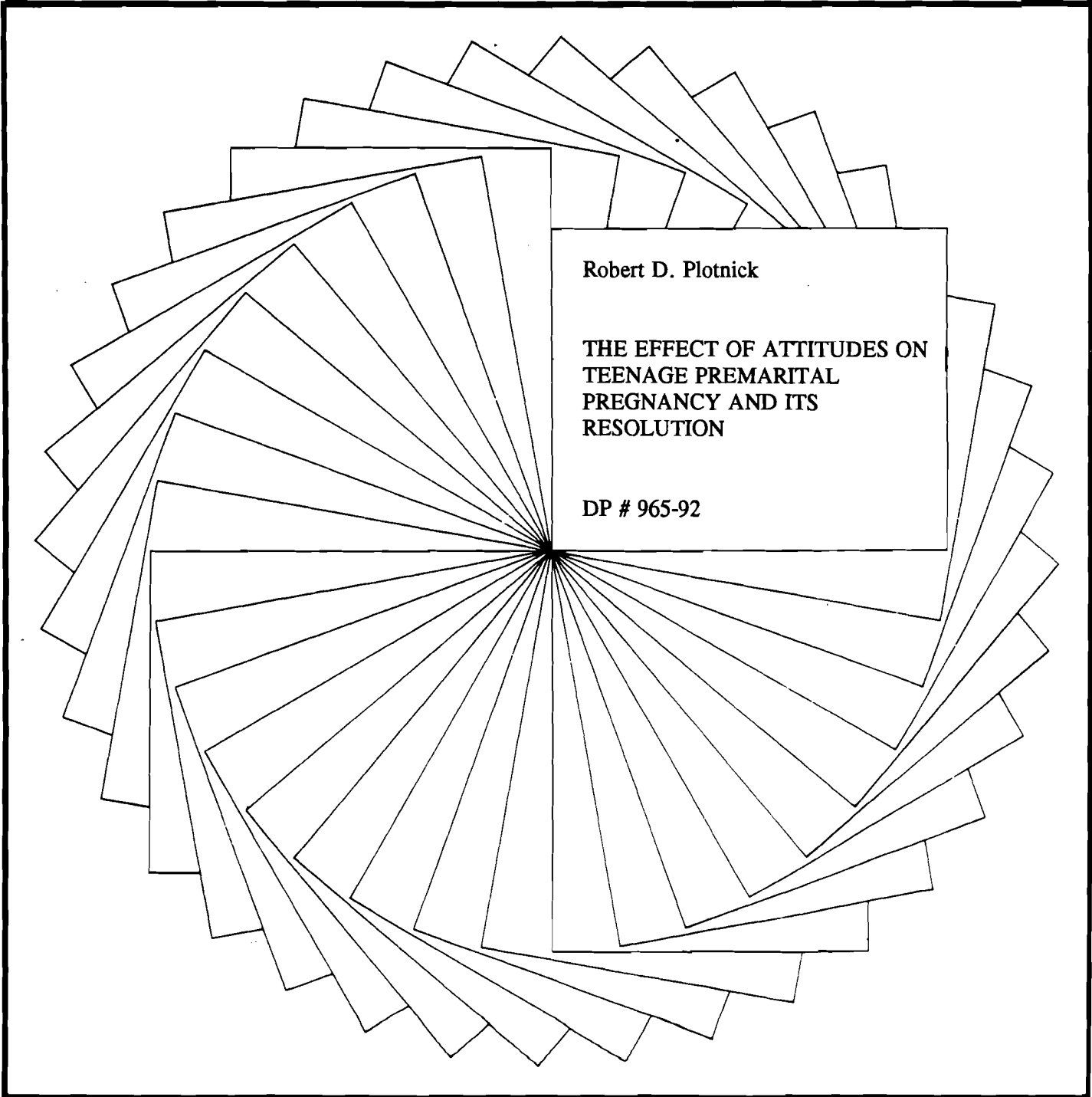




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THE EFFECT OF ATTITUDES ON
TEENAGE PREMARITAL
PREGNANCY AND ITS
RESOLUTION

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**The Effect of Attitudes on Teenage Premarital Pregnancy
and Its Resolution**

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Abstract

This study examines the influence of self-esteem, locus of control, and attitudes toward women's family roles and school on the probability of teenage premarital pregnancy and, given a pregnancy, whether it is resolved by abortion, having the birth premaritally, or marrying before the birth. The data are drawn from the National Longitudinal Survey of Youth and analyzed using the nested logit method. The evidence suggests that for both whites and blacks the four attitude variables are associated with premarital pregnancy and its resolution in the directions predicted by theory.

The Effect of Attitudes on Teenage Premarital Pregnancy and Its Resolution

Teenage premarital childbearing is associated with a number of negative consequences for both mother and child such as lower earnings and increased chances of poverty (Hofferth, 1987) and leads to substantial public costs for income support, health care, and social services (Burt with Levy, 1987). Because many observers believe that the adverse consequences are indeed caused by teenage premarital childbearing, and because teenage premarital childbearing violates mainstream norms, it emerged as a national concern during the 1980s and has remained the focus of heated debate. For these reasons and because the analysis of nonnormative behaviors has been of long-standing sociological interest, understanding the determinants of premarital childbearing can contribute to both public policy debate and social science.

Many social, economic, and psychological factors are likely to influence adolescent women's sexual behavior and, consequently, their chances of becoming premaritally pregnant and an unmarried mother. That these factors include attitudes and other psychosocial variables is an intuitively plausible proposition, and one that can be deduced from behavioral theory. Psychosocial variables may mediate the effects of family background and other personal characteristics, exert independent influence on premarital childbearing, or both. Improved knowledge about the relationships among attitudes, family background and other personal characteristics, and premarital childbearing will increase our understanding of the determinants of sexual and marriage behavior and of the mechanisms through which background characteristics influence such behaviors.

Using data from the National Longitudinal Survey of Youth (NLSY), this paper provides evidence on the relationship between teenage premarital childbearing and four psychosocial variables: self-esteem, locus of control, attitudes toward women's family roles, and attitudes toward school.¹ Recognizing that a premarital birth results from a premarital pregnancy followed by a decision to bear the child before marriage, the analysis examines the relationship of such variables to both premarital

pregnancy and its resolution. Along the way it explores plausible theoretical arguments why each of the four characteristics would tend to influence behaviors related to premarital childbearing and offers new evidence about the validity of models which predict that these attitudes affect behavior.

One strength of this study is its use of the NLSY. In contrast to the demographically skewed samples used in most other studies of this issue, the NLSY is a nationally representative data base containing high-quality, longitudinal data in which the attitudes were measured prospectively for the sample analyzed in this study. Findings derived from it, therefore, will avoid some methodological limitations of many other studies which have examined the strength of these same relationships. Moreover, this analysis is innovative in that it uses an integrated empirical framework based on the nested logit statistical technique. The advantages of this approach will be explained later in the paper.

CONCEPTUAL FRAMEWORK

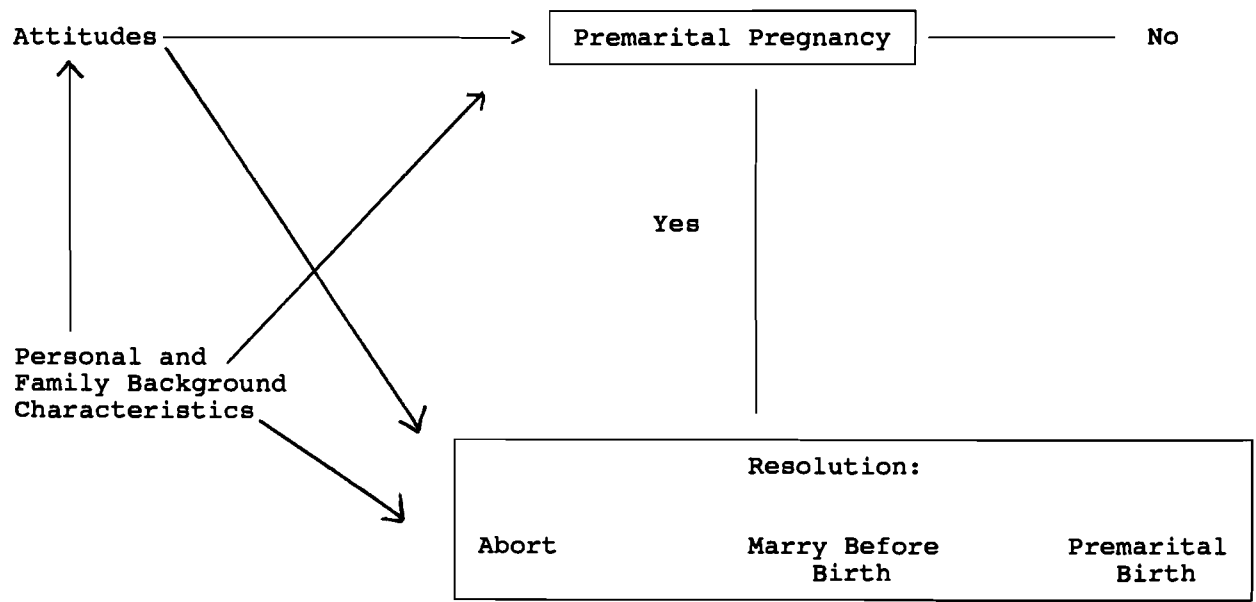
The Present Model

Figure 1 displays the general model that informs the empirical analysis. The process leading to a premarital birth divides into two major stages: becoming premaritally pregnant and, given a pregnancy, its resolution by abortion, carrying to term and marrying before the birth, or carrying to term and becoming an unwed mother.² Attitudes as well as family background and personal characteristics directly affect the likelihood of premarital pregnancy, abortion, and marriage. Additionally, attitudes are partly determined by family background and personal characteristics. This relationship may be one of the mechanisms through which such characteristics transmit their effect on adolescent sexual and marriage behavior.³

The model in figure 1 may be further elaborated by distinguishing between the personal attributes of self-esteem and locus of control, and attitudes about family roles and school. An individual's sense of self-esteem and locus of control may be well established by early childhood. A

Figure 1

Model of Attitudes, Premarital Pregnancy and Its Resolution



child's attitudes toward school and family roles will gradually develop as she experiences school and observes social relations, and may be partly determined by her self-esteem and locus of control. In such a model self-esteem and locus of control would have direct effects on premarital pregnancy and its resolution as well as indirect effects operating through attitudes about school and family roles.

The likelihood of premarital pregnancy depends on the initiation and frequency of sexual intercourse and efficacy of contraceptive use. The analysis is simplified by collapsing the consequences of these behaviors into one outcome--pregnancy. Thus, this study does not provide a fully exhaustive analysis of the process leading to premarital childbearing. Nonetheless, its examination of three resolutions to teenage premarital pregnancy distinguish it from previous analyses. In fact, only one other study of attitudes and behaviors related to premarital childbearing (Cvetkovich and Grote, 1980) examined even two outcomes.⁴

Models from Previous Studies: Self-Esteem, Locus of Control, and Paths to Premarital Childbearing

Though many attitudes may influence whether a young woman becomes premaritally pregnant and how she resolves such a pregnancy, the attitudinal variables analyzed in this study are necessarily limited to those available in the NLSY. Models of the relationship between psychosocial variables and behavior offer some predictions of the relationships between self-esteem, locus of control, attitudes toward women's family roles, and attitudes toward school and these outcomes.

Kaplan (1975) argues that persons with low self-esteem are more likely to engage in deviant behavior. Assuming that premarital pregnancy and childbearing qualify as deviant behaviors (because they occur among only a minority of adolescents and carry social disapproval), Kaplan's model implies that a young woman with low self-esteem will be more likely to become pregnant and bear a child outside of marriage.⁵ This implies that such a woman, once premaritally pregnant, will be less likely to abort and less likely to marry if she carries the pregnancy to term.

Teenage premarital childbearing among whites, while increasing, remains relatively unusual and generally is likely to be viewed as deviant behavior. Among blacks, teenage premarital childbearing is more widely accepted, seen in a positive light in some communities (Anderson, 1990), and is far more common.⁶ Thus, Kaplan's model is likely to predict whites' behavior better than blacks'. Indeed, its salience for explaining black behavior may be questioned.

Rotter's (1966) model implies that young women with an internal locus of control will be more likely to resist pressure to engage in sexual intercourse and, if they do have sexual relations, to be more effective contraceptors. Therefore, they would be less likely to become pregnant.⁷ By similar reasoning, one might expect that such young women would be more likely to terminate a premarital pregnancy, especially if the pregnancy is not wanted. Given prevailing, albeit weakening, norms in favor of childbearing within marriage, those with a stronger internal locus of control who carry to term are more likely to do so knowing they will marry the father.⁸

In an empirical model of the likelihood of premarital pregnancy, negative coefficients on scales that assign high values to persons with high self-esteem and external locus of control would be consistent with these arguments. In an empirical model of the resolution outcome, one would expect such scales to be positively associated with the likelihoods of abortion and marriage relative to the likelihood of becoming an unwed mother.

Theoretical Arguments: Premarital Childbearing and Attitudes toward Family Roles and School

Consider expectations about the relationship between attitudes on women's family roles and premarital childbearing. Young women with more liberated views may be more likely to reject the sexual double standard and engage in sexual activity. But since they have stronger career aspirations, they may tend to use contraceptives more diligently. A priori, the net effect on the likelihood of becoming pregnant will be a product of offsetting forces and, therefore, ambiguous. The career aspirations of young women with more liberated views make it more likely that they will obtain

abortions if pregnant (Brazzell and Acock, 1988); if abortion is rejected, however, they may be more willing to pursue single parenthood.

Last, following a similar line of thought in Hanson, Myers, and Ginsburg (1987), one can argue that young women with more favorable attitudes toward school will tend to have long-term goals and aspirations that would help them resist pressures to become sexually involved or at least make them more careful contraceptors. Moreover, if young women with such attitudes do engage in sexual activity and become pregnant, they would probably be more likely to have an abortion than bear the child. The expected relationship with the other two resolution outcomes is less clear. Marriage to a supportive husband might help the mother-to-be attain her long-term goals. But if the father appears to be self-centered or expects his wife to fulfill traditional roles, or if a marriage looks likely to be troubled and unstable, she may view marriage as an obstacle. A pregnant adolescent with long-term aspirations and in the latter situations might decide to remain single. Thus, there is no clear-cut expectation about the effect of school attitudes on marriage.

Measures of self-esteem, locus of control, attitudes toward family roles, and attitudes toward school do not directly indicate a young woman's attitudes about premarital intercourse, contraceptive use, abortion, marriage, or other specific behaviors that are directly involved in the steps leading to a premarital birth. It may be that these four variables affect premarital pregnancy, abortion, and marriage outcomes mainly by influencing attitudes about these specific behaviors, which in turn help determine the outcomes. A more complete model would include the latter attitudinal variables along with the four discussed here, allowing estimation of direct and indirect effects of the variables analyzed in this study.⁹ Again, the NLSY does not contain information on adolescents' attitudes and moral views about specific sexual behaviors and choices.¹⁰ The set of attitudinal variables analyzed in this study is necessarily limited to those available in the NLSY.

PREVIOUS RESEARCH ON ATTITUDES AND PREMARITAL CHILDBEARING

Studies investigating the influence of attitudes on adolescent premarital childbearing have taken one of two broad approaches. Some examined one of the behaviors that lead to a teenager having a child out-of-wedlock. The sequence of choices, which may be explicit or implicit, active or passive, is: whether to initiate sexual activity; whether to continue it; whether to practice contraception and, if so, how diligently; and once pregnant, whether to abort, marry the father, place the child for adoption, or bear the child as an unmarried mother. Studies taking this approach include Cvetkovich and Grote (1980), Brazzell and Acock (1988), and Morrison (1989). Cvetkovich and Grote examined initiation and contraceptive use; Morrison looked at contraceptive efficacy; Brazzell and Acock looked at anticipated choices about aborting a premarital pregnancy.

Other studies instead adopted a reduced-form approach to examine factors associated with teenage pregnancy (Robbins, Kaplan and Martin, 1985; Walters, Walters, and McKenry, 1986), or out-of-wedlock childbearing (Abrahamse, Morrison, and Waite, 1988; Hanson et al., 1987). A reduced-form model investigates factors which influence the final outcome of interest but does not identify the particular decision point (or points) where each factor exerts its influence. Thus, results from such a model show the net impact of each factor's direct and indirect effects on the final outcome.

To support the inference that attitudes affect the likelihood of premarital pregnancy and its resolution, it is necessary to control for other factors that directly affect teenage sexual behavior and may be correlated with (and partly determine) attitudes. While no study has had data on every factor which might confound the relationship between attitudes and behavior, one can have more confidence in the findings of those which conducted multivariate analyses to control for such factors, and little in those that did not. Thus, this review encompasses only multivariate studies.¹¹

To draw inferences about the effect of attitudes, it is also necessary to measure them before the pregnancy occurs. Otherwise, any statistical association may reflect the impact of the pregnancy or birth on attitudes, rather than the reverse. Cross-sectional data, which obtain attitude and outcome information at the same point in time, make it difficult to identify the nature of the causal links between attitudes and behavior. Unfortunately, much of the research discussed below has used cross-sectional data instead of more appropriate longitudinal data.

While theoretical analyses predict that self-esteem, locus of control, and attitudes toward family roles and school will affect behavior linked to premarital childbearing, empirical evidence is scanty and has yielded mixed results. Adolescent girls identifying with "liberated" family and gender roles were less likely to initiate sexual activity (Cvetkovich and Grote, 1980), tended to be more effective contraceptors (Morrison, 1989), and were more likely to claim they would resolve a premarital pregnancy with abortion (Brazzell and Acock, 1988).¹² Because these behaviors all reduce the likelihood of premarital childbearing, the extant evidence is unambiguous--liberated attitudes have tended to reduce premarital childbearing.

Self-esteem, locus of control, and attitudes toward school have been less fully studied. The available evidence has shown weak or no connections between these three attitudes and premarital childbearing. Cvetkovich and Grote's (1980) survey of 684 adolescents sampled from three cities showed no effect of self-esteem on initiation of sexual activity but found that higher self-esteem improved contraceptive efficacy.¹³ A careful reduced-form study by Robbins et al. (1985) generally found an insignificant relationship between self-esteem and the probability of becoming pregnant before marriage. Vernon, Green, and Frothingham (1983) reported a similar finding in both a bivariate and discriminant analysis.

Several reduced-form studies showed little impact of locus of control. Hanson et al. (1987) found a significant association between internal locus of control and lower premarital childbearing

among whites, but not blacks. Their use of longitudinal data from the nationally representative High School and Beyond Survey overcame the limitations of cross-sectional surveys and small nonrepresentative samples. Robbins et al. (1985) and Walters et al. (1986) found no relationship between locus of control and premarital pregnancy. The one study of locus of control and contraceptive behavior, Morrison (1989), also found no relationship.

Only Cvetkovich and Grote (1980) examined attitudes toward school. The authors found no relationship between liking school and initiation of sexual activity. They reported a relationship between liking school and being a better contraceptive user for blacks girls, but not for boys or white girls.

The reliance on small or local samples and nonprobability sampling methods in all of the studies except Hanson et al. (1987) has restricted generalization. In addition, cross-sectional designs have confounded the causal links between attitudes and behavior in several of the studies. Only Hanson et al. (1987), Robbins et al. (1985), and Vernon et al. (1983) measured attitudes that existed before the behavior of interest had occurred. In the other studies the data were collected from each respondent at one point in time, so causal links between attitudes and behavior may have been running in both directions. By using a national data base with attitude measures obtained before premarital childbearing had occurred, this study avoids these methodological problems.

These prior studies either adopted the reduced-form approach by examining the outcome of bearing a premarital child without identifying where an attitude influenced a particular behavior, or sought to isolate the effect of attitudes on one of the behaviors in the process leading to a premarital child without integrating the analysis with other aspects of the premarital childbearing process. One innovation of this study is to analyze the influence of attitudes on both the likelihood of a premarital pregnancy and its resolution with an integrated empirical framework based on the nested logit statistical technique.

METHODS

Data and Sample

The primary data source is the National Longitudinal Survey of Youth (NLSY).¹⁴ The NLSY is a multistage stratified probability sample of 12,686 persons aged 14 to 21 when first interviewed in 1979. Reinterviews have been conducted annually. Using a national data base overcomes one important problem of much previous work.

The NLSY provides data on the psychosocial attitudes discussed below, and on family background and personal characteristics. Most of the data on attitudes were gathered in 1979. Young women who were in their late teens or early twenties in 1979 were increasingly likely to have experienced a premarital birth or pregnancy. Attitudinal data measured in 1979 might have been endogenous to this behavior, so such women are excluded from the analysis. The sample is restricted to girls aged 14 to 16 in 1979 who at that time reported never being married and never having had a child. For the vast majority of the sample, attitudes are measured before premarital pregnancy and childbearing occur, so any statistical association between these variables is more likely to be indicative of a causal connection.¹⁵ This aspect of the sample mitigates a second problem of many earlier studies.

Each adolescent's fertility and marital history is followed from the first year she appears in the sample through age 19 (i.e., from 1979 until, depending on her age, 1982, 1983, or 1984). Thus, the study focuses on premarital pregnancy and its resolution during the teenage years. Only first premarital pregnancies are examined. Because racial differences in rates of premarital childbearing are large and appear to be determined by different social processes, the study analyzes separately non-Hispanic whites and non-Hispanic blacks (hereafter referred to simply as whites and blacks). The sample contains 1142 white females, 506 blacks.¹⁶

In the sample, adjusting for sampling weights, the teenage pregnancy rate among whites was 20 percent. Of these, 9 percent ended by miscarriage or stillbirth. Of the pregnancies that continued, 39 percent were aborted, 29 percent resulted in premarital births, and 32 percent resulted in births to women who married between conception and birth. The net result was that 5 percent of the whites in our sample had premarital births. The corresponding pregnancy, miscarriage/stillbirth, abortion, unmarried mother, and married mother figures for blacks in the sample were 42, 10, 12, 83, and 5 percent, which netted to a premarital birth rate of 32 percent.

Many fewer abortions are reported in survey data than are recorded in medical records. The extent of underreporting is especially severe for blacks, exceeding 80 percent when compared to Vital Statistics data and information compiled by the Alan Guttmacher Institute.¹⁷ Because the reported stillbirth and miscarriage rate nearly matches that based on medical records, it appears that few black abortions are being reported as one of these socially more acceptable terminations. They are simply not being reported in the NLSY. Such extensive underreporting greatly reduces the number of cases in the black resolution model, and especially reduces those with the outcome of having an abortion. Because unreported abortions are also unreported pregnancies, it also affects the sample available for estimating determinants of premarital pregnancy.

Underreporting would not necessarily lead to biased coefficients on the attitude variables if the choice to underreport is not systematically correlated with such variables. However, one might expect, for example, that an adolescent with more traditional views on family and gender roles would be more reluctant to report having had an abortion. Thus, estimates of pregnancy and resolution models for blacks are likely to be unreliable, and, consequently, findings from such models for blacks will not be reported. The last part of the section on statistical methods suggests an alternative strategy that circumvents the underreporting problem and allows estimation of findings for blacks, but requires using a simpler, conceptually less attractive model.

Teenage whites report nearly two-thirds of their abortions.¹⁸ Thus, the models of pregnancy and resolution choice are less likely to suffer from any problem associated with underreporting. The rate of marriage among whites in the NLSY who become premaritally pregnant and do not abort is slightly higher than that obtained from the Current Population Survey for 1980-1981 (reported in Hofferth and Hayes, 1987, p. 450).

Explanatory Variables

The NLSY includes responses to the ten-item Rosenberg Self-Esteem Scale, a four-item subset from the Rotter scale of locus of control, and two series of questions on women's family roles and on attitudes toward school. Respondents answered the self-esteem items in 1980 and all other items in 1979. The appendix table provides details on the construction of each attitude measure.

The Rosenberg Self-Esteem Scale contains ten statements of approval and disapproval with which respondents are asked to strongly agree, agree, disagree, or strongly disagree. High scores imply high self-esteem. Cronbach's alpha on this scale for the sample is .823.

The NLSY provides responses on four paired items adapted from the Rotter scale for locus of control. The scale measures the extent to which persons believe they have control over their lives through self-motivation and self-determination (internal control) as opposed to the extent that chance, fate, or luck controls their lives (external control). High scores correspond to an internal locus of control. Cronbach's alpha is only .271. Given the low reliability of the scale, estimates of its impact must be treated cautiously.

Six items on women's roles are used to form a scale measuring attitudes toward family and gender roles. The items deal with the conflict between work outside the home and successful fulfillment of the family roles traditionally held by women. High scores signify more "liberated" attitudes; low scores imply more traditional views. Cronbach's alpha for the scale equals .719.

A ten-item scale measures attitudes toward school. The items assess how satisfied an individual feels about her schooling experience. Positive attitudes result in higher scores on the scale. Interitem reliability is .665.

Table 1 provides summary statistics on the four attitude scales. The means and standard deviations are similar for the white and black samples. The simple correlations among the scales are surprisingly low. None exceeds 0.29 and most are less than 0.15.

Besides the attitude scales, all models include several personal and family background characteristics shown to be significantly associated with premarital pregnancy and its resolution by other research (Hofferth and Hayes, 1987: chapters 1, 3, and 4). Since these characteristics are likely to be correlated with attitudes, not including them would produce biased coefficients on the attitude variables. Moreover, by comparing models which include only background characteristics to those that include both background characteristics and attitudes, we can assess the extent to which attitudes mediate the relationship between such characteristics and premarital pregnancy and its resolution.

The controls are years of mother's education, number of siblings, and dummy variables for religion, religiosity, being born in the South, residing in the South at age 14, family structure at age 14, and whether an adult woman in the home (usually the mother) worked for pay when the respondent was 14.¹⁹ The first four controls measure characteristics as reported at the 1979 interview. The dummy variables for family structure distinguish among families with a mother as the only adult present, with a mother and stepfather present, and a residual "other family structure" category. The omitted category is a family with both natural parents present. For whites, religion is indicated with dummy variables for Catholic, Baptist, non-Baptist Protestant, and Jewish/other. The omitted category is "none." For blacks the small number of cases in some of these categories required that only one religion dummy, Baptist or not, be used. Religiosity is indicated by dummy

TABLE 1**Means, Standard Deviations, and Correlations of Attitude Variables**

	Mean	S.D.	Correlation Matrix		
			LC	F/GR	SCH
<u>Whites</u>					
Self-esteem	31.5	4.1	.24	.14	.20
Locus of control (LC)	11.0	2.3		.11	.10
Family/gender role attitudes (F/GR)	18.0	3.0			-.06
Attitude toward school (SCH)	31.8	4.0			
<u>Blacks</u>					
Self-esteem	32.4	3.9	.19	.29	.08
Locus of control	10.6	2.2		.14	.06
Family/gender role attitudes	17.7	3.0			.01
Attitude toward school	31.9	4.1			

Source: National Longitudinal Survey of Youth.

variables for the frequency of attendance at religious services. Since there are separate models for blacks and whites, the results implicitly embody complete interaction effects for race as well.²⁰

Statistical Methods

The sequence of outcomes illustrated in figure 1 fits naturally into a two-stage nested logit framework. The standard nested logit model is derived from the conditional logit model. In the conditional logit model all explanatory variables are characteristics of the alternative choices facing an individual in the sample. In this application, though, the variables are either background characteristics or attitudes, which are attributes of the individual. The nested logit approach can be modified for such a situation in a straightforward way.²¹

One can estimate a nested logit model by considering the decision stages sequentially. Denoting these as i (premarital pregnancy) and j (resolution), the probability of a final outcome is

$$P_{ij} = P_{j|i} * P_i$$

Let the value of a final outcome be

$$U_{ij} = V_{ij} + e_{ij}$$

where V_{ij} is a function of measured characteristics and e_{ij} is a residual.

The model in figure 1 has four possible final outcomes: no premarital pregnancy, abortion, marital birth, and premarital birth. In a standard logit framework, their values can be specified as follows:

No premarital pregnancy	$V_N = aX$
Pregnancy - Abortion	$V_A = bX$
Pregnancy - Marital Birth	$V_M = cX$
Pregnancy - Premarital Birth	$V_{PB} = dX$

where the vector X includes both attitude and background characteristics.

In nested logit, the e 's are assumed to have a generalized extreme value distribution rather than the independent extreme value distribution of multinomial and conditional logits. This specification permits correlation among the residuals of alternative choices and thus avoids the independence-of-irrelevant-alternatives property of standard logit models.

The model can be estimated in two stages, beginning with the resolution level. This sequential procedure is simple to compute and yields consistent estimates of the parameters. In the first stage the probability of abortion, conditional on a pregnancy, is a function of the parameters in vectors b , c , and d . Normalizing d to zero:

$$Prob (A | Pregnancy) = \frac{\exp[bX/(1-f)]}{1 + \exp[bX/(1-f)] + \exp[cX/(1-f)]}$$

where f is an index of similarity of the choices at this level (Maddala, 1983), and the parameters in vectors b and c can be estimated up to a scale factor $1 - f$. The probability of a marital birth is similarly expressed.

The results from the resolution stage are used to calculate an "inclusive value" for the pregnancy stage:

$$I_p = \log (\exp[bX/(1 - f)] + \exp[cX/(1 - f)])$$

Then, from the pregnancy outcome, one estimates the parameters in vector a . The probability of pregnancy is:

$$Prob (P) = \frac{\exp[(1-f)IP]}{\exp[(1-f)IP] + \exp[aX]}$$

If the coefficient on the inclusive value equals one (i.e., $f = 0$), the model reduces to a standard multinomial logit, so the nested structure can be tested against this alternative.

In a nested logit model one must interpret the coefficient on an individual characteristic with care. It shows the effect of that characteristic on the value of an outcome relative to an omitted

outcome. The estimation is set up so that, for example, the two coefficients on "self-esteem" in the first stage show the impact of a one-unit change in the self-esteem index on the values of aborting and of having a marital birth relative to having a premarital birth.²² Similarly, in stage two the coefficients show the impact on the value of becoming pregnant.

As observed earlier, the severe underreporting of abortions and, consequently, of pregnancies by blacks meant that findings from a nested logit model would be too unreliable to warrant reporting. To provide some evidence on the effect of attitudes on black behavior, and to see if the modest level of underreporting among whites may have biased estimates of the premarital pregnancy and resolution models, I estimate a simpler model with three outcomes.²³ A "no birth" outcome is constructed from three real outcomes: no premarital pregnancy, a pregnancy followed by a reported abortion, or a pregnancy followed by an unreported abortion, which will appear in the data as no pregnancy. The other two outcomes are having a premarital child or marrying before a premaritally conceived child is born. These three exhaust the possibilities.

Because births and marital status are well reported, none of the outcomes in this coding scheme should be underreported, so this problem should not bias the estimates. The price for this, of course, is that fewer outcomes are examined and the behavioral meaning of any estimated impact of attitudes on the "no birth" outcome is harder to interpret. The model is estimated using standard multinomial logit instead of nested logit and has the same set of control variables. In the white sample, 88.4 percent had the outcome "no birth," 5.6 percent had a premarital birth, and 6.0 percent married before a premaritally conceived child was born. In the black sample the corresponding percentages were 64.1, 33.6, and 2.2.

FINDINGS

Nested Logit Results

Consider first findings for whites from a nested logit model containing the four attitude measures, but excluding personal and family background characteristics. These estimated gross effects in table 2 suggest that attitudes influence the likelihood of premarital pregnancy and how it is resolved. Higher self-esteem shows a statistically significant association with a greater likelihood of aborting such a pregnancy relative to having a child out-of-wedlock, but not with having a marital birth relative to having a child out-of-wedlock. Higher scores on locus of control (reflecting stronger internal locus of control) are significantly associated with lower rates of premarital pregnancy.

Girls with more liberated views of women's family and gender roles (represented by larger scores) have higher rates of abortion relative to having a child out-of-wedlock. Last, a more positive attitude towards school is associated with lower rates of pregnancy and higher rates of abortion.

Turn now to table 3, which provides the coefficients on attitude variables derived from the more complete nested logit model that controls for personal and family background characteristics.²⁴ (Findings for the background and personal characteristics are discussed later.) The estimates provide evidence that attitudes do influence behaviors that lead to or forestall premarital childbearing, and that the directions of influence are consistent with theoretical expectations.

The five coefficients that are statistically significant in table 2 remain so in table 3. As one might anticipate, including the background variables generally reduces the coefficients' magnitudes. All five have the signs predicted by the models and theoretical arguments considered earlier.

Higher self-esteem is not related to the probability of becoming premaritally pregnant. It is significantly related to a higher likelihood of abortion relative to resolving a premarital pregnancy by bearing the child and either marrying or not, but does not distinguish between marriage outcomes. Overall, then, the estimates suggest that girls who score higher on self-esteem are less likely to

TABLE 2

**Effects of Attitudes on Teenage Premarital Pregnancy
and Its Resolution among Whites, No Control Variables
(Standard Errors in Parentheses)**

	Become Premaritally Pregnant	Resolution	
		Abort	Marry before Birth
Self-esteem	-.027 (.026)	.136** (.030)	.020 (.031)
Locus of control	-.112** (.021)	-.018 (.048)	.084 (.049)
Family/gender role attitudes	.002 (.027)	.183** (.037)	-.028 (.036)
Attitude toward school	-.087** (.021)	.081** (.027)	.042 (.027)
Log-likelihood	-1856		-689
Chi-squared	1790		184
N	1016		201

Source: Computations by author based on National Longitudinal Survey of Youth.

Notes: Model is estimated using the sample weights. The weights are rescaled to sum to the raw sample size to avoid inflating the t-statistics. The omitted outcome is giving birth out-of-wedlock.
** = Significant at 1% level.

TABLE 3

**Effects of Attitudes on Teenage Premarital Pregnancy and Its Resolution
among Whites, Controlling for Personal and Background Characteristics
(Standard Errors in Parentheses)**

	Become Premaritally Pregnant	Resolution	
		Abort	Marry before Birth
Self-esteem	-.011 (.019)	.157** (.035)	.043 (.035)
Locus of control	-.101** (.022)	-.086 (.059)	.034 (.058)
Family/gender role attitudes	.024 (.017)	.134** (.046)	-.026 (.044)
Attitude toward school	-.074** (.014)	.068** (.031)	.044 (.032)
Log-likelihood	-1795		-619
Chi-squared	1910		325
N	1016		201

Source: Computations by author based on National Longitudinal Survey of Youth.

Notes: Model is estimated using the sample weights. The weights are rescaled to sum to the raw sample size to avoid inflating the t-statistics. For each outcome the model also included a constant term and controls for family structure, mother's schooling, presence of a working adult female, number of siblings, southern birth, southern residence, religion, and religious attendance. The omitted outcome is giving birth out-of-wedlock.

** = Significant at 1% level.

become unwed mothers. Stronger internal locus of control has a significant negative effect on the likelihood of pregnancy and thus with lower rates of premarital childbearing. It is not related to the resolution outcome.

More liberated attitudes on family and gender roles show no relationship with the likelihood of premarital pregnancy. This may mean such attitudes have offsetting effects on sexual activity and contraceptive use, or little effect on both. Premaritally pregnant adolescents with more liberated attitudes are more likely to abort. If they choose to carry to term, their attitudes do not distinguish between those who marry and those who become unwed mothers. Overall, more liberated attitudes concerning family and gender roles are associated with lower rates of premarital childbearing. Adolescents with more positive attitudes toward school are less likely to become premaritally pregnant. If pregnant, they are more likely to resolve it by abortion. There is no effect on the likelihood of marriage if they carry to term.

Attitudes are likely to be more strongly related to outcomes that are more fully under a young woman's control. If so, one would predict the strongest relationship on the likelihood of choosing abortion (there was relatively free access to abortion in the early 1980s), followed by the likelihood of becoming premaritally pregnant and then the marriage outcome. The columns of table 3 reveal such a pattern. In the resolution model three of the four variables are significantly related to choosing abortion relative to either marriage outcome. For the pregnancy model, two are significant. None is significantly associated with the choice to resolve a pregnancy by marrying relative to remaining single.

Do Attitudes Mediate the Effects of Personal and Family Background Characteristics? As observed earlier, there is ample evidence that family background and personal characteristics are significant determinants of the chances of premarital pregnancy and how it is resolved. Evidence that psychosocial variables mediate these effects would provide insight about the mechanisms through

which background characteristics influence sexual and marriage behaviors. Table 4, therefore, presents the coefficients on background characteristics obtained from a model that includes only such characteristics as well as those from a model that includes both background characteristics and attitudes.

A comparison of the coefficients suggests that attitudes do exert important mediating effects. In the pregnancy model the coefficients on 4 of the 8 background variables that are significant when no attitudes are included (column 1) decline in absolute value and become statistically insignificant when attitudes are added (column 2). Three others fall in absolute value but remain statistically significant. The coefficient on mother's education is essentially the same under both specifications. In the resolution estimates, of the 11 significant background variables in the model without attitudes, 5 become insignificant when attitudes are added. The other 6 slightly rise or fall in absolute value and essentially are unchanged by adding attitudes.

The relationships between family structure and the dependent variables appear different depending on whether attitudes are included. Including attitudes reduces the strength of the association between living with a stepfather and becoming premaritally pregnant but uncovers a significant association between this family structure and marriage. When attitudes are added, living in a mother-only family becomes a significant determinant in the pregnancy model, fades to an insignificant determinant of choosing abortion relative to becoming an unwed mother, and remains a stable determinant of the marriage outcome. The coefficient on "other" family structure in the pregnancy model becomes insignificant when attitudes are included. These findings indicate need for further research on the linkages between family structure and attitude formation.

Do Attitudes on School and Family and Gender Roles Mediate Self-Esteem and Locus of Control? Consider a model which posits self-esteem and locus of control causally prior to attitudes on family and gender roles and school, and specifies the nested logit equations to exclude the latter

TABLE 4

**Effect of Personal and Family Characteristics on
Teenage Premarital Pregnancy and Its Resolution among Whites
(Standard Errors in Parentheses)**

Characteristic	Resolution					
	Premaritally Pregnant		Abort		Married before Birth	
	No Attitudes	With Attitudes	No Attitudes	With Attitudes	No Attitudes	With Attitudes
Southern birth	.011 (.189)	.125 (.169)	-.771 (.416)	-.512 (.470)	-.134 (.396)	.016 (.435)
Southern residence	-.044 (.250)	-.318 (.189)	.872* (.434)	.594 (.478)	.911* (.414)	.546 (.440)
Stepfather	.632** (.164)	.418* (.175)	.289 (.384)	.488 (.440)	.618 (.362)	1.000* (.402)
Mother only	.155 (.189)	.339* (.154)	-.583* (.296)	-.447 (.311)	-1.310** (.343)	-1.185** (.351)
Other family structure	.804** (.303)	.364 (.276)	.520 (.656)	.584 (.743)	1.307* (.633)	1.465* (.721)
Adult female worked	.652** (.250)	.215 (.203)	1.466** (.226)	1.655** (.256)	.897** (.221)	.915** (.240)
Mother's education	-.081** (.029)	-.111** (.019)	.234** (.055)	.095 (.062)	-.002 (.047)	-.044 (.055)
Number of siblings	-.015 (.039)	.031 (.033)	-.193** (.059)	-.220** (.063)	-.176** (.061)	-.171** (.063)
Protestant	-.696** (.158)	-.600** (.166)	.223 (.414)	.030 (.470)	-.126 (.426)	-.464 (.471)
Baptist	-.175 (.189)	.088 (.178)	-.437 (.399)	-.166 (.448)	-.400 (.387)	-.494 (.424)

(table continues)

TABLE 4
(continued)

Characteristic	Resolution					
	Prenatally Pregnant		Abort		Married before Birth	
	No Attitudes	With Attitudes	No Attitudes	With Attitudes	No Attitudes	With Attitudes
Catholic	-.702** (.167)	-.459* (.183)	-.057 (.396)	-.354 (.446)	-.437 (.409)	-.772 (.445)
Jewish/other	-.680** (.224)	-.397 (.222)	-.603 (.453)	-.820 (.495)	-.803 (.446)	-1.067* (.483)
Poor attendance	.234* (.115)	.133 (.112)	.464 (.267)	.500 (.287)	.054 (.272)	.065 (.285)
Occasional attendance	.166 (.155)	.333* (.132)	-.734* (.307)	-.549 (.331)	-.275 (.290)	-.251 (.306)
Missing data on school attitude	NA	-1.744** (.380)	NA	.129 (1.027)	NA	-.408 (1.045)
Constant	.467 (.315)	3.271** (.759)	-2.159** (.746)	-8.725** (1.718)	.710 (.658)	-.868 (1.627)
Inclusive value	-.575 (.262)	-.087 (.182)	NA	NA	NA	NA

Source: Computations by author based on National Longitudinal Survey of Youth.

* = Significant at 5% level.

** = Significant at 1% level.

NA = Not applicable.

two variables.²⁵ Estimates of such a model suggest the direct impacts of self-esteem and locus of control are not mediated by attitudes on family and gender roles and school. Self-esteem remains insignificantly related to the likelihood of premarital pregnancy and to the likelihood of marrying. It remains significantly associated with the likelihood of abortion ($t = 4.6$) and its magnitude, .153, is virtually identical to that in table 3. Locus of control is still significantly associated with premarital pregnancy ($t = -3.7$) and its magnitude, -.082 is slightly smaller than that in table 3. As before, locus of control was not associated with any resolution outcome.²⁶

Multinomial Logit Results and the Effect of Underreporting of Abortion

Estimates for the three-outcome multinomial logit model, including findings for blacks, are in table 5. Comparing the results to those in table 3 provides evidence on whether underreporting of abortions distorts the nested logit results for whites. Recall that the three outcomes are no birth, having a premarital child, and marrying before a premaritally conceived child is born ("Marital birth" in the table). With multinomial logit, the coefficients for one outcome are normalized to zero and not reported. These are the "No birth" coefficients.

Consider the results for blacks in the lower panel of table 5. Neither coefficient on self-esteem is statistically significant. Locus of control is positively associated with having a marital birth, which implies a reduction in the relative odds of having a premarital birth. The two negative coefficients on family and gender role attitudes imply that more liberated views reduce the chances of having any type of birth relative to the no-child outcome. The statistically significant and larger magnitude of the "Marital birth" coefficient imply a reduction in the likelihood of this outcome relative to a premarital birth. School attitudes are not related to any outcome in this model.

The four patterns of coefficients for whites in table 5 are consistent with the nested logit ones. One implication of table 3 is that higher self-esteem reduces the likelihood of a birth. The two negative coefficients in table 5 imply that the likelihood of either type of birth declines as self-esteem

TABLE 5

**Multinomial Logit Estimates of the Effect of Attitudes
on Adolescent Fertility-Marital Outcome
(Standard Errors in Parentheses)**

	Marital Birth	Premarital Birth
<u>Whites</u>		
Self-esteem	-.055 (.034)	-.092* (.044)
Locus of control	-.063 (.062)	-.128# (.075)
Family/gender role attitudes	-.058 (.047)	-.032 (.058)
Attitude toward school	-.056# (.034)	-.084* (.042)
Log-likelihood		-379
Chi-squared		126
N		1072
<u>Blacks</u>		
Self-esteem	-.008 (.103)	-.010 (.030)
Locus of control	.356* (.163)	-.004 (.049)
Family/gender role attitudes	-.236* (.122)	-.058 (.038)
Attitude toward school	.018 (.093)	-.003 (.028)
Log-likelihood		-301
Chi-squared		71
N		472

Source: Computations by author based on National Longitudinal Survey of Youth.

= Significant at 10% level.

* = Significant at 5% level.

** = Significant at 1% level.

increases. The larger, significant coefficient in column 2 means that a premarital birth is less likely than a marital birth. This is consistent with the positive (but insignificant) relationship in table 3 between self-esteem and the odds of marrying before the birth.

Similarly, the negative relationship between locus of control and a premarital birth in table 5 is consistent with this variable's negative relationship to premarital pregnancy in table 3. The negative relationships in table 5 between school attitude and both marital and premarital births are consistent with table 3's evidence that this attitude tends to reduce the likelihood of premarital pregnancy and raise the likelihood of abortion.

Finally, for family and gender role attitudes, note that the nested logit estimates only show a positive relationship with abortion. This implies a negative relationship with the likelihood of having a birth. The two negative coefficients on family and gender role attitudes in table 5 imply that more liberated views reduce the chances of having either a premarital or marital birth relative to the no-child outcome. Neither coefficient is statistically significant, but this may well have occurred because the no-birth outcome combines the abortion outcome, where a significant effect appeared, and the pregnancy outcome, where it did not. Because the two coefficients are not statistically different from each other, they are consistent with the nested logit finding of no relation between family and gender role attitudes and marital choices.

This alternative statistical model, then, suggests that underreporting of abortion does not distort estimates of the relationships between attitudes and white adolescents' outcomes. This strengthens the confidence one can place in the finding that the attitudes analyzed here are significantly related to premarital pregnancy and how it is resolved.

The white and black estimates both find significant relationships between attitudes and outcomes, always in the expected direction. The pattern of relationships differs, though. None of the significant attitude-outcome coefficients for whites also are significant for blacks, and vice versa.

That the patterns are not identical is hardly surprising. Unmeasured differences in culture, family background, personal and community values, and the socioeconomic environment may well lead to different estimated responses to the same measured explanatory variables.

DISCUSSION

Comparison of Findings

By using multivariate methods and a national data base, and measuring attitudes prior to the occurrence of a premarital birth, the analysis avoids some of the methodological problems in many earlier studies. How do its findings differ from or agree with earlier ones?

Earlier studies of self-esteem and premarital childbearing yielded mixed results. Most found no effect; one found that higher self-esteem improved contraceptive use, which lowered the likelihood of premarital pregnancy. In disagreement with the latter, this study finds no effect on pregnancy for whites and no significant relationships at all in the multinomial logit model for blacks. However, it provides new evidence that self-esteem is related to white premarital childbearing through its association with abortion behavior.

The significant association between internal locus of control and lower rates of premarital pregnancy for whites conflicts directly with the insignificant findings in the pregnancy analyses of Robbins et al. (1985) and Walters et al. (1986).²⁷ It also indirectly conflicts with the insignificant effect in Morrison's (1989) study of contraceptive behavior. But none of these studies examined racial groups separately. Given the racial differences in the relationships between attitudes and behavior identified here, this may be a source of the disagreement. Also, of the three only Morrison (1989) had a national data base, although its attitude measures were not obtained before the behavior of interest had occurred.

The finding for whites is consistent with Hanson et al.'s (1987) result that internal locus of control was associated with a lower likelihood of premarital childbearing. Their study also used separate racial samples and a longitudinal national data base. They did not, however, identify the route through which locus of control influenced premarital childbearing among whites. Table 3 suggests that it is largely through the pregnancy outcome. The finding in table 5 that locus of control is related to marriage and, hence, premarital childbearing among blacks, however, does not agree with the insignificant result in Hanson et al. (1987).

This study's evidence that more liberated attitudes on women's family and gender roles increase the likelihood of abortion is consistent with Brazzell and Acock's (1988) earlier work. Because no other work examines whether such attitudes reduce marriage among premaritally pregnant adolescents who do not abort, the evidence of such an impact among blacks lacks a point of comparison.

Other studies found liberated girls less likely to initiate sexual activity (Cvetkovich and Grote, 1980) and more likely to practice effective contraception (Morrison, 1989). These tendencies would reduce the chances of premarital pregnancy. It is surprising, then, that this study finds insignificant effects of these attitudes on premarital pregnancy. However, those other studies' samples either were not nationally representative or were cross-sectional in design, which may explain the divergent findings.

The one other analysis of school attitudes (Cvetkovich and Grote, 1980) found positive attitudes did not lead to better contraception for whites. This is inconsistent with the significant negative effect on pregnancy in table 3. It also reported a significant relationship between such attitudes and better contraception among blacks. This would tend to reduce premarital pregnancy. No significant effect appears in table 5 but because the no-birth outcome is a product of both

pregnancy and abortion behavior, an impact on pregnancy may have been obscured by other behavioral responses.

Illustrative Calculations

The substantive meaning of a logit coefficient is difficult to interpret because it does not directly translate into a change in probability. Table 6 illustrates in a simple way the effects of differences in attitudes for the white sample. I use the nested logit estimates to impute the probability of pregnancy and the conditional probability of bearing the child out-of-wedlock for each member of the sample, given her background characteristics and observed scores on the attitude measures. Multiplying these two probabilities yields the unconditional probability of having a premarital child. Averaging the results over the sample yields row 1 of the table.²⁸

The other rows show what happens to the means when each young woman's attitude score is raised or lowered by one standard deviation. The findings are akin to showing standardized coefficients from the standard linear model. In running these simulations, no score is allowed to exceed the maximum or fall below the minimum possible score on the scale.

The baseline simulation in row 1, based on observed attitude scores, shows mean probabilities of pregnancy and not marrying of .195 and .294, and a mean unconditional probability of having a premarital birth of .062. Rows 2 and 3 illustrate the effect of changes in self-esteem. A one standard deviation increase lowers the likelihood of each outcome and lowers the mean unconditional probability to .051. The impact on not marrying is larger than on pregnancy. Similarly, a one standard deviation decrease in self-esteem raises the mean unconditional probability to .074.

Rows 4 and 5 show that a one standard deviation change in the locus of control scale has a larger effect on pregnancy and a smaller effect on not marrying than that of the change in self-esteem. The net effect on the unconditional probability of premarital childbearing is the same as that for a one standard deviation change in self-esteem. Rows 6 and 7 reveal that changes in views on family and

TABLE 6

**Illustrative Effects of Attitudes on Outcomes Linked to
Premarital Childbearing among White Adolescents**

	<u>Mean Probability of:</u>		Mean Unconditional Probability of Premarital Birth
	Premarital Pregnancy	Not Marrying	
Baseline	.195	.294	.062
<u>Self-esteem</u>			
Increase 1 std. dev.	.186	.254	.051
Decrease 1 std. dev.	.205	.338	.074
<u>Locus of control</u>			
Increase 1 std. dev.	.164	.287	.051
Decrease 1 std. dev.	.231	.300	.074
<u>Family/sex role attitudes</u>			
Increase 1 std. dev.	.205	.293	.065
Decrease 1 std. dev.	.184	.291	.058
<u>Attitude toward school</u>			
Increase 1 std. dev.	.154	.263	.044
Decrease 1 std. dev.	.245	.329	.085

Source: See text, p. 28.

Notes: Baseline results use observed family background characteristics and scores on all attitude variables for a sample of 980 persons with complete data on all variables. Successive rows change one attitude in the direction indicated for all persons in the simulation sample, holding all other characteristics and attitudes at their observed values. A one standard deviation change in an attitude score is, in the order shown above, 4.1, 2.3, 3.0, and 4.0 points. Means are calculated using the sample weights.

gender roles generally have smaller effects than those for self-esteem and locus of control. The mean unconditional probabilities only change to .065 and .058.

Rows 8 and 9 show that a one standard deviation change in attitudes toward school shifts the unconditional probabilities to .044 and .085. These are the largest changes. Most of the effect acts by changing the probability of premarital pregnancy. The simulations suggest, therefore, that attitudes toward school have stronger influences on the likelihood of premarital childbearing than self-esteem, locus of control, or attitudes on family and gender roles.

CONCLUSION

The principal innovation of this study is the use of an integrated empirical framework to analyze the influence of attitudes on premarital pregnancy and its resolution via abortion, having the birth premaritally, or marrying sometime before the birth. Prior studies either examined the outcome of bearing a premarital child without identifying the particular stage (or stages) where an attitude exerts its influence, or sought to isolate the effect of attitudes on one of the behaviors that would precede having a premarital child without integrating the analysis with other aspects of the premarital childbearing process. Use of a national data base with attitude measures obtained before premarital childbearing occurs avoids methodological problems present in some earlier studies as well. The nested logit statistical model applied in this study is well suited for analyzing other social behaviors or processes for which the final outcome is determined by a hierarchical series of intermediate outcomes or choices.

What may we conclude about the relationship between attitudes and premarital childbearing from the evidence presented here and in earlier work? In view of the small number of studies that use multivariate methods to address this question and the mixed set of findings they contain, it is premature to draw firm conclusions. Nonetheless, the evidence currently supports the judgement that

self-esteem, attitudes toward family and gender roles, and attitudes toward school are associated with premarital pregnancy and its resolution and hence with premarital childbearing among adolescents. The significant associations in this and other studies that find them run in the directions predicted by theory. Some studies report insignificant associations, but none reports a significant association contrary to theoretical expectation. In addition, this study finds that attitudes are one of the mechanisms through which personal and family background characteristics transmit their influence on adolescent sexual and marriage behavior.

While most earlier studies did not find evidence that locus of control is related to premarital childbearing among whites, this study finds a significant estimate with the sign predicted by theory. The methodological advantages of this study may have uncovered such a relationship. However, the low reliability of the locus of control scale raises questions about the confidence one can place in this finding.

The estimates in table 3 suggest that attitudes mainly affect premarital childbearing by influencing the likelihood that a premaritally pregnant white teenager will abort. It makes sense that attitudes are most strongly related to the outcome that is most fully under a young woman's control. The young women analyzed here, however, may represent a unique cohort who entered adulthood in a time of relatively free access to abortion. In more recent years access has been abridged by parental notification and consent laws, restrictions on public funding of abortions, and a judicial ruling barring federally funded family planning clinics from discussing abortion with clients. Further abridgements are foreseeable. The findings, then, may not be generalizable to the extent that such policy and legal developments reduce the influence of personal attitudes on abortion choices. The findings do suggest, nonetheless, that attitudes tend to influence abortion choices if choice is relatively unconstrained.

There are plausible reasons why the attitudes analyzed in this study influence behaviors related to premarital childbearing. But none of them directly tap adolescents' attitudes and moral views about premarital intercourse, contraceptive use, abortion and other specific behaviors, and choices that are directly involved in the process leading to a premarital birth. The NLSY does not contain data on these more immediately salient variables, nor does it have data on the corresponding attitudes of peers. A useful extension of the approach charted in this study therefore would examine the relationship between attitudes more directly salient to adolescent sexual behavior and self-esteem, locus of control, and other relatively global attitudes, and then assess the relationship of both types of attitudes to actual behavior. Such findings would provide a deeper understanding of how attitudes influence this complex set of behaviors that raise bitterly controversial public policy questions.

Appendix Table: Items Used to Construct Attitude Variables

Each attitude variable is obtained by summing the item scores. The reported score on an item is reversed, when necessary, so that higher scores have a consistent interpretation. For example, for self-esteem item 3, a 4 would be converted to 1, a score of 3 converted to 2, etc.

Self-esteem items, scored on a four-point Likert scale:

1. I feel that I'm a person of worth, at least on an equal basis with others.
2. I feel that I have a number of good qualities.
3. All in all, I am inclined to feel that I am a failure.
4. I am able to do things as well as most other people.
5. I feel I do not have much to be proud of.
6. I take a positive attitude toward myself.
7. On the whole, I am satisfied with myself.
8. I wish I could have more respect for myself.

Rotter scale items:

The four items are the following pairs of statements. Each respondent selected which statement was closer to her opinion and then indicated whether it was much closer or slightly closer. This yields four possible sets of responses, coded from one to four, with one for the pair of responses indicative of the more external locus of control.

1. What happens to me is my own doing, or Sometimes I feel that I don't have enough control over the direction my life is taking.
2. When I make plans, I am almost certain that I can make them work, or It is not always wise to plan too far ahead, because many things turn out to be a matter of good or bad fortune anyhow.

3. In my case, getting what I want has little or nothing to do with luck, or Many times we might just as well decide what to do by flipping a coin.
 4. Many times I feel that I have little influence over the things that happen to me, or It is impossible for me to believe that chance or luck plays an important role in my life.
- Possible range is 4 to 16; actual range also 4 to 16.

Family and gender role attitude items, on a four-point Likert scale:

1. A woman's place is in the home, not in the office or shop.
 2. A wife who carries out her full family responsibilities doesn't have time for outside employment.
 3. The employment of wives leads to more juvenile delinquency.
 4. It is much better for everyone concerned if the man is the achiever outside the home and the woman takes care of the home and family.
 5. Men should share the work around the house with women, such as doing dishes, cleaning, and so forth.
 6. Women are much happier if they stay at home and take care of their children.
- Possible range is 6 to 24; actual range also 6 to 24.

School attitude items, scored on a four-point Likert scale:

1. Most of the teachers are willing to help with personal problems.
2. Most of my classes are boring.
3. This school offers good job counseling.
4. Most of my teachers really know their subjects well.
5. You can get away with almost anything at this school.
6. My schoolwork requires me to think to the best of my ability.

7. At this school, a person has the freedom to learn what interests him or her.
8. It's easy to make friends at this school.
9. I don't feel safe at this school.
10. How satisfied are you with your school--very satisfied, somewhat satisfied, somewhat dissatisfied, or very dissatisfied?

Possible range is 10 to 40; actual range is 18 to 40.

Notes

¹One may not want to include self-esteem and locus of control under a generic "attitude" label since there are good reasons to distinguish these personal attributes from other attitudes. However, because some scholars (e.g. Robbins et al. 1985) call these two variables "self-attitudes" and to eliminate a cumbersome phrase from the text, in the rest of the paper unless otherwise indicated, the term "attitudes" should be interpreted as including these two variables.

²For a similar approach see Leibowitz et al. (1986) and Cooksey (1990).

³Clearly, figure 1 is not a complete model of the determinants of premarital pregnancy and its resolution because some factors that may be associated with these behaviors--e.g., availability of family planning services, state policy on abortion--are not included. As long as the included attitudes are uncorrelated with such omitted factors, estimates of their impact will be unbiased. It is likely, of course, that some omitted variables are correlated with the included attitudes. The problem of possible omitted variable bias exists for every study of attitudes and premarital childbearing, not just this one.

⁴The choice between raising the child as an unmarried mother and placing it for adoption is not considered because the placement option is now rarely exercised. Cooksey (1990), Devaney and Hubley (1981), Lundberg and Plotnick (1990), Serrato (1989), Yamaguchi and Kandel (1988) and Zelnik, Kantner and Ford (1981) conduct multi-stage or multi-outcome analyses of premarital childbearing. None examines the role of attitudes.

⁵For further discussion of the link between self-esteem and premarital childbearing, see Crockenberg and Soby (1989).

⁶In the data analyzed here, less than 6 percent of white women, but nearly 32 percent of black women, had a premarital birth before age 20.

⁷See Hanson et al. (1987) and Robbins et al. (1985) for further discussion.

⁸Alternatively, one might argue that women with high self-esteem and internal locus of control would feel more self-sufficient to undertake single parenthood. This is more likely to be the case among women who are in their twenties, perhaps through college, with greater worldly experience. Among teenagers, prevailing norms and less experience with the demands of adulthood are more likely to encourage postponement of childbearing among those with high self-esteem and internal locus of control.

⁹Brazzell and Acock (1988) explores such an approach. Building on Azjen and Fishbein (1977), the study models the relations among attitudes on gender roles ("adult role aspirations" in the article), attitudes toward abortion, and intentions to abort. The study's limitations for understanding how attitudes affect the premarital childbearing process are that it does not consider how other relatively broad attitudes affect attitudes toward abortion, does not model the formation of attitudes toward other sexual behaviors and marriage, and does not analyze pregnancy or other pregnancy resolutions.

¹⁰Set against this limitation are the methodological contributions of the study discussed below and the recognition that no data set contains a complete set of salient attitudinal variables.

¹¹It also excludes multivariate studies which either report findings with insufficient detail to identify which specific attitudes were significant (e.g., Jessor and Jessor [1975], and Jessor, Costa, Jessor, and Donovan [1983] only report overall multiple correlations), or contain findings only for attitudes other than the four analyzed in this paper.

¹²Brazzell and Acock (1988) does not analyze relationships between attitudes and actual behavior. Stated intentions about the resolution of a hypothetical pregnancy may provide a clue about behavior when faced with the real situation.

¹³In a bivariate analysis of a cross-sectional, predominantly conservative Mormon sample, Miller, Christensen, and Olson (1987) find a negative relationship between self-esteem and sexual initiation among those who value abstinence, but a positive relationship among those with permissive sexual

values. They conduct a multivariate regression with virginity status as the dependent variable, but surprisingly did not include the self-esteem measure as an explanatory variable.

¹⁴For a general description of the data set, see Center for Human Resource Research (1988).

¹⁵Only 0.2 percent of girls have a birth by age 15, 3.2 percent by age 16 (table 6.11 in Hofferth and Hayes, 1987).

¹⁶A separate model for Hispanics was also estimated, but the sample size was so small that one can have little confidence in the findings. Because of missing data, samples used in the estimates are smaller.

¹⁷According to Henshaw et al. (1989, table 3) there were 109,410 abortions among nonwhites aged 15 to 19 in 1984. According to the National Center for Health Statistics (1986, tables 2 and 18) there were 127,829 births to unmarried women among the same population in 1984. The ratio of abortions to premarital births is 0.856. The corresponding ratio among blacks in the NLSY sample is 0.145, or 17 percent of 0.856. Note that the NLSY sample covers the 1979-1984 period for a three-year cohort that ranged in age from 14 to 19, but the national data are for women aged 15 to 19 in 1984. Though the two ratios are not strictly comparable, the comparison is certainly indicative of considerable underreporting. Underreporting is widespread even though data on date of pregnancy and whether it was aborted are from the 1984 and later survey rounds, which used confidential abortion reporting procedures that substantially increased the number of reported abortions.

¹⁸For white teenagers, the corresponding abortion-birth ratio from national records is 2.060. In the NLSY sample it is 1.313, or 64 percent as large.

¹⁹An individual's self-esteem and locus of control may be largely established before age 14, the age at which several of the controls are measured. Such controls may be viewed as proxies for conditions at earlier ages and thus as causally prior to these two psychosocial measures.

²⁰For both groups there is also a missing value dummy for school attitudes, the only attitude with a substantial number of cases lacking data.

²¹Thus, this discussion differs from the usual one, such as in Maddala (1983). For a discussion of how to incorporate individual characteristics into a conditional logit model, see Hoffman and Duncan (1988).

²²The discussion of the findings illustrates how to convert a change in the value into a change in the probability. The two are not identical.

²³I thank Kristin Moore for suggesting this approach.

²⁴Consistent with figure 1 and earlier discussion, the findings are for a two-stage model that treats the resolution choice as a decision among three options. An alternative approach (Eisen et al., 1983; Lundberg and Plotnick, 1990) proposes a hierarchical model of resolution by specifying that the abortion choice precedes the marriage choice. The nested logit technique allows one to specify the two-stage model as a special case of this three-stage model. The test for a statistically significant difference between the models did not reject the hypothesis that a two-stage model was appropriate. A similar test, however, did reject a four-outcome multinomial logit model (in which not getting premaritally pregnant and the three pregnancy outcomes are treated symmetrically) in favor of the two-stage nested logit one. Descriptive statistics for all variables are available upon request.

²⁵Ideally one would like self-esteem and locus of control indices measured at an early age and prior to the attitudes on school and family/gender roles. The NLSY files lack such data. One must regard the available measures of self-esteem and locus of control as indicators of their earlier values.

²⁶I also added interaction terms between the religious attendance dummies and Catholicity to see if such a proxy for attitudes about abortion affected the main findings. The coefficients on all attitude measures were very similar to those in table 3.

²⁷Robbins et al. (1985) estimate separate regressions for early, middle, and late adolescence and find that risk factors vary by age (though locus of control was insignificant for all three age groups of female adolescents). Sample size in the NLSY was too small to estimate separate models for different stages of adolescence.

²⁸In the table the product of the mean probabilities does not exactly equal the mean unconditional probability in column 3 because the product of the means does not necessarily equal the mean of the products.

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