

MARY ROGERS GILLMORE *University of Washington*

MATTHEW E. ARCHIBALD *Emory University**

DIANE M. MORRISON, ANTHONY WILSDON, ELIZABETH A. WELLS, MARILYN J. HOPPE,
DEBORAH NAHOM, AND ELISE MUROWCHICK
*University of Washington***

Teen Sexual Behavior: Applicability of the Theory of Reasoned Action

We examined the utility of the theory of reasoned action for predicting sexual intercourse among teenagers and determined whether it holds for both genders and for those with and without prior sexual experience. The data include 749 students who were in 9th–11th grades when the predictors were measured and in 10th–12th grades when sexual intercourse was assessed. About half (53%) were girls, about half (48%) were non-Hispanic European Americans. Results showed that prior sexual experience was related to a higher rate of sexual intercourse, but boys and girls did not differ. Tests of the causal model for subgroups (boy and girl virgins, boy and girl nonvirgins) yielded similar results. As predicted, paths from intentions to behavior and from norms and attitudes to intentions were significant, as were paths from outcome and normative beliefs to attitude and norm, respectively.

The majority of young people (about 80%) in the U.S. become sexually experienced during their teen years, typically in their mid to late teens (Singh & Darroch, 1999). Sociologists have long been interested in explaining the transition to first intercourse among teenagers not only because it has been linked to unintended pregnancies, early family formation, and sexually transmitted diseases (Berman & Hein, 1999; Moore, Driscoll, & Lindberg, 1998), but also because sexual intercourse is an important marker of adolescent development (Meschke, Bartholomae, & Zentall, 2000). This interest has led to a large literature on teenage sexuality, pregnancy, and contraceptive use (see Moore, Miller, Gleit, & Morrison, 1995, for a review), most of which has focused on identifying sociodemographic and family characteristics related to teen sexual behaviors. What is not well understood are the more proximal factors that influence youths' decisions to engage in sex (Carvajal et al., 1999). These factors are important to elucidate because they may ultimately aid our understanding of how more distal factors such as neighborhood, family structure, and social class influence behavior at the individual level (Baumer & South, 2001).

University of Washington, School of Social Work, 4101 15th Avenue NE, Seattle, WA 98105-6299 (maryg@u.washington.edu).

*Emory University, Department of Sociology, 225 Tarbuton Hall, Atlanta, GA 30322.

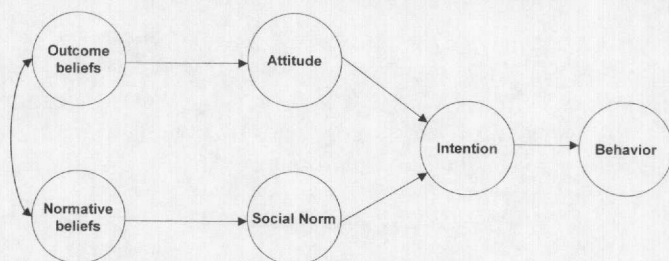
**School of Social Work, CHAP, 927 North Northlake Way, Seattle, WA 98103-8871.

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THEORY OF REASONED ACTION

The theory of reasoned action (Fishbein & Ajzen, 1975) is a cognitive model of the decision to en-

FIGURE 1. THEORY OF REASONED ACTION MODEL



gauge in a behavior. The theory of reasoned action takes what Cooper, Shapiro, and Powers (1998) have described as a functionalist perspective and rests on the assumption that the decision to engage in a behavior is based on the outcomes that the individual expects to accrue from the behavior. Motives, or anticipated outcomes, for sex may be positive (pleasure, intimacy, regard) or negative (unintended pregnancy, disease, disapproval). The individual's assessment of salient outcomes can be measured and combined into a testable causal model that links these beliefs to intention and behavior. The theory does not encompass the exogenous predictors of beliefs, be they sociocultural, hormonal, or idiosyncratic, but rather focuses on the organization of cognitive components that directly predict intention and behavior.

According to the theory of reasoned action, a decision to engage in a behavior (e.g., to have sex) is directly predicted by an individual's intention to perform the behavior. Intention, in turn, is a function of two factors: the individual's attitude toward the behavior (how desirable the behavior seems to me), and the individual's perception of general social norms regarding the behavior (what others think I should do). Both attitudes and norms are formed on the basis of sets of beliefs: beliefs about the consequences of performing the behavior (e.g., I will get pregnant), and beliefs about how significant others feel about the individual performing the behavior (e.g., my best friend's beliefs). Each outcome belief underlying attitude has two components: likelihood (how likely is it that I will get pregnant?) and evaluation (how good or bad would getting pregnant be?). Each normative belief also has two components—referent norm (what does my best friend think I should do?) and motivation to comply with this referent (how much do I want to do what my best friend wants me to?). These constructs (behavior, intention, attitude, perceived general norm, out-

come beliefs, and normative beliefs) can be organized as a testable causal model (Figure).

Applicability of the Theory of Reasoned Action to Teen Sexual Behavior

Sexual intercourse among adolescents frequently has been characterized as unplanned and impulsive (Moore et al., 1995), yet there are demonstrated systematic effects of factors such as educational aspirations and acceptance of premarital childbearing that are presumed to be mediated by individual cognitive processes (Lauritsen, 1994). We are motivated to test the theory's ability to add to our understanding of adolescent's decisions to have sex because it has been shown to have some utility for predicting other aspects of adolescent sexual behavior such as decisions to use condoms (Basen-Engquist & Parcel, 1992; Gillmore, Morrison, Lowery, & Baker, 1994; Kegeles, Adler, & Irwin, 1989; Morrison, Baker, & Gillmore, 1998; Richard & van der Pligt, 1991) and other contraceptives (Adler, Kegeles, Irwin, & Wibbelsman, 1990), and the frequency of sex and number of partners (Basen-Engquist & Parcel, 1992; Jorgensen & Sonstegard, 1984). Morrison et al. (1998), for example, found that condom use among teens was more highly related to attitudes than to norms, and that the most predictive outcome beliefs were not beliefs about the efficacy of condoms to prevent pregnancy and disease, but rather beliefs about their potential negative effects on intimacy. Carvajal et al. (1999) used some constructs from the theory of reasoned action, as well as from related theories, to predict sexual initiation among adolescents and found that both attitude and perceived norm predicted sexual initiation. Basen-Engquist and Parcel (1992) reported similar findings. Taken as a whole, these studies suggest that the theory of reasoned action can aid our understanding of adolescent sexual behaviors. However,

many of these studies did not distinguish between teens who were sexually experienced and those who were not, and rarely included tests of the full theoretical model. In several studies the measures of attitude seemed to assess more of a normative dimension, rather than the evaluative dimension of attitudes that Fishbein and Ajzen (1975) describe. In a rare exception, Fisher, Fisher, and Rye (1995) examined the ability of the fully elaborated theory of reasoned action to predict high school youth's decisions about whether to have sex. As predicted, intentions were related to having sex, attitudes and subjective norms were related to intentions, and outcome and normative beliefs were related to attitudes and subjective norms, respectively. However, these analyses were conducted in a series of stages, and the full causal model implied by the theory was not tested simultaneously. Thus no information regarding indirect effects is available, nor can it be determined whether the relationships would hold up when all six theory constructs are included in a single multivariate analysis.

Relevance of the Theory of Reasoned Action for Boys and Girls

Studies have consistently shown differences in the sexual behaviors of male and female adolescents, although some of these differences have narrowed over time (Santelli, Lindberg, Abma, McNeely, & Resnick, 2000). Because girls bear greater costs associated with sexual intercourse (e.g., unplanned pregnancy and greater susceptibility to STDs), girls and boys are presumed to balance the costs and rewards of sexual activities differently (Day, 1992; DiBlasio & Benda, 1992). They also give different reasons for not having sex (Blinn-Pike, 1999). Lauritsen (1994) argued that we may need different theoretical models to understand the sexual behaviors of girls and boys. This may be premature, however, because researchers have rarely explicitly tested whether the same model works equally well for boys and girls.

Fishbein and Ajzen (1975) acknowledge that there are factors other than those specified by their theory that affect a decision to engage in a behavior such as having sex. However, they suggest that the effects of such factors are mediated by the theory's constructs, rather than affecting behavior directly. This implies that the *relationships* specified by the theory, although not necessarily the mean values of constructs, will be the same for both boys and girls. For example, although boys

perceive norms and hold attitudes more favorable toward having sex than girls (Watts & Nagy, 2000), the theory suggests that the relationships among the constructs will not differ by gender; that is, in both cases behavior will be predicted by intentions, and intentions, in turn, will be predicted by norms and attitudes, and so on. We examine this expectation by testing whether there is a statistical interaction between gender and the variables in the theoretical model. The presence of an interaction suggests that the relationships among theory constructs differ by gender and would be a finding inconsistent with the theory.

Relevance of the Theory of Reasoned Action for Virgins and Nonvirgins

Recent evidence (Nahom et al., 2001) suggests that factors influencing an adolescent's decision to have sex may depend on whether the youth is sexually experienced. As noted above, the theory of reasoned action suggests that such factors influence social cognitions, which, in turn, influence decisions about having sex. That is, although there may be different factors that influence a virgin's decision to initiate sex relative to those that influence a sexually experienced youth's decision to have sex again, the theory suggests that these differences are reflected in differences in beliefs, norms, attitudes, and intentions, not in differences in the relationships among these constructs. We test this hypothesis by examining the statistical interaction between sexual status (virgin vs. nonvirgin) and the theory variables. The presence of an interaction would be inconsistent with the theory.

In summary, the central purpose of this paper is to present findings regarding the utility of the theory of reasoned action for aiding our understanding of teenager's decisions about having sex by testing the causal model implied by the theory (Figure). We also determine whether the model is equivalent for virgins and nonvirgins, and whether it is equivalent for boys and girls. We take advantage of recently collected longitudinal data from a diverse sample of youths to determine whether theory variables assessed in year 6 of the study when participants were in 9th–11th grades predict sexual intercourse in year 7 of the study when they were in 10th–12th grades.

METHOD

Overview of Research Design

The data reported here are part of a 7-year longitudinal study of students who were in grades 3–6 at the initial wave of data collection in 1992. Surveys were administered at yearly intervals in the spring to small groups of 1–25 participants. Trained interviewers read the questions aloud as the youth followed along in their own copies of the interview and recorded their answers; teachers were not present during survey administration. Administration of the survey took about 45 minutes.

Sample

Schools in a large northwest urban school district were selected to maximize geographic, socioeconomic, and racial/ethnic diversity. Sixteen of the 65 elementary, and 7 of 10 middle schools were invited to participate in the survey. Ten elementary and 3 middle schools agreed to participate. Most schools that refused did so because they had made commitments to other projects that would take up student and staff time. When a school refused, we replaced it with a school from the same area of the city that had a similar ethnic and free lunch profile. Parents (or guardians) of the students were sent brochures that described the study and asked for written consent for their children to participate. A total of 2,319 students were enrolled in the eligible grade levels at these schools. After removing 203 students who were non-English speakers, had changed schools, or could not be found, parental consent was obtained for 1,177 (56%) participants. This consent rate is similar to those obtained in other school-based studies requiring active parental consent (e.g., DeLoye, Henggeler, & Daniels, 1993). All children of consenting parents were asked to assent to study participation. Four children of consenting parents refused to participate, resulting in an initial sample of 1,173. When the study was extended beyond the 3 years originally planned, re-consent was obtained for 1,084 (92% of the original sample).

The distribution of racial and ethnic groups and the gender distribution in the sample were not significantly different from the school district population in the same grades. However, the sample contains a lower percentage of adolescents who were eligible for the federally funded or reduced price lunch program (35%) compared with the

school district population (44%) for these grades, suggesting a slight bias toward higher income families in our sample.

The data reported in this paper come from the sixth and seventh years of the study. Because measures of the fully elaborated theory of reasoned action were not asked until 9th grade, the youngest cohort (in 8th grade in year 6) was not included in these analyses. The sample size for the three cohorts included in the analyses is 749 (89% of the reconsenting sample). Thirty-two percent of the sample was in 10th grade, 31% in 11th grade, and 37% in 12th grade. Just over half (53%) of the sample was girls. About half of the sample (47%) was non-Latino European American, 20% African American, and 22% Asian American. The remaining 10% were of other racial/ethnic backgrounds, including Latino, Native American, and Alaskan Native. Based on eligibility for free or reduced lunch at school, nearly 8% had family incomes less than \$17,420, 27% had family incomes of between \$17,420 and \$24,790, and most (65%) had family incomes over \$24,790. Fifty-nine percent of the youth had not engaged in sexual intercourse prior to year 7 of the study. During the seventh year of the study, 44% reported having had sexual intercourse.

Measures

All theory of reasoned action variables were assessed in year 6 except for whether the youth had had sex, which was measured in the following year (year 7). Measures were constructed as recommended by Ajzen and Fishbein (1980). Outcome and normative beliefs were elicited from focus groups with adolescents from the same population, but who were not included in the longitudinal study (Hoppe, Graham, Wilsdon, & Wells, 1996). In 21 focus groups (10 boy and 11 girl groups), high school students responded to open-ended questions about reasons for, and consequences of, having sex. Questions were phrased in a variety of ways to elicit specific beliefs about both negative and positive consequences of having sex. In addition, teens were queried about whose opinions regarding their own sexual behavior mattered to them. This information was content analyzed to identify modal beliefs and normative referents, and these beliefs and referents were used to construct the outcome and normative belief measures described below.

Sexual behavior. Students were asked, "Since

you've been in [present] grade, have you had sexual intercourse?" Sexual intercourse was defined as "vaginal or anal intercourse between any two people. Vaginal intercourse means the penis in the vagina. Anal intercourse means the penis in the rectum or butt." Responses were coded 0 (*no*) or 1 (*yes*; $M = 0.44$, $SD = 0.50$).

Intentions. Intentions to have sex were measured by four items that appeared in different parts of the questionnaire: (a) "When you are in [next] grade, do you think you will have sexual intercourse?" ($M = 2.53$, $SD = 1.08$); (b) "If things went as you would like them to, would you have sexual intercourse when you are in [next] grade?" ($M = 2.49$, $SD = 1.06$); (c) "If things went as you would like them to, would you avoid (keep from) having sexual intercourse when you are in [next] grade?" ($M = 2.42$, $SD = 1.04$); and (d) "When you are in [next] grade, do you intend to avoid (keep from) having sexual intercourse?" ($M = 2.39$, $SD = 1.01$). Responses were rated 1 (*NO!*), 2 (*no*), 3 (*yes*), and 4 (*YES!*) for the first two items, and from 1 (*I definitely will avoid sex*) to 4 (*I definitely will not avoid sex*) for the latter two items. Higher scores indicate greater intentions to have sex.

General attitude. Two attitude items asked, "Do you think if you had sexual intercourse in [next] grade it would be . . .," scored on scales ranging from -2 (*very unpleasant*) to $+2$ (*very pleasant*; $M = 0.72$, $SD = 1.03$), and from -2 (*very awful*) to $+2$ (*very nice*; $M = 0.56$, $SD = 1.01$). Higher scores indicate more positive attitudes toward having sex.

General norm. Three norm items asked the following: (a) "Do the people in your life (adults and other young people) think it would be OK for you to have sexual intercourse when you are in [next] grade?" ($M = 0.67$, $SD = 1.35$), scored on a scale ranging from -2 (*NO!*) to $+2$ (*YES!*); (b) "Would the people in your life (adults and other young people) be against you having sexual intercourse when you are in [next] grade?" ($M = -0.91$, $SD = 0.93$) scored on a scale ranging from -2 (*They would be totally against it*) to $+2$ (*It would be OK with them*); and (c) "Would people in your life (adults and other young people) disapprove of you having sexual intercourse when you are in [next] grade?" ($M = -1.03$, $SD = 0.95$), scored on a scale ranging from -2 (*They would strongly disapprove*) to $+2$ (*They would*

approve). Higher scores indicate perceived norms more favorable toward having sex.

Outcome beliefs. Two aspects of outcome beliefs were measured: perceptions of how likely a given outcome is and how good or bad that outcome is. The likelihood items began with the stem "Do you think having sexual intercourse will . . .," followed by outcomes (listed below) identified in the focus groups. Responses were scored on scales ranging from 1 (*NO!*) to 4 (*YES!*). Evaluations of the outcomes were measured with the question "Do you think the following things are good or bad?" followed by a list of the outcomes. Responses were scored on scales ranging from -2 (*very bad*) to $+2$ (*very good*).

Following Ajzen and Fishbein (1980), each outcome belief was constructed as the product of the likelihood and evaluation scores for that outcome. Scores on these products could range from -8 (*very likely and very bad*) to $+8$ (*very likely and very good*). Outcome beliefs were scaled such that higher scores reflect beliefs more favorable toward having sex. Preliminary analyses (described in the Results section) suggested the presence of two factors: positive beliefs comprised of four items including *feel good* ($M = 5.43$, $SD = 2.08$); *more popular* ($M = 1.25$, $SD = 1.75$); *feel loved* ($M = 4.04$, $SD = 1.99$); and *feel experienced* ($M = 1.68$, $SD = 2.27$). The second factor, negative beliefs, contained five items including *get an STD* ($M = -5.68$, $SD = 2.11$); *get pregnant* ($M = -3.98$, $SD = 3.09$); *regret it later* ($M = -3.94$, $SD = 2.50$); *get AIDS* ($M = -4.23$, $SD = 2.47$); and *emotional stress* ($M = -3.90$, $SD = 2.40$).

Normative beliefs. Two aspects of normative beliefs were measured: perceptions of norms that specific referents (identified in the focus groups) held for the youth, and the youth's motivation to comply with each referent. Referent norms were measured with the following items: "Does your father [mother, best friend, most of your other friends, favorite teacher, the brother or sister you feel closest to] think it would be OK for you to have sexual intercourse when you are in [next] grade?" Referent norms were rated -2 (*NO!*), -1 (*no*), $+1$ (*yes*), and $+2$ (*YES!*). Motivation to comply with each referent was assessed by items of the form "Do you want to do what your [referent] wants you to do?" Responses were rated on a scale ranging from 1 (*NO!*) to 4 (*YES!*).

Normative beliefs were computed by multiply-

ing each referent norm score by the corresponding motivation to comply score for each of the five referents. The resulting scores could range from -8 (*referent has very negative norm and the child has high motivation to comply with the referent*) to $+8$ (*referent has very positive norm and the child has high motivation to comply with the referent*). The separate normative beliefs for mother and father were combined into one, because many students only had one parent. For students with two parents, the average of the two normative beliefs was used. Higher scores indicate normative beliefs more favorable toward having sex. Preliminary analyses (see Results) suggested the presence of two factors: adult normative beliefs that consisted of two items including parent(s) ($M = -3.28$, $SD = 3.11$) and teacher ($M = -2.96$, $SD = 2.94$); and youth normative beliefs containing three items, best friend ($M = 0.87$, $SD = 4.48$), other friends ($M = 0.86$, $SD = 3.84$), and sibling ($M = -1.09$, $SD = 3.47$).

Analytic Strategy

A covariance structure model was used to test the causal model implied by the theory of reasoned action (see Figure). We tested the interaction between sexual status in year 6 (virgins vs. nonvirgins), gender, and the theory constructs using multiple group analysis. Structural equation modeling is especially well suited for this analysis because (a) both direct and indirect paths to sexual intercourse can be examined; (b) random measurement error is taken into account so that errors have a reduced effect on the parameter estimates; (c) nonrandom error can be explicitly modeled, which is especially important with longitudinal data for which dependencies are likely to exist; and (d) the approach promotes a more general definition of theoretical constructs.

Sexual behavior in this study is a discrete event: whether adolescents had engaged in sexual intercourse. Most structural equation models are not appropriate for this kind of outcome (Long, 1983). However, recent innovations for analyzing models with dichotomous endogenous variables have been implemented in the program Mplus (Muthén & Muthén, 1998), which we used for these analyses.

Although maximum likelihood estimates are often robust with respect to violations of multivariate normality (Jöreskog & Sörbom, 1989), use of some categorical variables and the presence of kurtosis in several endogenous variables required

estimating model parameters with weighted least squares (Muthén, 1983; Muthén & Christoffersson, 1981). We used weighted least squares with mean adjusted standard errors and χ^2 tests (Browne, 1984; Muthén & Muthén, 1998; Wothke, 1993). Unlike regular weighted least squares, this procedure produces correct standard errors (Jöreskog & Yang, 1996).

RESULTS

Likelihood of Engaging in Sexual Intercourse by Sexual Status and Gender

Before testing the causal model implied by the theory of reasoned action, we first examined the likelihood of engaging in sex by gender and sexual status primarily for descriptive purposes. Boys and girls did not differ in their likelihood of engaging in sex in year 7 ($\chi^2 = 0.09$, $df = 1$, ns), but nonvirgins in year 6 were about 17 times more likely to have sex in year 7 than those who were virgins in year 6 ($\chi^2 = 275.19$, $df = 1$, $p < .01$). There were no significant differences between boy and girl virgins ($\chi^2 = .50$, $df = 1$, ns), nor between boy and girl nonvirgins ($\chi^2 = .61$, $df = 1$, ns), in their likelihood of having sex.

Measurement Model Assessment

Preliminary confirmatory factor analyses (CFA). A preliminary confirmatory factor analysis using weighted least squares estimation was undertaken to test the adequacy of the measurement model. Each latent construct (intentions, attitudes, general social norm, outcome beliefs, and normative beliefs) was identified by its corresponding measured variables. All latent constructs were free to vary; one indicator per construct was fixed to define the scales of the indicators (a table of factor loadings is available from the authors by request). The results of the CFA suggested that outcome beliefs were best specified as two factors—positive outcomes and negative outcomes (χ^2 difference for 1- vs. 2-factor model = 2,939.37, $df = 7$, $p < .01$). Similarly, normative beliefs were best specified as two factors, youth and adult norms (χ^2 difference for 1- vs. 2-factor model = 490, $df = 7$, $p < .01$). This measurement model then became the basic model for the analyses reported below.

Equivalence of the measurement model across subgroups. The next question we address is

TABLE 1. GOODNESS-OF-FIT INDICES FOR MULTIPLE GROUP MEASUREMENT MODEL COMPARISONS^a

	χ^2	df	TLI	CFI	AGFI	RMSEA
General measurement model	1493.66	225	0.99	0.99	0.99	0.09
Virgins vs. nonvirgins						
Constrained model—parameters equal for groups ^b	1904.88	466	0.99	0.99	0.99	0.06
Partially constrained model—partial equalities for groups	1574.45	461	0.99	0.99	0.99	0.06
Virgin boys vs. girls						
Constrained model—parameters equal for gender	1392.35	466	0.98	0.99	0.99	0.07
Partially constrained model—partial equalities for gender	1274.26	459	0.98	0.99	0.99	0.06
Nonvirgin boys vs. girls						
Constrained model—parameters equal for gender	1296.74	466	0.98	0.97	0.98	0.08
Partially constrained model—partial equalities for gender	1200.61	458	0.99	0.98	0.99	0.07

^aEstimates based on weighted least squares with mean-adjusted robust standard errors (Muthén & Muthén, 1998). ^bEquality constraints were set for the lambda matrix (i.e., factor loadings).

whether the measurement model is equivalent for the different subgroups (virgin girls, virgin boys, nonvirgin girls, nonvirgin boys). In the first step a multiple indicators and multiple causes design (Jöreskog & Sorbom, 1989; Muthén & Muthén, 1998) was used. This is a CFA measurement model with observed background variables. It estimates conventional CFA model parameters and constraints and includes controls for the observed exogenous variables (sexual status and gender). This analysis tests whether the variable of interest has a relationship with the other variables in the model. Conclusions are drawn formally from a χ^2 difference test based on the weighted least squares likelihood estimate. Results (not shown) suggested that both sexual status and gender were significantly related to the factor analytic structure of the model based on χ^2 differences and *t* tests for the path coefficients. However, measurement invariance is less an absolute standard than a continuum ranging from equivalence to nonequivalence. As Hoyle and Smith note (1994), most measures are partially equivalent between groups. Partial equivalence describes a model where factors are unequal based on a difference between unstandardized regression coefficients greater than 0.15. The more variables with a difference greater than 0.15, the less the equivalence of the measurement models.

Visual inspection of the factor loadings and standard errors (table available from the authors) indicated that there is considerable continuity among measurement models for the different subgroups. Examination of the unstandardized regression coefficients revealed that only about 5 of 24 measures differed by a magnitude of 0.15 or more. These differences were distributed random-

ly across several factors, except for negative beliefs. Differences in factor loadings for subgroups of boys and girls of different sexual statuses were more pronounced for the negative outcome beliefs.

The number of differences between coefficients among the subgroups amounted to less than 25% of the total number of indicators, which suggests that the measurement model is nearly equivalent for the subgroups. Examination of the factor loadings indicated that when differences occurred, they were differences in magnitude, not differences in the sign of the coefficient or whether it was significant.

Fit of the measurement model within subgroups.

We next examined the fit of the measurement model for each subgroup. Our expectation was that the measurement model would fit the different subgroups well enough so as not to jeopardize its use for predicting structural relationships among model constructs.

The TLI, CFI, AGFI, and RMSEA fit indices are quite consistent across models (Table 1). These standard fit statistics, commonly used with maximum likelihood estimators, provide only a rough guide to how well the measurement model fits each group and should be considered in light of the lack of information about their use with weighted least squares estimation. We include several overall measures of fit because there seems to be little agreement about which are the best for evaluating structural equation models, and those reported here are the most appropriate for the types of analyses we conducted (Hoyle & Panter, 1995; Hu & Bentler, 1995). Values of 0.90 or greater for the TLI, CFI, and AGFI indicate a

good fit of the model to the data (Kline, 1998). There is less agreement about what constitutes a good fit for the RMSEA, but generally 0.05 or less is considered evidence of a good fit, between 0.05 and 0.08 a fair fit, and less than 0.10 a poor fit (Browne & Cudeck, 1993; MacCallum, Browne, and Sugawara, 1996). The observed values for the former fit indices were well above 0.9, indicating a good fit, but the values for the RMSEA suggested a fair fit (Table 1). Given that the fit indices were reasonably acceptable, we chose not to re-specify the models post hoc in order to avoid overfitting the models.

A multiple group analysis for sexual status showed that when all the factor loadings for virgins were constrained to be equal to the loadings for the nonvirgins (constrained model), the model fit worse than the model in which most of the factor loadings were constrained to be equal (partially constrained model). The χ^2 and RMSEA for the fully constrained model were 1,904.88 with 466 *df* and 0.064, respectively; the χ^2 and RMSEA for the partially constrained model was 1,574.45 with 461 *df* and 0.056. Similarly, the tests of model fit for boys and girls, given their sexual statuses, indicated that the partially constrained model fit better than the fully constrained model. These findings suggested that measurement of the underlying constructs of the theory was comparable for subgroups based on sexual status and gender within sexual status. (Earlier analyses using a maximum likelihood estimate of goodness-of-fit supported these conclusions.)

Assessment of the Theory of Reasoned Action Causal (Structural) Model

This analysis tested the causal model implied by the theory of reasoned action (see Figure). In these analyses we controlled for grade level as a means of controlling for developmental differences (Whitbeck, Yoder, Hoyt, & Conger, 1999).

Table 2 provides estimates of the coefficients describing the relationships among the theory constructs for the sample as a whole and for each subgroup. Except for the effect of youth normative beliefs on general norms, all of the relationships were significant in the predicted direction. Positive beliefs were more strongly related to attitudes than negative beliefs, and general social norms had a stronger effect on intentions to have sexual intercourse than did attitudes.

By and large, the structural paths in the various subgroup models resembled those in the total sam-

TABLE 2. WEIGHTED LEAST SQUARES STANDARDIZED PARAMETER ESTIMATES OF EFFECTS OF THEORY OF REASONED ACTION VARIABLES ON SEXUAL INTERCOURSE^a

Theory of Reasoned Action Model		Sexual Status				Nonvirgins	
Endogenous	Exogenous	Total Sample	Virgins	Nonvirgins	Boys	Girls	Boys
Sexual intercourse	Intentions ^b	.63	.47	.26	.55	.57	.23
	General attitudes	.41	.39	.55	.35	.29	.47
General attitudes	General norms	.61	.63	.44	.70	.68	.43
	Positive beliefs	.70	.74	.73	.74	.71	.79
General Norms	Negative beliefs	.39	.30	.34	.27	.28	.27
	Youth norms	.03 (ns)	.17 (ns)	.11 (ns)	.25 (ns)	.12 (ns)	.20 (ns)
Number of cases	Adult norms	.93	.80	.81	.74	.83	.75
		749	446	303	204	242	148
							155

^aStandardized regression coefficients estimates based on weighted least squares with mean-adjusted robust standard errors (Muthén & Muthén, 1998). Except where noted by ns, all estimates are significant at $p < .01$. All analyses controlled for grade level. ^bStandardized probit regression coefficients.

ple. That is, all paths except one (the relationship between youth normative beliefs and general norm) were significant and in the direction predicted by the theory. However, for nonvirgins, attitudes were consistently more strongly related to intentions than were norms, whereas for virgins norms were more strongly related to intentions than attitudes.

The final path between intentions and sexual intercourse was calculated using probit regression. The model for the probit is similar to the model for the logit in logistic regression except that the former is based on the assumption of normality and the latter is based on a logistic distribution (Wickens, 1989). Following procedures recommended by Liao (1994), we transformed the parameters into the odds of occurrence. For the total sample, the odds of having sexual intercourse increased by 3.00 for every unit increase in intention to have sex. For the subgroups, the chances of a virgin having sexual intercourse the following year for every unit increase in intention to do so was about 2.6, and for nonvirgins it was about 2.1. Thus the effect of intentions on sexual intercourse was 1.2 times greater for the virgins than nonvirgins. The odds of having sexual intercourse, given the intention of doing so a year earlier, was greater for girls than for boys, regardless of sexual status, although the virgin girls had the greatest likelihood of all subgroups. The odds of having sex, given intentions to do so, for virgin girls were 1.1 times greater than the odds for virgin boys, and 1.3 times greater than for nonvirgin girls. Virgin girls were also 1.5 times more likely to have sex than nonvirgin boys, given their intention to do so.

DISCUSSION

The primary purpose of this study was to test the utility of Fishbein and Ajzen's (1975) theory of reasoned action for predicting sexual intercourse among an ethnically diverse sample of school-aged teenagers. Overall, our findings support the theory as a model of the cognitive processes underlying teens' decisions to have sex. As predicted, sexual intercourse was associated with intentions to have sex; intentions, in turn, were associated with both general attitude and general norm. These findings are consistent with those obtained by Fisher et al. (1995), although norm had somewhat greater weight than attitude in our data. The weights of attitude and norm were more similar in Fisher et al., especially for boys. Our find-

ings diverge from those of Fisher et al., however, in that we find a strong relationship between outcome beliefs and attitudes, whereas they found no relationship between the sum of outcome beliefs and attitude. Their finding is surprising given that they developed their set of outcome beliefs carefully based on 87 elicitation interviews with male and female high school students. Cohort differences might account for this difference; The data for Fisher et al. were collected in 1990; ours, in 1997 and 1998. Changes in the content of sex education, in youth exposure to explicit materials, and in general social awareness of sexual risk taking may have contributed to more carefully reasoned decisions about engaging in intercourse among more contemporary adolescents. Alternatively, the outcome beliefs tapped in the Fisher et al. study may have had a similar bidimensionality of positive and negative beliefs. In that case, the standard procedure of summing all of the outcome beliefs may have obscured this relationship.

General attitude was predicted by both positive and negative outcome beliefs, as predicted by the theory, with positive beliefs carrying greater weight. This finding echoes our previous research on condom use among high-risk adolescents (Morrison et al., 1998). There we found that beliefs about negative outcomes (e.g., unwanted pregnancies and sexually transmitted diseases) did not discriminate well between those who did and did not intend to use condoms, because all of the adolescents believed that condoms would reduce these risks. Beliefs about the effects of condoms on pleasure and intimacy had greater range and were more predictive.

We found that normative beliefs also were composed of two dimensions: youth and adult norms. Adult normative beliefs, but not youth normative beliefs, predicted overall perceived social norm toward engaging in sexual intercourse. Given the general belief in our culture of the power of peer norms, it seems surprising that youth norms were not significantly related to general norm. Relative to younger children, adolescents perceive a relaxation of parental norms about age-inappropriate behaviors such as drinking, and at the same time they are more motivated to comply with their peers (Gillmore et al., 1998). Therefore, we would expect youth normative beliefs to be important in predicting perceived general social norm among teenagers. Although we found that normative beliefs were best represented as two latent constructs, youth and adult normative beliefs were highly correlated in this sample ($r = .85$),

suggesting that much of the variance in youth normative beliefs may have been captured by the adult measures. It is not surprising that youth and adult norms are correlated. Parents help select their children's peers through their choice of neighborhoods and schools, as well as through parental monitoring. And children's selection of friends in part reflects parental values. Moreover, youth norms were measured by both peer and sibling norms. We would expect siblings to share many of the same norms as their parents.

To examine the possibility that the correlation between youth and adult norm was responsible for the failure of youth norm to predict general norm, we re-estimated the model excluding the adult normative beliefs measures (i.e., with only the youth normative beliefs in the model). In this model, youth normative beliefs were significantly related to general norm (standardized coefficient = 0.86, $p < .01$), reinforcing our interpretation that the shared variance with the adult normative beliefs in the original model accounts for the non-significant path when adult normative beliefs are in the model.

The tests of the theory of reasoned action for the subgroups of adolescents (boy and girl virgins, boy and girl nonvirgins) produced similar results, as predicted by the theory. Boys and girls, although they may differ in their reasons and motivations for having sexual intercourse (Blinn-Pike, 1999; Cooper et al., 1998; Eyre & Millstein, 1999; Leigh, 1989), appear to make their decisions about whether to have sex in much the same way. Virgins and nonvirgins also make this decision in similar ways, but there are a few noteworthy differences. Attitudes slightly outweighed norms in prediction of intention among nonvirgin youth, but norms greatly outweighed attitudes among virgins; this was true for both boys and girls. Adolescents who remained virgins appear to be giving greater weight to social norms in deciding whether to engage in intercourse. Adolescents who have had intercourse seem to base their intentions more heavily on their own attitudes.

The relationship between intention and subsequent behavior also differed among subgroups. Intention was a stronger predictor of subsequent behavior among virgins than nonvirgins, and it was stronger among nonvirgin girls than boys. To further examine these differences, we computed a mean intention score for each respondent based on the four intention items. We hypothesized that the difference between virgins and nonvirgins would be attributable to lower rates of successful

follow-through on intentions among nonvirgins. We expected that more nonvirgins than virgins would intend to have intercourse, and that those intending to have intercourse would be less successful in implementing their intentions than those intending not to have intercourse, because implementing an intention to have sex requires the cooperation of a second person.

Although the two groups differed in intentions as anticipated (most nonvirgins intend to have sex; most virgins intend not to), the overall proportion of correct predictions from intention was similar (76% among nonvirgins vs. 70% among virgins). Most of this is attributable to correct prediction of the status quo; 80% of virgins remained virgins in the ensuing year, and 81% of nonvirgins had intercourse. What appears to underlie the difference in the correlations can be seen in the cases in which respondents change status in the intervening year: nonvirgins who do not have intercourse, and virgins who do. Among nonvirgins who did not have sex, most (72%) had intended to have sex. Among virgins, there was no complementary effect: only 37% of virgins who did have sex had planned not to. It appears that virgins were more likely to follow through on intentions to remain virgins than nonvirgins were to successfully continue to have intercourse.

Within both the virgin and nonvirgin categories, there was also a notable difference between boys and girls in the relationship between intention and behavior, favoring girls in both cases. The data suggest different explanations for this difference. Among nonvirgins, the distributions for boys and girls differed. Almost all nonvirgin boys (94%) intended to have intercourse in the coming year, and only 6% intended not to; in contrast, 25% of nonvirgin girls did not intend to have intercourse. Thus the limited range of intention among boys limits the correlation.

Within the virgin category, the difference in correlations is attributable to the larger number of boys who intended to have sex, but did not. Among girls, 85% of those who subsequently did not have sex had not intended to, with the largest proportion of those not having sex having been most adamantly opposed. Among boys, however, almost half of those who did not have sex had, in fact, intended to have sex. Only a quarter of virgin boys who intended to have intercourse in the next year did so; almost half of virgin girls who intended to have sex did.

In both comparisons, the distributions echo conventional sexual double standards. More boys

than girls intend to have sex, particularly among those who have had sex in the past. Boys who have had sex in the past are unanimous in wanting to continue to; about a quarter of the girls who have had sex do not intend to have sex again, at least in the next year. Girls who want to have intercourse are more successful in implementing this decision, suggesting that finding a willing partner is less of a problem for them than it is for boys.

The ability of the theory of reasoned action to predict adolescents' decisions about having sexual intercourse demonstrates that adolescents' intentions with regard to having sexual intercourse are consistent with their attitudes, beliefs about the consequences of, and norms about having sex, and their behaviors are consistent with their intentions. This picture of a thoughtful, deliberate adolescent is at odds with popular notions that adolescent sexual behavior is irrational and impulsive. What can account for this? First, it should be noted that the prediction of the model is far from perfect; although a good deal of the variance in adolescent intercourse is accounted for by these cognitive constructs, most is not (intentions explain 40% of the variance in sexual intercourse). Thus we have only demonstrated that adolescent sex is partially cognitively directed. Second, it may be that adolescents do not so much intend to have sex in a deliberative way, but rather may not have strong intentions not to have sex. Should the opportunity arise, they may be willing to have sex (Gibbons, Gerrard, Blanton, & Russell, 1998). Further research to better clarify the meaning of intentions and how committed individuals are to follow through with their intentions would be useful. Third, it may be that sexually explicit images in the media and in popular songs, as well as changing norms in society about having sex, have affected volition regarding sex. This is an area worthy of further investigation. Finally, the frequent focus on adolescent sex (and, to a somewhat lesser extent, on adult sex as well) as a risky behavior may also have led us to overemphasize the irrationality of this behavior. From a health perspective, adolescent sex is risky; it brings risk of pregnancy, of disease, and possibly of psychological pain. From the actor's perspective, however, sex may be less a health behavior than an interpersonal behavior, leading to affiliation and pleasure.

Taken as a whole, the results suggest that the theory of reasoned action can add to our understanding of decisions made by teenagers about having sex. The theory is limited to behavior that actors have control over; it cannot help us under-

stand coerced or forced sex, which recent research suggests is more common among adolescent girls than previously thought (Silverman, Raj, Mucci, & Hathaway, 2001). Moreover, actors often do not follow through on intentions. It would be useful in future research to investigate factors that might interact with intentions to help account for such instances. For example, relationship quality, the relative power differentials between boys and girls, and substance use may be important factors to consider.

Prior research has identified sociodemographic and family factors that are related to teen sexuality, but how these factors become translated into microlevel processes, such as a decision to have sex, is largely unknown. Moreover, it is widely believed that sexual behavior is primarily hormonally driven and consequently that cognitive factors do not play a meaningful role in a teen's decision to have sex. Indeed, Halpern and Udry (1999) have provided evidence that hormones have a direct effect on teen sexual behaviors. However, the effect is small, explaining only 5%–10% of the variance. Models that contained both biological and social factors were considerably more powerful than hormonal models alone in explaining teen sexual behaviors (Halpern & Udry). The results of our study suggest that cognitive factors are related to teens' decisions to have sex. Both attitudes and perceived social norms about having sex were important factors influencing teenagers' decisions to engage in sex, and beliefs about the consequences of having sex, both good and bad, played a role in shaping these attitudes. Moreover, beliefs about the expectations of significant others, such as parents, influenced teens' perceptions of general social norms about engaging in sex, and thus were indirectly related to teens' decisions about whether to have sex.

Our findings have two important implications for our understanding of teenage sexual behavior. First, although we know that family factors influence teens' decisions to have sex, we know little about the processes through which this influence occurs. Our findings indicate that parental norms about their children engaging in sex have indirect effects on teens' decisions to have sex by influencing teens' perceptions of general social norms. This finding contrasts with the commonly held view, which has gained considerable attention in the popular press since the Harris (1995) article that stated parents have little or no influence on the behaviors of their adolescent children. What we do not know is how parental norms are com-

municated to children. This is an interesting question for future research. Second, cognitive factors may be an important mechanism through which macrolevel factors, such as socioeconomic status, influence teens' decisions to engage in sex. That is, the effects of macrolevel variables on teenage sexual behavior may be mediated through cognitive factors by shaping beliefs, perceived norms, and attitudes about engaging in sex. In a related study, South and Baumer (2000) found that the effect of socioeconomic status on teenage childbearing was related to social norms and attitudes about the acceptability of nonmarital parenthood. Although we did not examine the mediation hypothesis in the current study, it is an important avenue of future research. Ultimately, as Krieger (2001) suggested, we need to advance theory that integrates both macro- and microlevel factors if we are to have an adequate understanding of teen sexuality. Integrating these factors into an ecological model such as that described by Small and Luster (1994) might be a fruitful approach.

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