Ambivalence and Pregnancy: Adolescents' Attitudes, Contraceptive Use and Pregnancy

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CONTEXT: *It is often argued that adolescents who become pregnant do not sufficiently appreciate the negative consequences, and that prevention programs should target participants' attitudes toward pregnancy.*

METHODS: *Data from the first two waves of the National Longitudinal Study of Adolescent Health were used to examine whether 15–19-year-old females' attitudes toward pregnancy influence their contraceptive consistency and their risk of pregnancy. Characteristics and attitudes associated with pregnancy and contraceptive use were assessed using bivariate and multivariate analysis.*

RESULTS: *Twenty percent of female adolescents were defined as having antipregnancy attitudes, 8% as having propregnancy attitudes and 14% as being ambivalent toward pregnancy; the remainder were considered to have mainstream attitudes. Among sexually experienced adolescents, having an attitude toward pregnancy was not associated with risk of pregnancy. However, those who were ambivalent about pregnancy had reduced odds of using contraceptives consistently and inconsistently rather than not practicing contraception at all (odds ratios, 0.5 and 0.4, respectively). Antipregnancy respondents did not differ from proprepregancy respondents in terms of their contraceptive consistency. However, having a positive attitude toward contraception was associated with increased likelihood of inconsistent and consistent contraceptive use compared with nonuse (1.6 and 2.1, respectively).*

CONCLUSIONS: *Programs designed to prevent pregnancy need to give young women information about pregnancy and opportunities to discuss the topic so that they form opinions. Furthermore, programs should emphasize positive attitudes toward contraception, because effective contraceptive use is shaped by such attitudes and is strongly associated with reduction of pregnancy risk.*

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The majority of pregnancies among unmarried teenagers are unintended.[1] Most adolescents do not want to become pregnant, although some are not opposed to becoming pregnant and others have ambivalent attitudes.[2] A number of explanations of why adolescents' attitudes toward pregnancy vary exist in the literature; however, less often considered is whether these attitudes are associated with pregnancy risk and contraceptive use.

Questions about the relevance of attitudes are important because attitudes may mediate the often-observed association between socioeconomic disadvantage and pregnancy risk. For this reason, social policy is often oriented toward shaping attitudes. Many researchers and advocates have argued that teenage pregnancy prevention programs should target attitudes toward pregnancy.[3] One reason for the attention to pregnancy attitudes has been that interventions that increase the availability of contraceptives have experienced uneven success in reducing teenage pregnancy rates.[4] Many experts have concluded that adolescents have access to the means to avoid pregnancy but do not use them or use them inefficiently because they do not appreciate the consequences of pregnancy.[5]

Actors in the social policy domain may also focus on teenagers' attitudes because they seem easier to change than the social and economic conditions in which those attitudes develop. For example, poverty is associated with teenage initiation of sex, nonuse of condoms at first intercourse and accidental pregnancy,[6] but pregnancy intervention programs are not well suited to end poverty. They may, however, be well suited to shape attitudes. But which attitudes? In the current political climate, supporting programs designed to shift attitudes about pregnancy is easier than supporting programs designed to shift attitudes about contraception. In this article, we address whether sexually experienced adolescents' attitudes toward pregnancy influence their risk of becoming pregnant.

Adolescent Contraceptive Use and Pregnancy

An extensive literature documents the determinants of adolescent contraceptive behavior. Critical factors associated with contraceptive use include social and demographic characteristics (e.g., age, race and income), family-related characteristics (e.g., parental education and closeness with parents) and individual characteristics (e.g., cognitive ability, educational achievement and expectations, self-esteem, age at first sex, history of pregnancy and attitudes toward contraception).[7] The impact of religiosity on contraceptive use is less clear, and the literature

contains mixed results about the effects of adolescents' knowledge of sex, fertility and contraception.

With respect to pregnancy, the literature reports similar critical determinants.[8] Social and demographic predictors include age, race, income and parental education; family-related predictors include family structure and relationship with parents; and individual predictors include low cognitive ability, low educational expectations and achievement, negative attitudes toward school, lack of involvement in school clubs and problem behaviors. Popularity at school does not predict adolescent females' risk of pregnancy, but the characteristics of their friends do. Finally, number of partners, age at onset of sexual activity and contraceptive behavior are strong predictors of pregnancy risk.

Most studies that are concerned with attitudes toward pregnancy rely on small convenience samples or on retrospective accounts of pregnant adolescents' attitudes, which may be colored by the pregnancy. Jaccard et al. examined the role of attitudes toward pregnancy prospectively with a representative sample of sexually experienced and inexperienced adolescent females, and found a robust association between positive attitudes and subsequent pregnancies.[9] However, attitudes toward pregnancy are likely to be strongly correlated with attitudes toward having sex, which were not controlled for in the study's multivariate model. Thus, the finding may be due to this omitted variable or to other factors that are correlated with pregnancy attitudes and delay in sexual debut.

We expand on the prior research in several ways. First, we limited our sample to sexually experienced young women, which allows us to assess the role of pregnancy attitudes in the absence of factors associated with the timing of sexual debut but not pregnancy risk. Because the majority of adolescents will become sexually active between the ages of 15 and 19, it is important for educators and policymakers to know whether attitudes toward pregnancy are associated with pregnancy risk among sexually experienced adolescents. Second, we explore whether contraceptive use is the behavioral mechanism that links attitude and outcome. It has been argued that ambivalence toward pregnancy is a risk factor for pregnancy because it leads to inconsistent contraceptive use,[10] but few studies have directly tested this idea.*[11] Finally, we examine the antecedents of attitudes toward pregnancy, paying special attention to the characteristics of adolescent women who lack a clear opinion.

METHODS

Data

We used data from the National Longitudinal Study of Adolescent Health (Add Health) because of its significant advantages over competing data sets. First, researchers have argued for the need to analyze prospective measures of pregnancy attitudes.[12] Exploiting the prospective features of Add Health allows us to rule out a reverse effect of behaviors (such as becoming pregnant) on attitudes. Second, the range of Add Health data allows us to include in our multivariate models detailed measures of well-established antecedents of both adolescent attitudes toward contraception and pregnancy, and adolescent contraceptive use and pregnancy risk. Finally, Add Health is a nationally representative study; adolescents are not selected on the basis of failed contraceptive use, as is the case in many clinic-based studies.

Add Health utilizes a multistage clustered sample design, and for this study, we used data drawn from its in-home components.[13] From May through December 1995, Wave 1 in-home interviews were administered to 20,745 adolescents. The interviews took 90 minutes to complete, on average, and collected detailed information about risk behaviors, romantic partnerships, family dynamics, aspirations, attitudes and activities. Eighty percent of adolescents in the initial sample completed a Wave 1 interview. Audio computer-assisted self-interviewing technology was used for questions covering sexual and other sensitive health behaviors. Between April and September 1996, reinterviews with Wave 1 respondents, excluding high school seniors, were conducted. Some 88% of eligible respondents participated in Wave 2, yielding a sample of 14,738 adolescents who completed both interviews.

Female respondents aged 15–19 who participated in both in-home interviews were eligible for inclusion in our analyses; we excluded those younger than 15 because they were not asked the questions about pregnancy attitudes. Also, we excluded 44 respondents who were married at Wave 1 or got married between waves, and 138 who were missing information on pregnancy attitudes or sexual history. The final sample consisted of 4,877 adolescent females.

Measures

• *Attitudes toward pregnancy.* In the Wave 1 interviews, adolescents were asked how they would feel if they became pregnant. To measure pregnancy attitudes, we used five survey items that assessed adolescents' perceptions of the consequences of pregnancy: "If you got pregnant, it would be embarrassing for your family"; "If you got pregnant, it would be embarrassing for you"; "If you got pregnant, you would have to decide whether or not to have the baby, and that would be stressful and difficult"; "If you got pregnant, you would be forced to grow up too fast"; and "Getting pregnant at this time is one of the worst things that could happen to you." Response categories were strongly agree, agree, neither agree nor disagree, disagree and strongly disagree.

When the five responses were averaged into a single index of pregnancy attitude (Cronbach's alpha=0.72), this measure had relatively little dispersion (standard devia-

*Two studies found an association between positive or ambivalent attitudes toward childbearing and subsequent childbearing among samples of clinic clients presenting for pregnancy tests (sources: Zabin LS, Hirsch MB and Boscia JA, Differential characteristics of adolescent pregnancy test patients: abortion, childbearing and negative test groups, *Journal of Adolescent Health,* 1990, 11(2):107–113; and Zabin LS, Sedivy V and Emerson MR, Subsequent risk of childbearing among adolescents with negative pregnancy test, *Family Planning Perspectives,* 1994, 26(5):212–217).

TABLE 1. Characteristics included in analyses of 15–19-year-old females' contraceptive behavior and pregnancy risk, hypothesized relationship between characteristic and outcomes, and measure used, National Longitudinal Study of Adolescent Health

Characteristic	Contraception	Pregnancy	Measure
Social and demographic			
Age	+	+	Age in years as of Wave 1, based on interview date and date of birth
Black	–	+	Self-reported at Wave 1
Hispanic	–	+	Self-reported at Wave 1
Maternal education	+	–	Respondent's report at Wave 1
Poor/low-income	–	+	Respondent's report at Wave 1 of whether a parent or a parent's partner had received public assistance in the last year
Family			
Family structure	+	–	Family type (living situation) self-reported at Wave 1: two biological parents, at least one stepparent, single parent and other
Closeness with mother	+	–	Wave 1 response to the question "How much do you think she [biological/adoptive/step/foster mother] cares about you?" (scale: 0–4)
Individual			
Religiosity	Conflicting predictions and evidence in literature		Composite of responses to four items at Wave 1: frequency of religious service attendance, frequency of religious youth activity participation, importance of religion to self and frequency of praying (scale: 0–1)
AHPVT	+	–	Abridged version of the Peabody Picture Vocabulary Test–Revised
$AHPVT^2/100$	–	–	Squared term of AHPVT, to model curvilinear relationship
Risk status	–	+	Composite typology of academic and behavioral orientation of adolescents
Self-esteem	+	0	Composite of responses to nine belief statements at Wave 1: "You have a lot of energy," "You are well-coordinated," "You have a lot of good qualities," "You are physically fit," "You have a lot to be proud of," "You like yourself just the way you are," "You feel like you are doing everything just about right," "You feel socially accepted" and "You feel loved and wanted" (scale: 0–4)
Socially isolated	–	0	Respondent was considered socially isolated if fewer than three other respondents in school named her as friend
Sexual			
Length of sexual career	–	+	Duration between sexual debut and Wave 2
Duration of interwave period	–	+	Duration of exposure to pregnancy risk between Wave 1 and Wave 2
No. of sexual partners between waves	–	+	Self-reported at Wave 2
Prior pregnancy	+	+	Self-reported at Wave 1
Attitudes toward contraception	+	na	Composite of responses to seven items about birth control at Wave 1: "too much of a hassle to use," "too expensive to buy," "takes too much planning," "too hard to get a boy to use with you," "interferes with sexual enjoyment," "using it is morally wrong" and "if you used it, your friends might think that you were looking for sex" (scale: 1–5)
Contraceptive use	na	–	Consistency of use across all partnerships between waves
Knowledge about pregnancy avoidance	+	–	Number of correct answers to nine true-or-false questions about proper condom usage, ovulation and pregnancy risk (scale: 0–9)
Unfounded certainty	–	+	Number of incorrect answers in the knowledge quiz about which the respondent was certain she was right (scale: 0–9)

Notes: +=positive relationship. –=negative relationship. 0=no relationship. na=not applicable. Wave 1 interviews were performed between May and December 1995, and Wave 2 interviews were performed between April and September 1996.

tion=0.09) around its mean (2.1). Most respondents opposed pregnancy, although some respondents did so more vehemently than others, and still others appeared not to oppose it all. Yet another group of respondents were unable to form an opinion and chose "neither agree nor disagree."

We divided respondents into four groups according to their attitudes toward pregnancy. Those who strongly agreed with all five statements, or strongly agreed with four

TABLE 2. Descriptive statistics for 15–19-year-old females, by their attitude toward becoming pregnant and by whether they are sexually experienced

Characteristic	Anti		Mainstream		Pro		Ambivalent		Comparison across attitude	
	No (N=682)	Yes (N=314)	No (N=1,629)	Yes (N=1,153)	No (N=116)	Yes (N=292)	No (N=323)	Yes (N=368)	No	Yes
Social and demographic										
Age (mean)	16.4	16.8	16.5	16.9	16.6	17.2	16.4	16.8	ns	**
Race/ethnicity (%)										
White	52.1	63.7	52.1	51.5	32.8	39.4	44.6	44.8	**	**
Black	16.0	14.7	18.1	27.0	29.3	41.1	17.3	32.1	**	**
Hispanic	15.4	13.7	21.1	15.0	31.0	14.0	26.0	16.3	**	ns
Other	16.6	8.0	8.8	6.4	†	5.5	†	6.8	**	ns
Maternal education (mean)	6.0	6.1	5.7	5.4	4.3	4.8	5.3	5.1	**	**
Poor/low-income (%)	9.2	6.4	10.7	15.0	19.0	27.4	14.6	20.1	**	**
Family										
Family structure (%)										
2 biological parents	63.8	54.5	58.6	38.4	44.0	31.9	55.1	32.1	**	**
≥1 stepparent	14.8	20.4	14.6	21.9	17.2	16.4	15.2	27.2	ns	**
Single parent	17.9	21.0	22.8	29.0	31.9	34.6	25.4	29.9	**	**
Other	3.5	4.1	4.0	10.8	†	17.1	†	10.9	ns	**
Closeness with mother	3.3	3.1	3.1	3.0	3.2	2.9	3.1	2.9	**	**
Individual										
Religiosity (mean)	0.5	0.4	0.5	0.4	0.4	0.4	0.4	0.4	**	ns
AHPVT (mean)	102.3	101.6	100.0	98.0	90.0	92.8	97.6	96.8	**	**
Risk status (%)										
Low	54.8	30.6	45.1	19.3	37.9	14.7	35.0	14.1	**	**
Middle	29.0	33.1	35.5	31.6	23.3	27.1	35.9	29.9	**	**
High	16.1	36.3	19.3	49.1	38.8	58.2	29.1	56.0	**	**
Self-esteem (mean)	3.1	3.0	2.9	2.8	2.9	2.8	2.9	2.8	**	**
Socially isolated (%)	20.8	11.5	23.2	18.2	23.3	25.3	26.6	23.4	ns	**
Sexual										
Prior pregnancy at Wave 1 (%)	na	6.5	na	15.8	na	43.0	na	21.2	na	**
Attitudes toward contraception (mean)	4.0	4.1	3.9	4.0	3.9	3.9	3.8	3.9	**	**
Knowledge about pregnancy avoidance (mean)	5.4	6.3	5.4	6.2	4.9	6.0	5.4	6.3	*	ns
Unfounded certainty (mean)	0.7	0.7	0.7	0.8	1.3	1.2	0.6	0.6	**	**

*p<.05. **p<.01. †Estimates not reported because of small sample. *Notes:* ns=not significant. na=not applicable.

and agreed with one, were classified as having the most unfavorable attitudes toward becoming pregnant (antipregnancy). Respondents who disagreed or strongly disagreed with at least three statements were classified as having the most favorable attitudes toward becoming pregnant (propregnancy). Those who neither agreed nor disagreed with at least two statements were classified as having the least defined attitudes toward becoming pregnant (ambivalent). We categorized the 15 respondents who qualified as both ambivalent and propregnancy as propregnancy. The remaining respondents were considered to have mainstream attitudes.

Our analytic strategy was to define groups outside the mainstream that would be small enough to be considered extreme in attitude, but large enough to exhibit sufficient within-group variation. These group definitions are robust. Multiple adjustments to the groups (i.e., restriction and relaxation of the criteria) did not alter the relationship between attitudes and contraceptive behaviors or the occurrence of pregnancy in multivariate analyses.*

• *Background characteristics.* We controlled for age, race and ethnicity, maternal education, poverty status, family structure, closeness with mother, religiosity, cognitive ability, self-esteem and social isolation (Table 1). In addition, we created a measure of risk status—adolescents' orientation to school, future expectations and nonnormative social behavior—from the cross-classification of two indices, as was done in a previous study.[14] The first index summarizes orientation to school, and includes grade point average, school attachment, number of extracurricular activities, and desire for and perceived likelihood of attending college. The second index summarizes nonnormative social behavior, and includes drinking, truancy, delinquency and having trouble with teachers or other students. We defined respondents who scored in the bottom quartile on the school orientation index and in the top quartile on the nonnormative social behavior index as being high-risk, and

*A detailed methodological supplement reporting sensitivity tests for results based on different conceptualizations is available from the corresponding author.

TABLE 3. Descriptive statistics for 15–19-year-old females, by level of contraceptive use, according to selected characteristics

Characteristic	None (N=303)	Inconsistent (N=193)	Consistent (N=691)
All	**26.8**	**16.4**	**56.7**
Social and demographic			
Age (mean)	16.7	16.9	16.7
Race/ethnicity (%)			
White	70.8	72.5	70.9
Black	14.9	19.9	18.1
Hispanic	9.8	3.8**	6.9
Other	4.5	3.8	4.2
Maternal education (mean)	4.7	5.1	5.0
Poor/low-income (%)	14.6	8.9	14.9
Family			
Family structure (%)			
2 biological parents	47.2	45.6	48.8
≥1 stepparent	21.8	26.0	19.1
Single parent	22.7	20.3	28.0
Other	8.3	8.1	4.2*
Closeness with mother (mean)	3.0	3.0	3.1
Individual			
Religiosity (mean)	0.4	0.4	0.4
AHPVT (mean)	85.6	88.1	88.2*
Risk status (%)			
Low	12.7	20.5*	25.2**
Middle	35.7	25.1	34.5
High	51.6	54.4	40.2**
Self-esteem (mean)	2.8	2.8	2.9*
Socially isolated (%)	14.8	14.6	16.0
Sexual			
Length of sexual career (mean)	1.3	1.3	0.9*
No. of sexual partners between waves (mean)	1.7	1.3**	1.2**
Prior pregnancy at Wave 1 (%)	11.7	9.6	6.3*
Attitudes toward contraception (mean)	3.8	4.1**	4.2**
Knowledge about pregnancy avoidance (mean)	6.1	6.4	6.1
Unfounded certainty (mean)	0.7	0.6	0.6
Attitudes toward pregnancy (%)			
Mainstream	55.4	61.5	58.9
Anti	15.6	16.5	18.4
Pro	12.0	12.5	10.8
Ambivalent	17.0	9.6*	11.9

*Significantly different from nonusers at p<.05. **Significantly different from nonusers at p<.01. *Note:* Data are weighted.

those who scored in the top quartile on the school orientation index and in the bottom quartile on the nonnormative social behavior index as being low-risk. The remaining respondents (the majority) were defined as middle-risk.

• *Sexual behavior, contraceptive use and contraceptive knowledge.* We considered respondents sexually experienced if they reported at Wave 1 that they had ever had sexual intercourse. Length of sexual career was measured as the difference between respondents' age at sexual debut and their age at Wave 2. We defined respondents' number of partners as the number of sexual partners they reported having between Waves 1 and 2, excluding any partners who were current at Wave 1. If a respondent reported at Wave 1 that she had ever been pregnant, she was considered to have had a prior pregnancy. Only pregnancies that occurred between waves were used to construct the outcome measure; pregnancies that had occurred prior to Wave 1 were used as a predictor of between-wave pregnancy.

We assessed respondents' knowledge about pregnancy avoidance at Wave 1 by their responses to nine true-or-false questions about proper condom usage, ovulation and pregnancy risk. In addition, we used the number of questions that a respondent answered incorrectly but was certain she had gotten right as a measure of respondents' unfounded certainty about pregnancy avoidance.

The questionnaire contained seven items that measured attitudes toward contraception. We constructed a scale from these items by averaging responses, which were given on a five-point Likert scale. Higher values indicate more positive attitudes toward contraception (Cronbach's alpha= 0.81).

Contraceptive behavior was measured retrospectively at Wave 2. Respondents were asked to report on up to six sexual relationships and, for each relationship, whether they used contraceptives, which methods they used and their contraceptive consistency (always, sometimes or never). To make sure that we measured the independent variables (e.g., attitudes) before the outcome occurred, only sexual relationships initiated between waves were included in the analysis.

For the analysis of pregnancy, we characterized contraceptive behavior differently for respondents who did not get pregnant between waves and those who did, to allow for the possibility that a pregnant respondent's contraceptive behavior was influenced by her pregnancy. For respondents who became pregnant, contraceptive behavior was characterized by use during the month in which the pregnancy occurred. To create a similar "worst-case" measure for respondents who did not get pregnant, contraceptive behavior was summarized across all interwave sexual relationships. Respondents were considered nonusers if they had not practiced contraception in at least one relationship. Among respondents who had practiced contraception in all their relationships, those who had used contraceptives inconsistently in at least one relationship were classified as inconsistent users, and those who always used contraceptives in every relationship were classified as consistent users.

Analysis

Because sexual experience is closely related to the outcomes of interest, we considered separately respondents who were not sexually experienced at Wave 1 and those who were. This allowed us to disentangle associations with timing of sexual debut from direct associations with pregnancy risk. We selected just those respondents who had had sex between waves and did not become pregnant, and examined the association between their attitudes toward pregnancy and their contraceptive behavior. Furthermore, we looked at the relationship of pregnancy attitudes to the occurrence of pregnancy among sexually experienced respondents. For each outcome, we began with bivariate analyses, using t-tests or analysis of variance for continuous

variables and chi-square tests for categorical variables. Then, to explore whether the effect of pregnancy attitudes is mediated or suppressed by other predictors of the outcome in question, we used multivariate analyses, including the most important predictors identified in the literature. We adjusted the standard errors for the clustered sample design of Add Health.[15]

RESULTS

Attitude Toward Pregnancy

Of the 4,877 respondents, 57% had mainstream attitudes, 20% had antipregnancy attitudes, 8% had propregnancy attitudes and 14% were ambivalent. Overall, 44% of respondents were sexually experienced. Forty-one percent of the respondents in the mainstream group were sexually experienced; a significantly smaller proportion of those in the antipregnancy group (32%) and significantly greater proportions of those in the ambivalent (53%) and propregnancy (72%) groups were sexually experienced.

When we compared respondents' characteristics by their attitudes toward pregnancy, we found pronounced differences among the four groups in virtually every characteristic. In general, antipregnancy respondents enjoyed the greatest social advantages and personal assets, followed by mainstream, ambivalent and finally propregnancy respondents. (Table 2, page 251). Respondents with antipregnancy attitudes had the highest mean maternal education, maternal closeness, cognitive ability and self-esteem, and the most positive attitude toward contraception. In addition, greater proportions of those in the antipregnancy group than of others reported living with two biological parents and were considered low-risk. In contrast, respondents in the propregnancy group had the lowest mean maternal education, cognitive ability and knowledge of pregnancy avoidance, and the highest mean unfounded certainty about pregnancy avoidance. In addition, greater proportions of those in the propregnancy group than of others reported being poor or low-income, and were considered high-risk. Furthermore, among sexually experienced respondents, those who were propregnancy had the highest rate of previous pregnancy: Some 43% had had a pregnancy prior to Wave 1, compared with 21% of ambivalent respondents, 16% of mainstream respondents and 7% of antipregnancy respondents. A greater proportion of respondents who had had a prior pregnancy than of those who had not were antipregnancy (not shown); for this group, having a pregnancy may have led to a positive attitude toward pregnancy, rather than vice versa.

Attitude and Contraceptive Consistency

After weighting was applied, 1,415 sexually experienced respondents at Wave 2 answered questions regarding contraceptive behavior for at least one sexual relationship that began after Wave 1. Of these, 228 became pregnant between waves, leaving 1,187 respondents for the analysis of the influence of pregnancy attitudes on consistency of contraceptive use.*

TABLE 4. Odds ratios (and 95% confidence intervals) from multinomial regression analyses predicting 15–19-year-olds females' contraceptive use (versus nonuse), by contraceptive consistency, according to selected characteristics

Characteristic	Inconsistent	Consistent
Social and demographic		
Age		
15 (ref)	1.00	1.00
16	1.26 (0.65–2.43)	1.23 (0.75–2.02)
17	1.49 (0.69–3.23)	1.06 (0.60–1.86)
18	0.96 (0.42–2.22)	0.53 (0.26–1.05)
Race/ethnicity		
White (ref)	1.00	1.00
Black	1.95 (0.90–4.23)	1.37 (0.63–2.95)
Hispanic	0.75 (0.27–2.07)	1.60 (0.80–3.21)
Other	1.39 (0.48–3.98)	1.62(0.72–3.65)
Maternal education	1.02 (0.91–1.15)	0.99 (0.88–1.11)
Poor/low-income	0.66 (0.25–1.69)	1.31 (0.67–2.55)
Family		
Family structure		
2 biological parents (ref)	1.00	1.00
≥1 stepparent	1.74 (0.82–3.73)	1.27 (0.70–2.29)
Single parent	1.08 (0.57–2.06)	1.31 (0.76–2.25)
Other	1.16 (0.21–6.36)	0.50 (0.14–1.84)
Closeness with mother	0.86 (0.58–1.25)	0.87 (0.64–1.18)
Individual		
Religiosity	0.78 (0.26–2.34)	0.78 (0.35–1.77)
AHPVT	1.31 (1.02–1.68)*	1.24 (1.06–1.45)**
AHPVT^2/100	0.99 (0.99–1.00)*	0.99 (0.99–1.00)*
Risk status		
Middle (ref)	1.00	1.00
Low	2.04 (1.03–4.05)*	1.77 (1.05–2.98)*
High	1.29 (0.69–2.44)	0.77 (0.47–1.26)
Self-esteem	1.00 (0.62–1.64)	1.21 (0.80–1.84)
Socially isolated	1.38 (0.60–3.16)	1.87 (0.98–3.55)
Sexual		
Length of sexual career	1.04 (0.87–1.26)	0.96 (0.86–1.07)
Duration of interwave period	0.94 (0.83–1.06)	0.98 (0.87–1.11)
No. of sexual partners between waves	0.40 (0.27–0.61)**	0.34 (0.24–0.49)**
Prior pregnancy at Wave 1	1.05 (0.44–2.48)	0.96 (0.42–2.19)
Attitudes toward contraception	1.57 (1.06–2.30)*	2.07 (1.54–2.79)**
Knowledge about pregnancy avoidance	1.04 (0.88–1.23)	0.99 (0.89–1.10)
Unfounded certainty	0.84 (0.64–1.10)	0.87 (0.72–1.05)
Attitudes toward pregnancy		
Mainstream (ref)	1.00	1.00
Anti	0.86 (0.39–1.92)	0.85 (0.51–1.41)
Pro	0.89 (0.38–2.10)	0.80 (0.42–1.54)
Ambivalent	0.37 (0.18–0.75)**	0.50 (0.28–0.88)*

*p<.05. **p<.01. *Note:* ref=reference group.

Overall, 57% used contraceptives consistently, and an additional 16% inconsistently (Table 3); 27% of the respondents did not practice contraception at all. Although differences between mainstream (25%), antipregnancy (24%) and propregnancy (28%) respondents were nonsignificant, a greater proportion of ambivalent respondents (35%) than of those in other groups did not practice contraception (not shown). Compared with nonusers, a significantly greater proportion of inconsistent users were low-risk (21% vs. 13%), and a smaller proportion

*It was possible that excluding teenagers who became pregnant between waves would select respondents more likely to have positive attitudes toward pregnancy or more likely to be inconsistent users or nonusers of contraception. This was not the case. Attitudes toward pregnancy do not predict pregnancy in either group; analyses supporting this are available from the corresponding author. The small number of respondents who became pregnant prohibited a separate analysis of whether their attitudes toward pregnancy predicted contraceptive use. Many respondents who became pregnant reported that they had used contraceptives.

TABLE 5. Descriptive statistics for 15–19-year-old females, by whether they had a pregnancy between survey waves

Characteristic	No (N=1,187)	Yes (N=228)
Social and demographic		
Age (mean)	16.7	16.9
Race/ethnicity (%)		
White	71.2	57.2**
Black	17.5	25.2*
Hispanic	7.2	13.8**
Other	4.2	3.8
Maternal education (mean)	4.9	4.4*
Poor/low-income (%)	13.8	19.6
Family		
Family structure (%)		
2 biological parents	47.8	30.0**
≥1 stepparent	21.0	21.4
Single parent	25.3	32.9
Other	5.9	15.7**
Closeness with mother (mean)	3.0	2.9*
Individual		
Religiosity (mean)	0.4	0.4
AHPVT (mean)	87.5	84.5**
Risk status (%)		
Low	21.1	16.3
Middle	33.3	28.9
High	45.6	54.8*
Self-esteem (mean)	2.8	2.8
Socially isolated (%)	15.5	18.0
Sexual		
Length of sexual career (mean)	1.1	1.7**
Prior pregnancy at Wave 1 (%)	8.3	23.3**
Contraceptive use (%)		
None	26.8	72.9**
Inconsistent	16.5	12.1
Consistent	56.7	15.1**
Knowledge about pregnancy avoidance (mean)	6.2	6.3
Unfounded certainty (mean)	0.6	0.9*
Attitudes toward pregnancy (%)		
Mainstream	58.4	55.4
Anti	17.3	10.9
Pro	11.4	18.1
Ambivalent	12.9	15.6

*p<.05. **p<.01.

were Hispanic (4% vs. 10%); on average, inconsistent users had more positive attitudes toward contraception and had had fewer sexual partners. A greater proportion of consistent users than of nonusers were low-risk (25% vs. 13%), and smaller proportions reported an other family structure (4% vs. 8%), were high-risk (40% vs. 52%) or had had a previous pregnancy (6% vs. 12%). On average, consistent users had higher cognitive ability and self-esteem, and more positive attitudes toward contraception than nonusers, but they had had a shorter sexual career and fewer sexual partners.

The only difference between contraceptive users' and nonusers' attitudes toward pregnancy was in regard to ambivalence. A significantly greater proportion of nonusers than of inconsistent users reported feeling ambivalent toward pregnancy (17% vs. 10%). In contrast, attitudes toward contraception were strongly associated with contraceptive use: Those who used contraceptives consistently had the most positive attitude, followed by those who used it inconsistently and, finally, nonusers.

In multinomial logistic regression analyses, female adolescents differed significantly in their odds of being inconsistent or consistent contraceptive users (versus nonusers) according to certain characteristics (Table 4, page 253). Low-risk status and having positive attitudes toward contraception were associated with increased odds of inconsistent or consistent contraceptive use (odds ratios, 1.6–2.1), and greater number of sexual partners was associated with decreased odds of contraceptive use (0.3–0.4). We found a curvilinear relationship between cognitive ability and likelihood of consistent and inconsistent contraceptive use, similar to that previously described for sexual debut.[16] Up to a point, greater cognitive ability increases the odds of using contraceptives, but for the smartest respondents, the likelihood decreases again. Thus, among the smartest adolescents, those who have sex tend to have risky sex. Most important, in comparison to respondents with mainstream attitudes toward pregnancy, those who felt ambivalent toward pregnancy had significantly reduced odds of using contraceptives inconsistently (0.4) or consistently (0.5).

In further analyses, we asked what differentiates consistent from inconsistent users (not shown). Pregnancy attitude was not significant. The only factor that was significantly associated with consistency was risk status: High-risk adolescents were less likely than middle-risk adolescents to be consistent rather than inconsistent users (0.6). This is interesting in light of our findings that being low-risk increased the odds of inconsistent use as opposed to no use. Being high-risk did not make respondents less likely to use contraceptives, but it made users less likely to be consistent users.

Attitude and Pregnancy

Respondents who became pregnant between Wave 1 and Wave 2 differed from those who did not in many respects (Table 5).* Greater proportions of adolescents who became pregnant than of those who did not were black or Hispanic, lived in an other family structure and were high-risk. On average, they had lower maternal closeness and cognitive ability scores, and their mothers were less educated. A greater proportion of respondents who became pregnant than of those who did not had had a prior pregnancy at Wave 1. In addition, they were far less likely to have used contraception: Fifteen percent of respondents who reported a pregnancy between waves used contraceptives consistently, compared with 57% of those who did not become pregnant. And although respondents who became pregnant were as knowledgeable about pregnancy avoidance as others, they more often were certain that they answered questions about pregnancy avoidance correctly when they

*Here, a number of small changes are introduced. Specifically, contraceptive consistency, as determined in the previous model, is included among the sexual characteristics; attitude toward contraception is excluded because of its redundancy with the consistency of use measure. To ensure the correct temporal order, we excluded the number of partners between waves because for respondents who became pregnant, it may have included relationships following the pregnancy.

TABLE 6. Odds ratios (and 95% confidence intervals) from logistic regression analysis predicting 15–19-year-old females' risk of pregnancy, by selected characteristics

Characteristic	Odds ratio
Social and demographic	
Age	
15 (ref)	1.00
16	0.91 (0.45–1.82)
17	0.88 (0.49–1.57)
18	0.97 (0.40–2.39)
Race/ethnicity	
White (ref)	1.00
Black	1.38 (0.86–2.23)
Hispanic	2.42 (1.30–4.50)**
Other	1.26 (0.54–2.96)
Maternal education	0.96 (0.86–1.08)
Poor/low-income	1.21 (0.67–2.19)
Family	
Family structure	
2 biological parents (ref)	1.00
≥1 stepparent	1.57 (0.91–2.73)
Single parent	2.05 (1.19–3.51)*
Other	1.86 (0.66–5.26)
Closeness with mother	0.84 (0.67–1.05)
Individual	
Religiosity	1.03 (0.45–2.36)
AHPVT	1.34 (1.07–1.68)*
AHPVT^2/100	0.99 (0.99–1.00)*
Risk status	
Middle (ref)	1.00
Low	1.43 (0.66–3.10)
High	1.13 (0.72–1.78)
Self-esteem	1.40 (0.82–2.39)
Socially isolated	1.00 (0.54–1.86)
Sexual	
Sexual career length	1.08 (0.96–1.21)
Duration of interwave period	1.08 (0.95–1.23)
Prior pregnancy at Wave 1	1.98 (1.06–3.71)*
Contraceptive use	
Consistent (ref)	1.00
Inconsistent	2.76 (1.46–5.22)**
None	11.39 (7.25–17.9)**
Knowledge about pregnancy avoidance	1.08 (0.93–1.25)
Unfounded certainty	1.15 (0.95–1.40)
Attitudes toward pregnancy	
Mainstream (ref)	1.00
Anti	0.77 (0.38–1.56)
Pro	0.96 (0.49–1.88)
Ambivalent	0.80 (0.45–1.45)

*p<.05. **p<.01. *Note:* ref=reference group.

were, in fact, wrong. There were no significant differences between the respondents who got pregnant and those who did not in their attitudes toward becoming pregnant.

In multivariate analyses, respondents' attitudes toward pregnancy were not significantly associated with the risk of pregnancy (Table 6). Living with a single parent doubled the odds, and being Hispanic more than doubled the odds of becoming pregnant between waves. Each increment in the AHPVT score increased the odds of becoming pregnant; as we observed in the analyses of contraceptive use, the relationship between cognitive ability and pregnancy is curvilinear. Contraceptive use was by far the most powerful predictor of pregnancy in the multivariate context: In comparison with consistent users, inconsistent users had 2.8 times and nonusers had 11.4 times the odds of becoming pregnant.

One would expect that respondents on polar ends of the opinion spectrum (i.e., those most opposed to and most in favor of pregnancy) would differ from each other in their risk of pregnancy. To assess this possibility, we used a Wald test for the equality of their respective coefficients in the pregnancy model. The result was nonsignificant, suggesting that attitudes toward pregnancy do not affect the likelihood of its occurrence. Finally, we constructed a model without the contraceptive consistency measures to test whether attitudes toward pregnancy were mediated by contraceptive use. The attitude coefficients did not change, and they did not become significant. Consequently, we found no support for the idea that such indirect effects were operating, and no evidence that pregnancy attitudes influence adolescent pregnancy outcomes via contraceptive behavior.

DISCUSSION

This study suggests that sexually experienced adolescents' attitudes toward pregnancy do not influence their subsequent risk of pregnancy. Because this finding appears to contradict previous research,[17] we conducted extensive sensitivity analyses. The difference rests on the definition of our sample, which excludes adolescents who had never had sex. Thus, the findings are not contradictory; rather, our results elaborate on the previous findings.

The results reported here are robust across multiple specifications. Specifically, more stringent criteria for defining the propregnancy and antipregnancy groups did not affect the association between attitudes and contraceptive consistency or pregnancy in multivariate analyses. Attempts to represent pregnancy attitudes through any alternative uses of the five survey questions about pregnancy also failed to change our results. Likewise, a summary index that averaged responses to all five questions bore no relationship to pregnancy. Finally, representing pregnancy attitudes as categorical variables did not alter the conclusions. The results are not an artifact of our measurement of pregnancy attitudes. In contrast, attitudes toward contraception have a strong impact on contraceptive use and, therefore, a strong impact on pregnancy.

Pregnancy attitudes appear to be subtly linked to contraceptive use, insofar as respondents with ambivalent attitudes are less likely than respondents with mainstream attitudes to practice contraception. Our definition of ambivalence is intended to capture the failure to form an opinion, rather than the presence of conflicting opinions. If ambivalent respondents were conflicted and merely less in favor of pregnancy than propregnancy respondents, the latter should be even less likely to use contraceptives. That they are not suggests that ambivalent respondents are a meaningfully distinct group. Their ambivalence does not represent the midpoint of a continuum of attitudes toward pregnancy, but rather absence from the continuum because of their inability to form an attitude at all. Because ambivalence about pregnancy is associated with contraceptive use, and contraceptive use is strongly associated with pregnancy, programs that focus on shaping attitudes

toward pregnancy can be effective. Still, attitudes toward contraception are by far the most important element.

Nevertheless, we cannot conclude that because we found no association between attitudes toward pregnancy and the risk of pregnancy that these attitudes are inconsequential. Attitudes toward pregnancy may express themselves by encouraging or discouraging respondents to have sexual intercourse.[18] In our sample, we find a strong bivariate association between attitudes toward pregnancy and being sexually experienced. Future research should examine this question with the appropriate prospective research design. Among respondents who have sex (the majority of adolescents in this age-group), variations in attitudes toward pregnancy do not predict the occurrence of pregnancy.*

The factor most strongly associated with the risk of pregnancy among young women is contraceptive use, with nonusers being significantly more likely than inconsistent and consistent users to become pregnant; this finding is consistent with the results from previous research.[19] Factors associated with contraceptive use (regardless of consistency) include cognitive ability, number of sexual partners, attitudes toward contraception, being ambivalent toward pregnancy and being low-risk. The only predictor of consistent contraceptive use, as opposed to inconsistent use, was risk status.

These findings have implications for future attempts to reduce adolescent pregnancy. First, they suggest that targeting the pregnancy attitudes of sexually experienced female adolescents is not likely to be an effective means of discouraging pregnancy. Respondents with the strongest antipregnancy attitudes were no more likely than other respondents to use contraceptives either inconsistently or consistently, and no less likely to become pregnant. In contrast, the more positive respondents' attitudes toward contraceptives, the higher the likelihood that they used them, either inconsistently or consistently rather than not at all. Therefore, pregnancy interventions that focus on attitudes should prioritize attitudes toward contraception over those toward pregnancy.

The way programs focusing on attitudes toward pregnancy can make a difference is by helping adolescents who are ambivalent about pregnancy to form any opinion—regardless whether it is positive, negative or mainstream. Adolescents without an opinion about pregnancy were less likely than others to use contraceptives, and because contraceptive use among sexually experienced respondents is important in preventing pregnancy, getting ambivalent adolescents to form an opinion about pregnancy may be one step toward pregnancy prevention.

Even so, having an attitude toward pregnancy may help adolescents use contraceptives sometimes rather than never, but may not be a factor in getting them to use contraceptives consistently. Of the measures included in our study, risk status was the only factor that distinguished consistent and inconsistent contraceptive users. This cluster of interrelated factors likely reflect adolescents' strikingly different conceptions of the world and their place within it. Many adolescent pregnancy reduction interventions that have focused on widening adolescents' experience and understanding of life opportunities have shown success.[20] Additional efforts in this vein ought to supplement campaigns to change attitudes toward pregnancy per se, because even if the latter succeed in changing attitudes, our results indicate that they may fail to change behavior.

*Previous research argues that the absence of a relationship between attitudes and behavior in social science research is due to an inexact correspondence between the measured attitudes and behavior in the action of interest, the target of that action or both (sources: Ajzen I and Fishbein M, Attitudinal and normative variables as predictors of specific behaviors, *Journal of Personality and Social Psychology,* 1973, 27(1):41–57; and Ajzen I and Fishbein M, Attitude-behavior relations: a theoretical analysis and review of empirical research, *Psychology Bulletin,* 1977, 84(5):888–918). In this study, the measured attitudes referred precisely to the action of interest; thus, the target is not relevant. However, the absence of a relationship between pregnancy attitudes and pregnancy risk may be in part the consequence of forced sex or rape. If respondents were raped, their attitudes toward pregnancy are not relevant for their risk of pregnancy. Add Health did not collect data that would allow us to assess this possibility.

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