)	Parental support discriminates between sexually experienced and nonexperienced teens (both genders at bivariate level, females only in multivariate model)
Danziger (1995)	Close family relationship related to later age first intercourse
Jaccard et al. (1996)	Quality of mother/teen relationship negatively related to ever had intercourse and to frequency of intercourse; positively related to consistency of contraceptive use among sexually active teens
Miller et al. (1997)	Mother/child closeness related to later onset of sexual intercourse for daughters (not sons)
Resnick et al. (1997)	Teen/family connectedness related to delay of sexual debut; parent/teen activities related to lower risk daughter ever been pregnant
Taris & Semin (1997)	Parent/child closeness inversely related to intrafamily conflict; intrafamily conflict inversely related to sexual intercourse experience (counter intuitive)
Chewning & Koningsveld (1998)	Parental support related to later onset of teen intercourse, but not related to contraceptive use
Jaccard et al. (1998)	Mother/teen relationship satisfaction inversely related to onset of intercourse
K. E. Miller et al. (1998)	Family cohesion related to older age at first intercourse, lower frequency of intercourse, and fewer partners
Perkins et al. (1998)	Family support not associated with adolescent sexual activity
Ramirez-Valles et al. (1998)	Parental involvement indirectly linked to adolescent sexual risk behavior through increased involvement of teens in pro-social activities
Scaramella et al. (1998)	Warm and involved parenting in 7th grade reduced adolescents' risk for involvement in pregnancy through higher academic competence and lower substance use and affiliation with deviant peers
Rodgers (1999)	Parental support not related to sexual risk taking among sexually active teens
Upchurch et al. (1999)	High emotional support from parents related to older age of first sex for sons (not daughters), but effect not significant in full multivariate models
Whitbeck et al. (1999)	Early onset of adolescent sexual intercourse related to mothers' report of rejecting behaviors, but not related to mother warmth and supportiveness; in full analytic models neither maternal variable predicted adolescents' sexual intercourse

family cohesion to all three outcomes (later onset of first intercourse, fewer sexual partners, and lower frequency of intercourse).

Several studies of parent/child closeness have focused exclusively on mother/child relationships. About 20 years ago the theoretical position was developed that the mother/daughter relationship is a particularly salient sexual socialization structure (Fox & Inazu, 1980). As expected, close mother/daughter relationships were found to be related to daughters' postponement of sexual intercourse (Inazu & Fox, 1980). Other investigators who focused on mother/teen relationships (Jaccard et al., 1996; Weinstein & Thornton, 1989) reported a similar influence of mother/child closeness on the sexual behaviors of both daughters and sons. Jaccard et al. (1996) also reported that high-quality mother/teen relationships were related to more consistent contraceptive use by sexually active teens of both sexes.

Feldman and Brown's (1993) study of parental support/closeness is unusual for its focus only on sons' sexual behavior. Their investigation was further distinguished by its careful attention to measures of parent/child relationships, including direct observations of family interaction, self-reports from multiple respondents, and longitudinal data spanning sons' 6th through 10th grades. Quality of observed family interactions and positive child-rearing practices of both mothers and fathers were significant inverse predictors of the number of sexual partners reported by adolescent males 4 years later, and father variables were as successful as mother variables in predicting sons' sexual behavior over time.

A number of recent studies have identified mediating mechanisms that could help explain how parent/child connectedness influences adolescents' sexual behavior. Specifically, parent/child closeness appears to be related to teens' attitudes about having intercourse, to teens' depression, to their impulse control, to academic and prosocial activities, and to their use of substances and association with sexually active peers, all of which are related to adolescent sexual behavior and pregnancy.

Whitbeck, Hoyt, Miller, and Kao (1992) reported that a lack of parental support was related to depression for teen males and females, but the association between depressive symptoms and sexual activity was much stronger for females than for males. Low support from parents also was associated with a greater propensity for alcohol use, which was more strongly associated with early sexual activity of teen males than females. Both daughters and sons who viewed their parents as being unsupportive were likely to report depressed moods and use of alcohol, but depression influenced sexual behavior for daughters, while alcohol use was more strongly related to the sexual behavior of sons. In longitudinal analyses with the same sample (Whitbeck, Conger, & Kao, 1993), the relationship of parental warmth/support and adolescents' depression was found to be linked with daughters' sexually permissive attitudes and association with sexually active friends 1 year later. The investigators concluded that daughters might compensate for a lack of close relation-

ships with their parents by becoming more involved in emotionally (and sexually) intimate peer relationships. Other researchers have suggested that family conflict over teen autonomy plays a mediating role between parent/child closeness and sexual intercourse (Taris & Semin, 1997). Parent/child involvement also can influence teen sexual behavior indirectly by providing youth with opportunities to develop prosocial skills and acquire a sense of competence and worth (Ramirez-Valles, Zimmerman, & Newcomb, 1998).

The studies of Feldman and Brown (1993) and Whitbeck et al. (1992, 1993) share the conclusion that a lack of closeness in the parent/teen relationship increases the influence of peers on adolescent sexual activity. Benda and DiBlasio (1991) also theorized that more intensive association with sexually active peers reflects a deficit or void left by weak bonding to parents. Feldman and Brown (1993) suggested that increased peer group interaction could be one of the likely mechanisms accounting for the link between poor parent/child relationships and risky adolescent sexual behavior. Apparently, the negative influence of peers is intensified for both male and female adolescents with poor or distant relationships with their parents. This conclusion is consistent with a model of mediating mechanisms where poor parent/child relationship quality (e.g., low warmth or support and high rejection) is associated with more proximate predictors (e.g., delinquent friends, steady dating, and alcohol use) of adolescent sexual intercourse (Whitbeck et al., 1999).

Fewer studies have analyzed whether parent/child connectedness also might lower adolescent pregnancy risk by increasing use of contraception among sexually active adolescents. If daughters perceive that their parents disapprove of contraception, then daughters turn to peers, especially female friends, for help in obtaining a method of contraception (Nathanson & Becker, 1986). Jaccard et al. (1996) reported that high-quality mother/teen relationships were associated with more consistent contraceptive use among sexually active teens. Rodgers (1999) did not find parental support to be related to risk behaviors of sons or daughters who were already sexually active, but Resnick et al. (1997) found that parent/teen connectedness was associated with a lower risk that daughters had ever been pregnant.

Mediated models of family influences are similar for various adolescent behavioral outcomes. For example, Kandel and Andrews (1987) reported that closeness to parents discourages adolescents' drug use both directly and indirectly; that is, parental closeness directly reduces drug involvement, and parent/child closeness also influences adolescents' choice of friends who do not use drugs. An unusual 7-year longitudinal study (Scaramella, Conger, Simons, & Whitbeck, 1998) used measures from observer ratings and multiple family reports to test a mediated social contextual model of whether adolescents had been pregnant or caused a pregnancy during high school. The effects of parental warmth and involvement in 7th grade were shown to affect teen pregnancy status in 12th grade through intervening mechanisms such as deviant peer affiliations, substance use, delinquency, and academic competence.

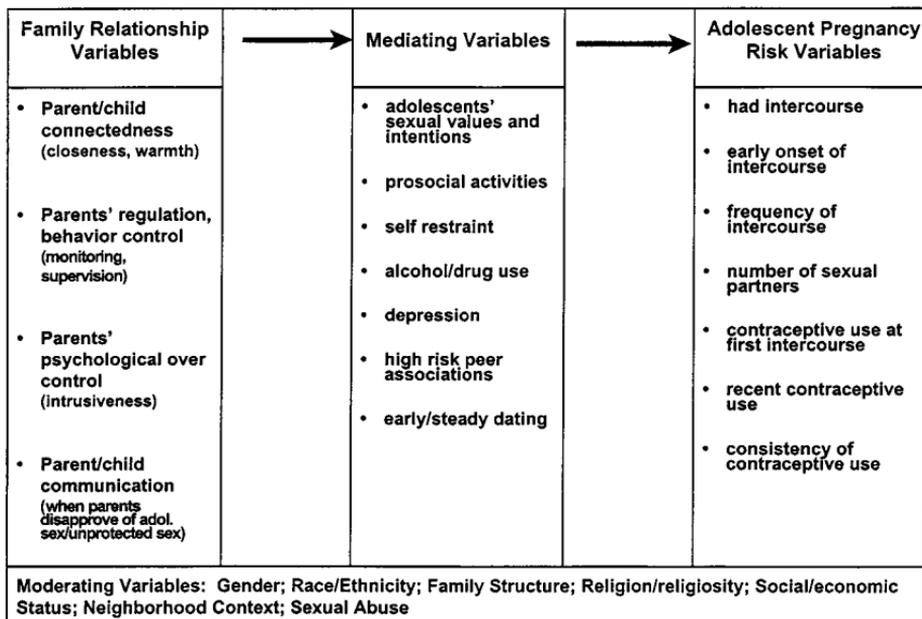


FIG. 1. Mediated conceptual model of family relationships and adolescent pregnancy risk.

In summary, across more than 20 studies using diverse research designs and a variety of measures, the evidence is strongly consistent that parental support, warmth, closeness, and connection between parents and children reduces adolescent pregnancy risk. Apparently this effect operates through the influence of parent/child connectedness on both adolescent sexual and contraceptive behaviors, but the evidence is strongest for the former. Figure 1 depicts the major mediating mechanisms through which parent/child connectedness has been reported to influence adolescent pregnancy. More specific directional relationships between the many variables that can not all be depicted in Fig. 1 are noted in the tables.

### *Parental Control/Regulation*

Parental monitoring, supervision, and rules are theorized and usually reported to be related to lower levels of adolescent problem behaviors of various kinds (Herman, Dornbush, Herron, & Herting, 1997; Steinberg, Fletcher, & Darling, 1994). Most of the evidence shows that parents' supervision and monitoring of children is related to adolescents' sexual behaviors in ways that would lower their risk of pregnancy (not having intercourse, later sexual debut, or having fewer sexual partners).

In a large majority of the studies shown in Table 2, parental monitoring was reported to be inversely related to adolescent pregnancy risk, usually through not having sexual intercourse or having sex less often. Most of the

TABLE 2  
 Studies Linking Parental Control/Regulation with Adolescent Pregnancy Risk

Author(s)/year	Main findings
Inazu & Fox (1980)	Mothers' direct supervisory activities not related to daughter ever having had intercourse
Hogan et al. (1985)	Parental supervision of daughters dating activities inversely related to their having intercourse and ever being pregnant
Miller et al. (1986)	Highest percent of teens had intercourse if parents had no rules, lowest percent of teens had intercourse if parents had moderate strictness and rules
Ku et al. (1993)	Strictness of family rules inversely related to males' age first intercourse
Benda & DiBlasio (1994)	Parental monitoring related to less frequent sexual intercourse (F)
Hovell et al. (1994)	Mothers' rules and strictness inversely related to teen sexual behaviors
Luster & Small (1994)	Parental monitoring is related to lower sexual risk taking (not having multiple partners and using contraception) among male and female teens
Small & Luster (1994)	Parental monitoring strongly discriminates between sexually experienced and nonexperienced teens (both genders in bivariate and multivariate models)
Danziger (1995)	Presence of household routines and rules related to later sexual debut
East (1996)	Mothers' strictness and rules not related to daughters' sexual intercourse status (after effect of race and older teen childbearing sister included)
Luster & Small (1997)	Parental monitoring inversely related to number of sex partners among never abused and sexually abused daughters
Resnick et al. (1997)	Parental presence at home not related to age first intercourse or ever been pregnant when other independent variables (connectedness) also included
Dorius & Barber (1998)	Maternal intrusive psychological control related to earlier age of first intercourse
Manlove (1998)	Parental involvement in teen's education related to reduced risk of teen pregnancy
Perkins et al. (1998)	Unsupervised time at home associated with teen sexual activity
Miller et al. (1999)	Maternal monitoring related to less frequent adolescent sexual intercourse and fewer sexual partners
Rodgers (1999)	Parental monitoring related to lower risk behaviors among sexually active teens; parental psychological control related to higher sex risk behavior among daughters
Whitbeck et al. (1999)	Maternal monitoring decreased onset of sexual intercourse in early adolescence (Grades 8 & 9), but related to increased onset of sex among older teens (Grade 10); nonsignificant in full model
Upchurch et al. (1999)	Teen perceptions of parents' over control related to earlier age of first intercourse; not significant in complex multivariate model

investigators used teens' perceptions of their parents' rules or supervision as the measure of parental regulation, but some researchers (e.g., Miller, Forehand, & Kotchick, 1999) measured parents' own reports of their rules and monitoring. In either case, the results generally indicate that parental supervision/regulation is associated with adolescents not having had sexual intercourse. Among sexually experienced adolescents, parental monitoring is related to adolescents being older when they first began having intercourse (Capaldi, Crosby, & Stoolmiller, 1996; Dorius & Barber, 1998; Ku et al., 1993) or having fewer partners and using contraception (Luster & Small, 1994; Miller et al., 1999; Rodgers, 1999). In two studies (Benda & DiBlasio, 1994; Miller et al., 1999) investigators found that parental monitoring was related to less frequent intercourse among sexually active adolescents. Luster and Small (1997) also found parental monitoring to be inversely related to daughters' number of sexual partners in the past year, whether or not the daughters had ever been sexually abused.

It is not clear why parental supervision or rules did not have the expected inverse association with adolescent sexual behavior in several other studies. Inazu and Fox (1980) reported that mothers' direct supervisory activities were not related to whether daughters had ever had sexual intercourse, and East (1996b) reported that mothers' strictness and rules were not related to daughters' sexual intercourse status, after other variables were controlled. Presence of an adult in the home, but not parental monitoring, was found to be correlated with teen sexual intercourse in another study (Perkins, Luster, Villarruel, & Small, 1998). Resnick et al. (1997) reported that parents' presence at home before and after school, at dinner, and at bedtime (as indicators of supervision) was not related to adolescents' age of first intercourse or pregnancy history in multivariate analyses that included other significant variables, such as parent/child connectedness and parents' attitudes about teenagers having sex. Parental presence did, however, show a significant bivariate association with age of first sexual intercourse. Large proportions of racial/ethnic minorities were included in these studies with nonsignificant parental supervision results, but this was also true of other studies in which parental supervision was found to be strongly related to the sexual behavior of African American (Hogan et al., 1985) and Latino adolescents (Hovell et al., 1994).

A possible explanation for mixed findings is that parental control is associated with negative teen outcomes if it is excessive or coercive. The amount and type of parental control that children need changes as they grow and become increasingly able to make their own decisions. Throughout the adolescent years parents and teens frequently renegotiate acceptable levels of parental regulation and adolescent autonomy. Partly for these reasons, the study of parental control effects on child development and outcomes has been somewhat problematic. For example, Barber (1996) showed that parents' behavioral and psychological control of children are both important, but that these distinct kinds of control have different consequences. Similarly, Gray

and Steinberg (1999) reported that parents' behavioral control (supervision) was inversely related to adolescents' behavior problems, whereas psychological autonomy granting was not; parents' autonomy granting was, however, inversely related to adolescents' emotional distress. Evidence supports the theoretical premise that psychologically intrusive and overly controlling parenting (control by guilt) is associated with adolescent problem behaviors (Conger, Conger, & Scaramella, 1997), but few studies have linked adolescent pregnancy risk to parents' intrusive psychological control. In one cross-sectional study (Miller, McCoy, Olson, & Wallace, 1986) it was found that teens who perceived their parents to be "very strict" with "many rules" were more likely to have had sexual intercourse than teens who perceived their parents to be more moderate. In an intriguing longitudinal analysis, maternal monitoring was related to decreased onset of sexual intercourse among younger adolescents, but monitoring was related to increased sexual intercourse among older adolescents (Whitbeck et al., 1999). Although there is some evidence (Upchurch et al., 1999) for reciprocal effects (increasing parental control after adolescent sexual onset), Dorius and Barber (1998) and Upchurch et al. (1999) reported that intrusive maternal control was related to early age of first sexual intercourse, and Rodgers (1999) reported that parents' psychological control was related to high-risk behavior among sexually active daughters.

To summarize, in a large majority of studies, investigators have reported that parental control/regulation is inversely related to adolescent pregnancy or pregnancy risk, primarily through reduced exposure to sexual intercourse. Null results were reported in several studies, however, suggesting that this area of research needs additional conceptual and empirical clarification. Parental supervision and control also influence teen pregnancy through some of the mediating mechanisms depicted in Fig. 1. For example, low levels of parental supervision are associated with high levels of alcohol and drug use and with high-risk peer associations, which increase sexual behaviors and decrease contraceptive use. Clearer distinctions also need to be made between parental monitoring or supervision of adolescents' activities (behavioral control) and parents' intrusive psychological overcontrol (Barber, 1996; Gray & Steinberg, 1999; Rodgers, 1999). It is also plausible that parental control/regulation might have a curvilinear relationship with adolescent pregnancy risk, with adolescents being at greatest risk if their parents are at either extreme of very low or high control (Miller et al., 1986). Such conceptual and measurement distinctions are needed to clarify how parental regulation is related to the development of autonomy and competencies of teens (Barber, 1997; Barber et al., 1998; Gray & Steinberg, 1999) and to adolescent pregnancy risk.

### *Parent/Child Communication*

Associations between parent/child communication and adolescent pregnancy risk have been investigated in more than 30 studies (see Table 3). Results across these studies are complex and discrepant. Perhaps the clearest

TABLE 3  
 Studies Linking Parent/Child Communication with Adolescent Pregnancy Risk

Author(s)/year	Main findings
Fox & Inazu (1980)	High mother/daughter recent communication about sexual issues related to daughter being more likely to have had sexual intercourse
Inazu & Fox (1980)	Early and recent frequency of mother/child communication about sex not related to daughter having had intercourse in multivariate analyses
Darling & Hicks (1982)	Pregnancy of sexual messages from parents unrelated to daughters' intercourse status, but frequency of positive and negative sexual messages both directly related to son's level of sexual involvement
Thomson (1982)	Level of sexual and contraceptive discussions with mother and friends not related to virginity status or to use of effective contraception at first intercourse, but positively related to current contraceptive use
Cvetkovich & Grote (1983)	Amount of parent/adolescent sexual communication not related to adolescent intercourse experience
Furstenberg et al. (1984)	No relation between mother/child communication about sex and birth control and daughters' later contraceptive use
Kastner (1984)	Openness of parent/child communication about sex not related to adolescent sex behavior, but positively related to consistent use of contraception
Newcomer & Udry (1985)	Mother (not teen) report of sexual communication related to lower probability of intercourse 2 years later; teen (not mother) report of contraceptive communication related to higher probability of contraceptive use at last coitus
Furstenberg et al. (1985)	Being able to discuss sexual matters with parents related to lower probability teen ever had intercourse
Moore et al. (1986)	Sexual communication with conservative parents related to probability (lower for daughters, higher for sons) teen ever had intercourse; if parents listen and discuss general decisions, sons less likely to have intercourse
Fisher (1987)	Parents report of general communication quality related to son's being less likely to have intercourse and to being older at onset of intercourse; amount of communication about sex with mother related to daughters being more likely to use contraception
Handelsman et al. (1987)	Quality of parent/teen communication about sex not related to intercourse status, but positively related to use of contraception by sexually active teens
Fisher (1989)	Parent/child sexual communication not related to adolescent sex in whole sample, but talking about sex with permissive parents related to daughters having sexual intercourse and sons use of effective birth control methods
Casper (1990)	Parent/child communication about sex not related to initiation of intercourse

TABLE 3—Continued

Author(s)/year	Main findings
Mueller & Powers (1990)	Parental communication style related to timing of teen intercourse
Barnett et al. (1991)	Adolescent perception of closed communication with parents positively related to daughters' pregnancy status
Jaccard & Dittus (1991)	Relation between parent/child communication and teen sexual intercourse depends on parents' values about teen sex
Christopher et al. (1993)	Openness or problems of parent/child communication not related to level of sexual involvement (ordinal)
Fisher (1993)	Various measures of parent/child communication not related to college students initiating intercourse or use of contraception
Leland & Barth (1993)	Communication with parents about sex related to not having had intercourse and never being pregnant; among sexually active parent/child communication related to using condoms and having fewer sexual partners
Hovell et al. (1993)	Parent/child communication (problematic to measure) not related to adolescent sexual behavior
Ward & Wyatt (1994)	Negative or prohibitive verbal sexual messages in childhood related to higher risky sexual behavior score
Holtzman & Rubinson (1995)	Discussion of HIV/AIDS with parents related to teens being less likely to have multiple sex partners and unprotected intercourse
Pick & Palos (1995)	Frequent talk with mother about sex related to lower probability of having sex and higher probability of using contraception (F); better quality communication with mother related to lower probability of getting girl pregnant (M)
East (1996b)	Comfortable, frequent, open mother/daughter communication related to teen not having sexual intercourse
Jaccard et al. (1996)	Parent/child communication about birth control related to teen being more likely to have had intercourse and to sons being more likely to use contraception
Widmer (1997)	Parents communicate a lot about sex related to teen more likely to have intercourse
Chewning & Koningsveld (1998)	Parent/child discussions about sex was not related to timing of sexual intercourse or contraceptive use
Miller et al. (1998)	Quality of parent/child sexual communication reduces teens' sexual behavior indirectly, through values and intentions about teen sex
Miller et al. (1998)	Quality of mother/adolescent general communication is associated with less frequent sexual intercourse and fewer sex partners, but communication about sex has weak and inconsistent association
Rodgers (1999)	Frequency of sexual communication not related to sexual risk behaviors of sexually active teens
Whitaker et al. (1999)	Mother/teen sexual communication related to higher teen condom use when mother viewed as open and responsive, but relationship reversed when mothers not seen as responsive

conclusion that can be drawn from these studies is that there is no simple, direct effect. That is, parent/teen communication about sexual issues has no uniform or consistent effect on adolescent pregnancy risk that holds across parent and child gender, race, source of data (parent or child report), and especially across parental attitudes and values. In most studies that have tested for these complexities, mothers' communication is more strongly associated with adolescent pregnancy risk than fathers' communication, and there is a stronger effect for daughters than for sons. Usually the pattern of associations is stronger among Whites than among Blacks, but there is little or no correlation between what parents and teens perceive to have been communicated, and there is no consistency in findings about whether parents' or teens' reports of their communication produces more significant results.

A common finding across these studies is that open, positive, and frequent parent/child communication about sex is associated with adolescents not having sexual intercourse, postponing their sexual debut, or having fewer sexual partners (Barnett, Papini, & Gbur, 1991; East, 1996b; Fox & Inazu, 1980; Furstenberg et al., 1985; Holtzman & Rubinson, 1995; Jaccard & Dittus, 1991; Jaccard et al., 1996; Leland & Barth, 1993; Miller et al., 1999; Pick & Palos, 1995; Ward & Wyatt, 1994). Some investigators also have reported that parent/child communication is positively associated with sexually active adolescents being more likely to use effective contraception (Casper, 1990; Fisher, 1989; Fox & Inazu, 1980; Handelsman et al. 1987; Leland & Barth, 1993; Pick & Palos, 1995). In about as many studies, however, no association was found between parent/child communication and adolescent sexual or contraceptive behavior (Casper, 1990; Chewing & Koningsveld, 1998; Christopher et al., 1993; Cvetkovich & Grote, 1983; Darling & Hicks, 1982; Fisher, 1993; Furstenberg et al., 1984; Handelsman et al., 1987; Hovell et al., 1994; Inazu & Fox, 1980, 1985; Kastner, 1984; Newcomer & Udry, 1985; Rodgers, 1999). There are several studies in which findings have been reported opposite the direction expected from theory; that is, where the amount or frequency of parent/child sexual communication is related to sons (Darling & Hicks, 1982; Kahn et al., 1984) or daughters (Inazu & Fox, 1980) or both (Widmer, 1997) being more likely to have had sexual intercourse.

Several important issues complicate our understanding of the association between parent/child communication and adolescent pregnancy risk (Jaccard, Dittus, & Litardo, 1999). One is the temporal ordering of variables. Most studies of parent/teen communication are cross sectional; only a few measure the variables over time in a temporal order suggested by theory. Prior parent/child sexual communication might establish a theoretical basis for predicting later onset of adolescent sexual intercourse, especially if parents disapprove of their child having sex and there is a close parent/child relationship. The alternative temporal order is that teens' sexual intercourse occurs first and becomes suspected by or known to parents, who then instigate or intensify their communication with teens about sex and contraception.

In two early studies (Inazu & Fox, 1980; Thomson, 1982) results were interpreted as providing support for parents increasing sexual communication with their son or daughter *after* the teens' initial sexual experience. This might be an accurate causal interpretation for direction of effects in some of the cross-sectional studies reporting counterintuitive findings, where high levels of parent/teen communication about sex were related to adolescents having had sexual intercourse.

Associations between parent/teen communication and adolescent sexual behavior also are moderated by parents' values. Moore, Peterson, and Fursenberg (1986) first suggested that the relation between parent/child communication and adolescent sexual behavior depends on parents' attitudes; they reported that parent/child communication about sex was associated with daughters' not having intercourse only if parents' held conservative attitudes. Fisher (1989) tested for similar patterns, but her findings varied by subgroups and by the source of data (parent or college student). Recent investigations (Jaccard et al., 1996; Luster & Small, 1997; Miller, Norton, Fan, & Christopher, 1998; Miller et al., 1999) have demonstrated that parents' sexual values, in combination with parent/child communication, have an important effect on adolescents' intercourse experience. Parents' values are highly relevant to the sexual and contraceptive behavior of teens, and failure to include parental value orientations along with parent/teen communication could explain the null results in some previous studies (Jaccard & Dittus, 1991, 1993; Mueller & Powers, 1990).

Communication content—what parents and teens talk about—also needs to be considered. Miller et al. (1999) found that general parent/child communication was not, but specific sexual communication was related to adolescent pregnancy risk. Sexual communication measures have consisted of single items, or long lists of topics, about which parents and children might have talked. Besides communication content, the frequency and quality of parent/teen communication also vary greatly. Some questions about parent/child communication asked if parents had *ever* talked about various sexual issues, whereas other measures attempted to establish how often such communication occurred. The *quality* of parent/child communication, especially the parents' ability to be open and responsive, is a key communication dimension which has been found to change the direction of the relationship between parent/teen sexual communications and adolescents' use of condoms (Whitaker et al., 1999).

In summary, research findings about parent/teen communication and adolescent pregnancy risk are very mixed and inconclusive. Some of the contradictory results across studies arise from using widely different measures of parent/teen communication (ever talked about sex, frequency of sexual communication, number of topics discussed, and general vs sexual communication quality). Results also depend on temporal order of the variables: In some studies prior parent/child communication appears to reduce adolescent pregnancy risk, but other studies suggest that after adolescent sexual behaviors

become known to parents, they instigate and/or intensify parent/child communication about sex and contraception. Parental values about sex and pregnancy also moderate the effect of parent/teen communication on adolescent pregnancy risk. The most revealing recent investigations analyze the interactive effects of parental values and parent/teen communication, in combination with affective dimensions of the parent/child relationship, to predict time lagged measures of teen pregnancy risk.

### *Combined Effects of Parent/Teen Relationship Dimensions*

Relatively few investigations of adolescent pregnancy risk have been designed to test the reality that dimensions of parent/child relationships overlap and exist in combinations. For example, if parents and teens are closely connected but parental supervision is lacking, adolescents might be more susceptible to nonfamily influences (media, peers, and partners) that increase pregnancy risk. On the other hand, even if parents do provide appropriate structure and conscientiously supervise their children's activities, adolescents who do not feel connected to their parents will probably find a way around parental supervision. Generally speaking, if parents and children are strongly connected, teens might be more likely to go along with parental supervision, and parents probably would be more likely to allow appropriate adolescent autonomy.

Some investigators have argued persuasively that parents' attitudes and values about teen pregnancy are an especially important piece of this puzzle. Studies consistently have shown that parents' sexual values influence whether teens have sexual intercourse, the timing of their sexual debut, their number of sexual partners, their use of contraception, and whether they have been pregnant (see Table 4). Research and theory indicates that there are two prerequisites for children to internalize parents' values: a parental message must be accurately perceived by children, and children must be willing to accept the message and allow it to guide their behavior (Grusec & Goodnow, 1994; Grusec & Kuczynski, 1997). These principles are evident in a line of research in which investigators (Jaccard & Dittus, 1991, 1993; Jaccard et al., 1996) have argued that the power of parent/teen communication depends on both the parents' values about teen sex and pregnancy as well as parent/child closeness. With the least optimal combination of these factors, African American teens in Philadelphia were estimated to be 12 times more likely to have had early sexual intercourse than teens in families where parents had abstinent values, communicated openly, and had a close relationship with the child (Jaccard et al., 1996). These investigators (Dittus, Jaccard, & Gordon, 1997) also reported that intercourse was delayed among Black teens when fathers were perceived as disapproving. This effect moderated the presence or absence of father in the household, even though adolescents were more likely to perceive father disapproval when he was living in the home.

A related logical argument is that parents' values for their teen to avoid pregnancy (either through sexual abstinence or through contraceptive use)

TABLE 4  
 Studies Linking Parents' Values with Adolescent Pregnancy Risk

Author(s)/year	Main findings
Shah & Zelnik (1981)	White teens who perceive their sexual attitudes as similar to parents (vs peers) less likely to have intercourse, have multiple partners or use contraception; Black teens with views like their parents least likely to use contraception and most likely to have been pregnant
Thomson (1982)	Perceived sexual restrictiveness of mothers related to teens not having had intercourse; teens who perceive restrictive parental attitudes are less likely to use contraception
Jorgensen & Sonstegard (1984)	Perceived parental support for contraception, weighted by motivation to comply with parents, positively related to daughters' use of effective contraception
Yarber & Greer (1986)	Parents' premarital sexual permissiveness and sexual liberalism scales not related to college student sexual intercourse experience
White (1987)	Young women who visited a contraceptive clinic before having intercourse (virgins) more likely to perceive mothers as approving of teen sex
Baker et al. (1988)	Parents' norms related to teen ever had intercourse
Weinstein & Thornton (1989)	Mothers' permissive or nonpermissive values about teen sex are correlated with teens' sexual attitudes and intercourse experience
Jaccard & Dittus (1991)	Parents' value orientations disapproving premarital sex related to teens not having sexual intercourse
Hovell et al. (1994)	Mother attitude that child should not have sex until marriage inversely related to teen having intercourse
Small & Luster (1994)	Parents' nonpermissive premarital sexual values strongly discriminate between sexually experienced and nonexperienced teens of both genders (bivariate and multivariate models)
Jaccard et al. (1996)	Mother disapproval of teen sex inversely related to teen ever had intercourse and intercourse frequency among sexually active; not related to consistency of teen contraceptive use
Dittus et al. (1997)	Perceived father's disapproval of teen sex associated with delayed first intercourse; initiation of sex is considerably reduced if both mother and father disapprove of teen sex
Luster & Small (1997)	Parents' belief that teen sex is wrong inversely related to teens' number of sex partners
Resnick et al. (1997)	Perceived parent disapproval of teen sex related to delay of sexual debut; perceived parent disapproval of teen contraception related to delay sexual debut and lower risk that daughter ever been pregnant
Taris & Semin (1997)	Teens are more likely to have intercourse if mothers have permissive attitudes about sex
Widmer (1997)	Perceived parent pressure to not have sex inversely related to teen intercourse
Jaccard et al. (1998)	Mother disapproval of teen sex inversely related to onset of intercourse
Miller et al. (1999)	Conservative maternal attitudes about adolescent sexual behavior are related to less teen sex

are most effectively transmitted when parents have a close relationship (connectedness) with their children (Jaccard, Dittus, & Gordon, 1998; Weinstein & Thornton, 1989). Similarly, the larger picture of "family assets" (Luster & Small, 1997) to prevent teen pregnancy can be viewed as including not only parental disapproval of teen sex (or unprotected teen sex), but also having a supportive parent/teen relationship (connectedness) and appropriately monitoring (regulation) teen activities.

### CONTEXTUAL FAMILY INFLUENCES

Because it has a secondary place in this article, the vast research literature showing that contextual aspects of families are related to adolescent pregnancy risk can be only briefly profiled here. Families usually live in neighborhoods, and residential location is linked with a variety of social advantages and disadvantages (Brooks-Gunn, Duncan, Klebanov, & Sealand, 1993). In neighborhoods that are characterized by high residential turnover, poverty, and crime rates, and which are generally perceived by residents to be dangerous, adolescents tend to have early onset of sexual intercourse, low use of contraception, and high adolescent pregnancy rates (see Table 5). Neighborhood contextual effects on adolescent pregnancy risk are conceptually simi-

TABLE 5  
Studies Linking Neighborhood Characteristics with Adolescent Pregnancy Risk

Author(s)/year	Main findings
Hogan & Kitagawa (1985)	Social economic neighborhood quality inversely related to probability female teen ever been pregnant
Brewster et al. (1993)	SES, divorce rates, and residential turnover in census tract all related to risk of first sexual intercourse (F)
Ku et al. (1993b)	Neighborhood unemployment rate related to number of sex partners, ever impregnated partner, ever fathered baby (M)
Billy et al. (1994)	SES, social disorganization, religiosity, and female employment in census tract all related to frequency and consistency of teen intercourse
Brewster (1994)	Neighborhood SES and women's employment related to adolescent age of first intercourse; controlling these neighborhood variables reduces but does not eliminate Black/White difference in risk of early teen intercourse
Lauritsen (1994)	Neighborhood disorder related to teen having intercourse last year
Small & Luster (1994)	Neighborhood monitoring by adults in community inversely related to sexual intercourse experience
Ramirez-Valles et al. (1998)	Neighborhood poverty associated with teen sexual risk behavior
Sucoff & Upchurch (1998)	Racial composition (racially segregated neighborhoods) is a better predictor of premarital adolescent childbearing among blacks in metropolitan areas than is neighborhood SES
Upchurch et al. (1999)	Experiential neighborhood hazards related to younger age first intercourse

lar to other findings that perceptions of neighborhood danger are inversely related to adolescents' mental health (Aneshensel & Sucoff, 1996) and sexual activity (Upchurch et al., 1999). Effects of concentrated disadvantage and residential instability on adolescent delinquency and adult violence have been found to be mediated by social cohesion among neighbors (Sampson, 1997; Sampson, Raudenbush, & Earls, 1997), an effect that also could explain contextual variation in adolescent pregnancy risk.

TABLE 6  
Studies Linking Parents' Socioeconomic Status with Adolescent Pregnancy Risk

Author(s)/year	Main findings
Inazu & Fox (1980)	Girls in low-income households more likely to have had sexual intercourse
Zelnik et al. (1981)	Parents' education inversely related to teen's sexual intercourse experience
Hogan & Kitagawa (1985)	Social class has a strong inverse relationship to risk of adolescent pregnancy
Forste & Heaton (1988)	Parent years of education inversely related to teen sexual intercourse
Grady et al. (1989)	Mother's education inversely related to probability of premarital intercourse (F)
Kahn et al. (1990)	Mother's education related to teen contraceptive use at first intercourse
Hayward et al. (1992)	Mother's education inversely related to onset of intercourse, directly related to use of contraception (F)
Brewster (1994)	Mother's education inversely related to risk of teen intercourse (F)
Lauritsen (1994)	Household income inversely related to risk of teen intercourse (F)
Capaldi et al. (1996)	Parental SES inversely related to age at first intercourse (univariate model)
Mott et al. (1996)	Amount of mother's employment while child growing up positively related to child having sex before age 14; mother's years of school not related to child risk of early intercourse
Afxentiou & Hawley (1997)	Family income inversely related to daughters' intercourse experience; mothers' education inversely related to daughters' sexual intercourse without sample weights, but not significant with sample weights
Roosa et al. (1997)	Mother's completion of high school inversely related to daughter having been pregnant
Taris & Semin (1997)	Parental SES inversely related to having sexual intercourse
Manlove et al. (1998)	High parental SES associated with a lower risk of teen pregnancy among Latinos and an increased risk among Blacks
Miller et al. (1998)	Family income not associated with adolescent behavior
Ramirez-Valles et al. (1998)	Social class indirectly linked to teen sexual risk behavior by dampening the effects of neighborhood poverty and increasing teen's involvement in prosocial activities
Upchurch et al. (1998)	Low household income and poverty status related to teen being more likely to have had sexual intercourse

Parents or parenting adults occupy a social and economic status (SES) in the community, usually reflected by some combination of their education, occupation, and income. Parents also have characteristics—such as race/ethnicity and religion—that help to define their family's culture. There is abundant evidence (see Table 6) that parents' SES is related to adolescent pregnancy; adolescents whose parents have higher education and income are more likely both to postpone sexual intercourse and to use contraception.

Family structure is a salient family context in that children grow up usually having primary relationships with one or two biological parents and with or without older and younger siblings. Sometimes step, adoptive or foster parents and siblings are part of the family. Grandparents, uncles and aunts, and other related and unrelated adults sometimes also have frequent and substantial interaction with, and form important social contexts for, children and adolescents as they mature. Some of these family contextual or structural characteristics have been shown to be related to adolescents' risk of pregnancy. With respect to parents' marital status, research consistently shows that living with a single parent is related to adolescents having sexual intercourse at younger ages. Several investigators have gone beyond the bivariate relationship (see Table 7) to show that single or divorced parents' more per-

TABLE 7  
Studies Linking Parents' Marital Status with Adolescent Pregnancy Risk

Author(s)/year	Main findings
Inazu & Fox (1980)	Daughters in mother-headed households more likely to have had intercourse
Rodgers (1983)	Number of original parents in household inversely related to adolescent sexual intercourse experience
Hogan et al. (1985)	Living with both married parents related to lower risk of sexual intercourse and to lower risk of daughter ever being pregnant
Newcomer & Udry (1987)	Living in mother only household associated with earlier onset of intercourse for daughters; marital disruption between survey rounds associated with earlier onset of intercourse for sons
Thornton & Camburn (1987)	Teen sexual activity: with single parent > remarried parents > both biological parents
White (1987)	Young women who visited a contraceptive clinic before having intercourse (virgins) more likely to live in nonintact than intact families
Forste & Heaton (1988)	Living with both parents related to lower risk of premarital intercourse and higher use of contraception among sexually active daughters
Miller & Bingham (1989)	Female adolescents not raised by both biological parents more likely to have premarital sexual intercourse
Flewelling & Bauman (1990)	Living with single parent or stepparent doubles adolescent risk of having sexual intercourse in 1985 and increases risk of intercourse by 1.6 between 1985 and 1987
Day (1992)	Presence of biological father negatively related and presence of stepfather positively related to risk of first intercourse

TABLE 7—Continued

Author(s)/year	Main findings
Feldman & Brown (1993)	Living with single parent related to number of son's sex partners 4 years later, even in multivariate models including family process variables
Ku et al. (1993a)	Father absence at age 14 inversely related to age of first intercourse
Brewster (1994)	Not live with both parents at age 14 related to early age of first intercourse
Lauritsen (1994)	Teen living with 1 parent is more likely to have had intercourse last year
Whitbeck et al. (1994)	Single mothers' dating behaviors related to teens' sexual behaviors
Moore et al. (1995)	Living with single parent inversely related to age first intercourse and use of contraception
Pick & Palos (1995)	Mother not married at first pregnancy positively related to probability of daughter having sex, inversely related to using contraception, and positively related having been pregnant
Capaldi et al. (1996)	Parental transitions (i.e., divorce, repartnering, etc.) associated with a younger age of first intercourse
Mott et al. (1996)	Mothers partner present during childhood not related to child's age first intercourse
Afxentiou & Hawley (1997)	Daughters living with both parents at age 14 less likely to have had sexual intercourse
Dittus et al. (1997)	The effect of father live-in-status on teen sex was mediated by teen perceptions of parental attitudes toward teen sex
Miller et al. (1997)	Number of changes in parents' marital status inversely related to age first intercourse (M); time lived with single parent inversely related to age first intercourse (F)
Taris & Semin (1997)	Presence of the father associated with an older age of first intercourse
Upchurch et al. (1998)	Living with step or single parent related to early age first intercourse
Dorius & Barber (1998)	Living with single parent is related to early age first intercourse
Manlove (1998)	Teens in intact families have a lower risk of pregnancy than teens from nonintact families
Ramirez-Valles et al. (1998)	Family structure indirectly affected teen sexual risk behavior by dampening the effects of neighborhood poverty and increasing both parental involvement and participation by teens in prosocial activities
Miller et al. (1999)	After controlling for adolescents' gender, age, and race, mothers marital status was not related to adolescent sexual behavior in African American and Latino samples
Whitbeck et al. (1999)	Living in single parent family associated with early sexual intercourse, but became statistically nonsignificant in full model that included many adolescent characteristics and behaviors
Upchurch et al. (1999)	Living in single parent or stepparent family associated with early sexual onset in complex multivariate models

missive sexual attitudes, lesser parental supervision, and parents' own dating activity help explain why adolescents in some single parent families are at increased risk of pregnancy.

Having older siblings also is related to higher risk of pregnancy. Apparently this effect is not due to siblings being older per se; the influence on younger sibs' pregnancy and pregnancy risk behaviors is most evident if older siblings have had sexual intercourse and especially if the older sibs have experienced an adolescent pregnancy or birth (see Table 8).

Some adolescents grow up in families that are violent and abusive. Many recent studies have found that traumatic experiences, especially those involv-

TABLE 8  
Studies Linking Sibling Characteristics with Adolescent Pregnancy Risk

Author(s)/year	Main findings
Rodgers (1983)	Having older brothers related to early teen sexual intercourse
Hogan & Kitagawa (1985)	Having large number of siblings and having older sister who is teen mother is positively related to probability of having intercourse and probability of ever being pregnant
Rodgers & Rowe (1988)	Younger sibs more likely to have had intercourse than older sibs at the same year of age
Miller & Bingham (1989)	Having older brothers not related to age first intercourse
Haurin & Mott (1990)	Timing of older sibs' sexual initiation positively related to younger sibs' timing of first intercourse (W only)
Rodgers et al. (1992)	Younger sibs have sexual intercourse at younger age than older sibs
East et al. (1993)	Having sexually active and/or childbearing teen sister positively related to ever having intercourse (F)
Pick & Palos (1995)	Having sister who was pregnant teen related to teen intercourse (F)
Mott et al. (1996)	Number of siblings not related to age at first intercourse
East (1996a)	Having older teenage pregnant or parenting sister related to younger brothers and sisters more intimate sexual behavior (scale), having had intercourse, and frequency of intercourse
East (1996b)	Having older sister who is a teen parent is positively related to younger sister ever having had intercourse
East & Shi (1997)	Younger sisters of pregnant and parenting teens who had negative relationship qualities with their sister (e.g., rivalry, competition, and conflict) were more likely to have had sex than the younger sisters of pregnant and parenting teens who had positive relationship qualities with their sister
Widmer (1997)	Having older sexually active siblings (especially brothers) related to younger siblings early onset intercourse
Whitbeck et al. (1999)	Having sexually active older siblings related to younger siblings early sexual onset, but sibling effect was nonsignificant in full model that included many adolescent characteristics and behaviors

TABLE 9  
Studies Linking Sexual Abuse with Adolescent Pregnancy Risk

Author(s)/year	Main findings
Boyer & Fine (1992)	Sexually victimized teens had an earlier sexual debut, increased substance use, and decreased use of contraception
Butler & Burton (1992)	Few differences between victims and nonvictims of sexual abuse, except that victims reported more unwanted intercourse
Luster & Small (1994)	Sexual abuse is related to sexual risk taking (multiple partners and not using contraception) for both males and females
Small & Luster (1994)	Sexual abuse is related to having sexual intercourse for both male and female teens
Miller et al. (1995)	Sexual abuse related to more permissive attitudes about teen sex and earlier age of sexual debut
Nagy et al. (1995)	Female teens who had been forced to have intercourse initiated sex at younger ages and were more likely to have been pregnant than nonabused sexually experienced peers
Widom & Kuhns (1996)	Childhood sexual abuse not associated with increased risk of sexual promiscuity (10+ partners/year) or teen pregnancy for either gender, but positively associated with prostitution
Browning & Laumann (1997)	Childhood sexual abuse by an adult is related to a life course trajectory of both adolescent and adult risky sexual behavior, including early age of first intercourse, having a teen birth, a large number of sexual partners, and having STDs
Luster & Small (1997)	Sexual abuse positively related to number of sex partners
Roosa et al. (1997)	Sexual abuse alone not related to teen pregnancy, but sexual precocity and failure to use contraception (alone and in combination with sexual abuse) strongly related to pregnancy history
Stock et al. (1997)	Sexual abuse positively related to intercourse before age 15 and to less use of birth control
Perkins et al. (1998)	Sexual abuse predicted sexual activity among Latinos, African Americans, and European Americans

ing sexual abuse, are related to higher adolescent pregnancy risk, especially risk through earlier onset of voluntary sexual intercourse and through less consistent use of contraception (see Table 9).

### BIOLOGICAL INFLUENCES

This brief third section provides some balance to an otherwise solely environmental perspective about family influences on adolescent pregnancy risk. Because there are fewer studies about biological influences than environmental influences on adolescent pregnancy risk, and because biological influences are not the central focus of this article, the biological literature is presented only briefly. Evidence is increasingly clear, however, that there are biological bases for many human behaviors (Plomin & McClearn, 1993), and there is mounting evidence for subtle, complex interactions between

TABLE 10  
Studies Linking Biological Variables with Adolescent Pregnancy Risk

Author(s)/year	Main findings
Garn (1980)	Age of menarche is highly correlated within biological families, both between mothers and daughters and between sisters
Newcomer & Udry (1984)	Mothers' age at first sex and first birth positively related to daughters' age of intercourse
Udry et al. (1985)	Androgen hormone levels related to males' sexual interest and behaviors
Udry et al. (1986)	Androgen hormone levels related to female sexual motivation, not coitus
Zabin et al. (1986)	Precocious pubertal development related to early age first intercourse
Udry & Billy (1987)	Androgen hormone levels related to white males age of intercourse; onset of intercourse for females associated with social controls (Whites) and with early pubertal development (Blacks)
Udry (1988)	Strong androgen effect on male sexual behavior including coitus; androgen influences female sexual motivation and noncoital behavior
Udry (1990)	Androgen hormone levels strongly related to boys' problem behavior index (including had intercourse); biological and social variables have both additive and interactive effects
Ku et al. (1993a)	Mothers' teen birth inversely related to teen sons' age of first intercourse
Halpern et al. (1993)	Pubertal development related to sexual ideation and behavior, including intercourse status; free testosterone levels (not changes) related to males' current sexual behavior and behavior 4 years later
Flannery et al. (1993)	Precocious pubertal development positively related to sexual behavior (ordinal)
Halpern et al. (1994)	Free testosterone level inversely related to multiple measures of sexual arousal and behavior, including age first intercourse (M)
Whitbeck et al. (1993)	Pubertal development status positively related to intercourse 1 year later
Capaldi et al. (1996)	Physical maturation associated with younger age of first intercourse
Mott et al. (1996)	Mothers' age at menarche related to daughters' age at menarche, but neither correlated with sex before age 14; mothers' age first sex related to sons' and daughters' intercourse before age 14
Roosa et al. (1997)	Age of menarche not related to teen ever having been pregnant
Widmer (1997)	Mother's age at first birth inversely related to risk teen ever had intercourse
Miller et al. (1997)	Age menarche positively related to age of first intercourse
W. B. Miller et al. (1998)	Dopamine receptor genes are associated with age of first intercourse
B. C. Miller et al. (1998)	Early development related to level of sexual behavior 2 years later

heredity and environment (Ge et al., 1996; Plomin, Reiss, Hetherington, & Howe, 1994).

Research on hormone levels and genes indicates that there are biological influences on initiation of sexual intercourse (see Table 10). Investigators have found that androgen hormone levels (assessed by blood serum assays) are related to adolescent sexual arousal and sexual behaviors, including intercourse, especially among males. Recent research also indicates that dopamine receptor genes are associated with age of first sexual intercourse for both males and females, explaining a substantial amount of variance in age of first sex beyond that explained by psychosocial variables alone.

Additional research evidence suggesting biological influences on adolescent pregnancy can be found in studies that focus on independent variables which are known or presumed to be heritable. For example, several studies have correlated the timing of fertility-related events between mothers and daughters, finding that if mothers had an early age of menarche, first sexual intercourse, and first pregnancy, their daughters are more likely to be precocious in experiencing these fertility-related events. Early pubertal development is partially inherited, and in most studies precocious development is found to be related to early onset of sexual intercourse, which, of course, increases the risk of adolescent pregnancy.

It should be acknowledged that biological variables probably play a more important role in risk of adolescent pregnancy than generally has been recognized. Biosocial studies that investigate interactive effects of both hereditary and environmental variables are rare but revealing (Halpern et al., 1994; Udry, 1988). Interested readers can consult original studies listed in Table 10 or summary reviews that emphasize biological influences (Morris, 1992; Smith, 1989; Udry & Campbell, 1994).

## CONCLUSIONS AND CAVEATS

The research reviewed here shows clearly that there are family influences on adolescent pregnancy risk. Some of the contextual and biological influences are impossible or difficult for parents (or others) to change. By contrast, parental support (connectedness), supervision (regulation), and parent/teen communication are relatively more subject to parents' control, and these variables make a difference in risk of adolescent pregnancy. The major family influences apparent in the research literature can be summarized as follows:

1. The most consistent finding across studies is that parent/child connectedness (support, closeness, and warmth) is related to lower adolescent pregnancy risk; evidence is greatest for this effect through delaying and reducing adolescent sexual intercourse.

2. Parental regulation (supervision and monitoring) is related to lower adolescent pregnancy risk in a large majority of studies. Overly controlling or psychologically intrusive parenting has received little research attention in

relation to adolescent pregnancy risk; failure to examine curvilinearity or to differentiate intrusive psychological control could explain mixed results in studies of parental regulation.

3. Studies linking parent/child communication with adolescent pregnancy risk are very inconclusive; no simple direct effect is apparent.

4. Parental attitudes and values disapproving of adolescent sexual intercourse (or unprotected intercourse) and pregnancy are related to lower adolescent pregnancy risk.

5. Parents' values, parent/child communication, and closeness of the parent/child relationship have important interactive effects on adolescent pregnancy risk through reducing sexual intercourse and/or increasing contraceptive use.

6. Family structural and contextual variables influence adolescent pregnancy risk through both sexual behavior and contraceptive use. Residing in disorganized/dangerous neighborhoods and in a lower SES family, living with a single parent and having older sexually active siblings or pregnant/parenting teenage sisters, and being a victim of sexual abuse all place teens at elevated risk of adolescent pregnancy.

7. Several biological variables (e.g., timing of pubertal development, hormone levels, and genes) are related to adolescent pregnancy risk because of their association with adolescent sexual intercourse behaviors.

There are several significant limitations to this review. One is that some potentially important influences on adolescent pregnancy risk have been left out. For example, there is substantial research evidence about the effects of differential association with peers (Bearman & Bruckner, 1999; Brown & Theobald, 1999) on adolescent sexual and contraceptive behavior. Socialization within families provides an initial environment for adolescent pregnancy risk, but during adolescence, nonfamilial environmental influences (e.g., peers, neighborhoods, schools, and media) become increasingly important. In addition to parents (or in place of them) it is obvious that other adults (especially extended family members) also influence pregnancy risk for some adolescents, but very little research has examined the effects of such significant others. This is a particularly salient omission for groups with high extended family connectedness and for teens who have lesser parental involvement and who might, as a result, be at greater risk of adolescent pregnancy.

Because there are such large race/ethnic differences in adolescent pregnancy and childbearing in the United States, another caution about this article has to do with potentially important race/ethnic variations in the findings. In the late 1990s the 15- to 19-year-old birth rate was almost twice as high among Blacks, and more than twice as high among Latinos, compared with White teens (Ventura, Curtin, & Mathews, 1998). Of the nearly 60 studies summarized in Tables 1 to 3, 31 were conducted using random samples or samples nonrandomly composed of multiple race/ethnic groups. Thus, Whites, Blacks, Latinos, and other races were included in the majority of

parent/child studies reviewed, but subgroup analyses by race were not always reported because of small subgroup sample sizes. However, studies of parental support/connectedness, and parental control/regulation using only Black and/or Latino samples (Danziger, 1995; Hogan & Kitagawa, 1985, Jaccard et al., 1996, 1998; Miller et al., 1999) had findings similar to the studies using predominantly White samples (Barnett et al., 1991; Capaldi et al., 1996; Jessor, 1983; Luster & Small, 1994, 1997; Rodgers, 1999; Scaramella et al., 1999; Weinstein & Thorton, 1989; Whitbeck et al., 1992, 1993). Therefore, cohesive parent/child relations and parental supervision appear to be inversely related to teen pregnancy risk, regardless of race ethnicity.

There is a tendency for adolescent pregnancy research to be focused on females, particularly on mothers' influences on daughters' sexual and contraceptive behavior. To some extent this is understandable because mothers tend to be more involved in parenting than fathers, and daughters face more direct consequences than sons when unintended pregnancy occurs. The emphasis on females is somewhat surprising, however, because much of the research base included both male and female adolescents. Bringing a needed balance to the field in the 1990s, some investigators focused on adolescent males (Feldman & Brown, 1994; Ku et al., 1993a, 1993b) or separately analyzed fathers' as well as mothers' influences (Feldman & Brown, 1994; Jaccard et al., 1996).

A limitation of this review is that the studies vary greatly in their methodological sophistication, so that findings are not always directly comparable. This is partly because studies are based on different samples, measures, research designs, and analytic strategies, so that direct comparisons are inherently problematic. One of the most daunting methodological complications for this review is that there are such diverse measures of family relationships and adolescent pregnancy risk. Further, the same measure of parent/child connectedness could relate somewhat differently to age of first sexual intercourse, use of contraception, and adolescents' reports of ever having been pregnant. Still, this article is based on the premise that a pattern of consistent findings can be compelling, especially when studies differ in their methods. In some studies the associations between family variables and measures of adolescent pregnancy risk are reported only at the bivariate level. In other studies associations between the same variables might not be statistically significant because additional variables were included in multivariate analyses. Whether a particular family variable was found to be significantly related to adolescent pregnancy risk depends partly on the extent to which other variables were included that share overlapping variance. In sum, there are significant methodological limitations in this body of research; all results are not equal, and some of the null or contradictory findings probably reflect problems with the quality of research.

Another limitation of this review is that many of the studies examined did not report effect sizes or other estimates of the magnitude of relationships.

Among the studies of parent/child connectedness, the magnitude of effects ranges from zero to quite large. For example, Feldman and Brown (1993) explained about 50% of the variance in the number of sons' sexual partners 4 years later from earlier father, mother, and family quality measures. Jaccard et al. (1996) reported that low satisfaction with the mother/child relationship more than doubled the probability of teen sexual intercourse. Similarly, Danziger (1995) found that 54% more teens who had intercourse prior to age 15 came from families with conflictual relations as compared to close family relationships, and that twice as many teens from homes with no rules were sexually active before age 15 as compared with teens who reported having family rules. Hogan and Kitagawa (1985) reported a 64% higher pregnancy rate among teens with "lax" versus "careful" parental supervision of dating. Jaccard and Dittus (1991) reported that the combination of parental communication and parents' values about sex accounted for about 30% of variance in teen sexual intercourse experience. In spite of these selected examples of promising effect sizes, a quantitative meta-analysis of this literature is problematic because so many different measures of the independent and dependent variables have been used.

Based on the research findings reviewed, Fig. 1 was presented as a way of conceptualizing the associations reported. In Fig. 1, parent/child relationships are shown to influence adolescent pregnancy risk through a variety of mediating mechanisms. For example, when teens are emotionally connected to parents and perceive them to be warm and supportive, teens are more likely to internalize parental values and follow their counsel because teens trust parents and desire to please them. In such close parent/child relationships, adolescents are also more likely to exercise self restraint and to be involved in prosocial activities that lessen their risk of adolescent pregnancy. Conversely, when there is little or no parent/child closeness or connectedness, adolescents are more likely to be emotionally distressed, to use drugs and alcohol, and to begin early/steady dating, which places them at increased risk of adolescent pregnancy.

Specific paths between family relationships, mediating mechanisms, and adolescent pregnancy risk variables are tremendously complex and need to be further delineated. It seems likely that parent/child connectedness is more closely related to some mediating mechanisms than others (e.g., adolescents' sexual values/intentions), whereas parental regulation (supervision) would be more closely related to other mediating mechanisms (e.g., early dating and substance use). Similarly, some mediating mechanisms might be more strongly related to sexual behaviors (e.g., early dating is related to early onset of sexual intercourse), whereas other mediating variables probably are more predictive of contraceptive use (e.g., alcohol/drug use decreases contraceptive consistency). A number of studies have begun testing such complex mediated models of family influences on adolescent pregnancy risk over time (see Scaramella et al., 1998; Whitbeck et al., 1993, 1999).

Parent/child closeness or connectedness is highlighted in this article as being especially important to reduce the risk of adolescent pregnancy. In a parallel way, school connectedness as reflected by academic achievement and involvement (Ohannesian & Crockett, 1993), and neighborhood connectedness as reflected by associations with neighbors and caring others, also have been shown to be inversely related to problematic adolescent outcomes (Barber & Olsen, 1997). This broader concept of connectedness highlights the importance of contextual factors when considering effects of parenting practices on child development (Coley & Hoffman, 1996). For example, a lack of parental supervision could be especially risky in neighborhoods characterized by low community cohesion.

It also should be stated that parental influences are important to adolescent well being in general, not just with respect to preventing adolescent pregnancy. Parent/child connectedness and parental regulation clearly are related to positive adolescent outcomes (Barber, 1997), to positive health and health risk behaviors (Resnick et al., 1997), and to adolescents' deviant and delinquent behavior (Feldman & Weinberger, 1994; Johnson et al., 1995). Adolescent risk and problem behaviors are comorbid or tend to cluster together (Ketterlinus, Lamb, Nitz, & Elster, 1992). For example, involvement with drugs elevates risk of adolescent pregnancy through early onset and more frequent sexual behavior and through not using effective contraception (Elliott & Morse, 1989; Rosenbaum & Kandel, 1990).

Finally, a caveat should be stated that family variables, and parenting in particular, are not the only—and might not be the most important—influences on adolescent sexual and contraceptive behaviors. Onset and frequency of sexual intercourse, and the use or nonuse of contraception, are behaviors determined by a complex array of antecedents. Family variables clearly play a significant role, but they do not account for all of the variance. The implication of this fact is that parents can have some influence on, but they can not determine, whether adolescents have sex, use contraception, or become pregnant. What parents do, however, does make these outcomes more or less likely.

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