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Maternal Influences on Asian American–Pacific Islander Adolescents’ Perceived Maternal Sexual Expectations and Their Sexual Initiation

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Abstract

Maternal influences on adolescents’ sexual initiation have been examined over two time points in 433 Asian American–Pacific Islander (AAPI) adolescents in a secondary analysis of the Add Health data set using structural equation modeling. A longitudinal model built on a preliminary qualitative study is used to examine the fit between data and model. Maternal perceived connectedness and adolescents’ perceived maternal sexual expectations in sexual timing are found to be protective for delaying AAPI adolescents’ sexual initiation. Unexpectedly, mothers’ perceptions of sexual discussion are not protective for delaying adolescents’ sexual initiation. The results suggest interventions should focus on promoting AAPI mothers’ perceptions of connectedness with their adolescents and adolescents’ perceptions of their mothers’ sexual expectations (as measured by adolescents’ perceived maternal disapproval attitudes and affects) in delaying sexual initiation.

Keywords

parental expectations; connectedness; mother-adolescent interaction; sexual debut; Asian American adolescents

Introduction

The sexual health–related problems of Asian American–Pacific Islander (AAPI) adolescents have often been overlooked because of the stereotype that they are a trouble-free, “model minority.” Yet AAPI women have incurred the highest increases of certain sexually transmitted infections (STIs), such as gonorrhea and HIV/AIDS (Foo, 2002). For example, between 1999 and 2003, there was a 34% increase in AAPIs diagnosed with AIDS. From 1992 to 2004, there was a sevenfold increase in AAPIs diagnosed with AIDS (1,010 to 7,317; CDC, 2004). For female adolescents and adults, heterosexual contact has been identified as the primary source of new cases of HIV/AIDS, yet there is a dearth of research literature examining parental influences on adolescent sexual behaviors in this population.

The fallacy of viewing the AAPI population as an affluent, model minority has led the public to believe that this population has few, if any, health-related problems. In reality, this is a

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heterogeneous group (consisting of at least 26 subgroups) whose health needs are as genuine as those of other ethnic groups. In reality, they also experience additional pressures related to overcoming differences in appearance, language, and culture (Kao, 2006). In addition, different degrees of acculturation between generations may affect the dynamics of the parent–child dyad. Hence, it is relevant to extend the breadth of knowledge of mother–adolescent interactions to include AAPI families. For instance, AAPI family-centered values are considered to be a strength of Asian cultures in terms of preventing alcohol and drug abuse and for promoting academic achievement (Hall & Barongan, 1997; Okazaki, 2002; Yeung & Chang, 2002). What is unclear is whether AAPI family-centered cultural values are protective against unplanned teenage pregnancies and STIs/AIDS. A 1992 survey of 2,026 9th- to 12th-grade students in Los Angeles county schools, which included 186 Asian Americans, found that 26% of the Asian American students who had engaged in vaginal intercourse during the preceding year reported they had never used condoms, as compared with all other adolescents (14% African Americans, 16% Whites, and 19% Other race and ethnicities; Schuster, Bell, Nakajima, & Kanouse, 1998). Although compared with other ethnic groups AAPI adolescents have a lower incidence of STIs and a later sexual debut, once they became sexually active, AAPI adolescents were as likely as other ethnic groups to use drugs, alcohol, and/or to engage in unprotected sex (Grunbaum, Lowery, Kann, & Pateman, 2000). Hence, it is important to understand factors related to AAPI adolescents' early sexual initiation.

In this study, the relationships among mothers' and adolescents' perceptions of mother–adolescent interactions, adolescents' perceived maternal sexual expectations (APMSE) in sexual timing, and adolescents' self-reported sexual initiation were explored using a national representative data set (Add Health data set, Waves 1 and 2). The conceptual underpinnings for the study included aspects of Bronfenbrenner's social ecological model (Wilson, Evans, & Roberts, 2003) and the expectancy violation–realignment model (Collins & Luebker, 1994). Bronfenbrenner advocates consideration of reciprocal, ever-changing, multicontextual interactions without reductionism with their environment (Wilson et al., 2003). Based on his model, it is important to consider AAPI adolescents within the context of important environments, in this case, mother–adolescent interactions. In addition, the expectancy violation–realignment model (Collins & Luebker, 1994) was used to explicate mother–adolescent interactions, specifically to form the construct of APMSE in sexual timing. Collins and Luebker (1994) have suggested that through parent–child interactions, both parents and children constantly realign their expectations and behaviors (e.g., attitudes and affects) with each other. In addition, our preliminary qualitative study (Kao, Guthrie, & Loveland-Cherry, 2007) suggested that Taiwanese American girls' decision making about when to engage in sexual activity was related to their perceived expectancy and connectedness with their parents. In fact, reading their mothers' affect and disapproval attitudes on sex-related issues was identified by the U.S.-born Taiwanese American adolescent females as the main pathway to learn about their foreign-born Taiwanese American mothers' sexual expectations for them. This finding is congruent with research findings (Hahm, Lahiff, & Barreto, 2006; Lederman, Chan, & Roberts-Gray, 2004; Sieving, McNeely, & Blum, 2000) that link parental disapproval attitudes with adolescents' sexual initiation. In this study, we incorporated adolescents' perceived disapproval attitudes along with their expected affect from their mothers to represent the construct of APMSE in sexual timing. This approach is a part of explorations to develop an expectancy-focused family intervention to promote positive parental influences on adolescents' sexual behaviors among culturally diverse families.

Conceptual Model

In our conceptual model (Figure 1), maternal influences were assessed by APMSE derived from the mother–adolescent's prolonged and constant interactions (i.e., perceived communication and connectedness). We proposed that APMSE is a result of prolonged

interactions between parent and adolescent and can be used to theorize and reflect on the effects of maternal influences on adolescents' sexual timing, with the assumption that maternal influences are significant in adolescents' development in sexual behaviors (Hahm et al., 2008; Jaccard, Dodge, & Dittus, 2003). We hypothesized that a higher level of interactions between mother and adolescent would result in a higher level of perceived expectancy (APMSE) for a later sexual onset and consequently would be associated with later sexual initiation by these adolescents over time. We also proposed that the perceived expectancy would serve as an intermediate factor between mother–adolescent interactions and adolescents' sexual initiation. We empirically tested the cross-sectional relationship between perceived expectancy and adolescents' self-reported sexual initiation at both waves to understand the associations within same waves.

Mother–Adolescent Perceptions of Interaction

Several variables were identified to reflect how mothers and adolescents interact on sex-related issues. Maternal sexual discussions, adolescents' perceived general communication, and both mothers' and adolescents' perceptions of connectedness are important formative factors. The reasons mothers' perceptions of sexual discussion were selected, instead of adolescents' perceptions, or both, are to consider (a) the fact that the incongruent reports between mother and adolescent about sexual discussion have been consistently noted in the literature (K. S. Miller, Kotchick, Dorsey, Forehand, & Ham, 1998) and (b) the notion that encouraging parental sexual discussion with their adolescents is one of the recommended strategies to promote adolescents' sexual behaviors (Jaccard, Dodge, & Dittus, 2002; Jaccard et al., 2003; Kao et al., 2007). Hence, using mothers' perceptions of discussion could reflect potential challenges that the AAPI mothers might have faced, such as mothers' discomfort about sexual discussion, particularly when there is a limited understanding about the effect of maternal sexual discussion among AAPIs.

Research conducted with other ethnic groups has yielded mixed results on the effects of maternal sexual discussion. Generally, more frequent and positive maternal sexual discussions have been associated with fewer sexual partners, later sexual initiation, and less frequent sexual activity (DiIorio et al., 2001; Jaccard, Dittus, & Gordon, 2000; Jaccard et al., 2002, 2003; B. C. Miller, 2002; Whitaker & Miller, 2000). Whitaker and Miller (2000) found that peer norms were more strongly associated with risky sexual behavior for those adolescents who had not discussed sex or condom use with their mothers than those who did so. To the contrary, Widmer (1997) found a negative association between maternal sexual discussions and adolescents' levels of sexual behaviors. One possible explanation for this negative correlation could be that the mothers might have decided to speak with their children about sexual issues after learning about their sexual or impending sexual activities. Hence, the timing of sexual discussion could be influential in understanding Widmer's research findings. Although there still remains some disagreement in the literature about the effectiveness of maternal–adolescent sexual discussions regarding the onset and the frequency of adolescent sexual intercourse, most research studies indicate consistent and positive links between maternal sexual discussion and condom use in sexually active adolescents. For African American and Hispanic adolescents, in-depth and more frequent sexual discussions with their mothers were positively associated with condom use (Crosby et al., 2002; DiClemente et al., 2001). Other researchers (Jackson, Bijstra, Oostra, & Bosma, 1998; K. S. Miller et al., 1998) have suggested that to facilitate sexual discussions between mothers and adolescents, measures of such interactions should cover not only what is discussed but also how the information is conveyed.

Other factors associated with family or parental supports, such as perceived connectedness between mothers and adolescents, have been found to be as important as communication or discussions about sex. In fact, studies (Resnick et al., 1997; Rodgers, 1999; Taris & Semin,

1997) have found that perceived connectedness between the mother and adolescent can lead to a successful sexual discussion and decrease adolescent pregnancy risk. In our preliminary qualitative study (Kao et al., 2007), adolescent females' perceived connectedness was an important element in how adolescents would follow or comply with the expectancy they have perceived from their mothers. In addition, many researchers (Hahm et al., 2008; Lederman et al., 2004; Sieving et al., 2000) have suggested that mothers' perception of connectedness (attachment) plays an important role in adolescents' sexual timing. Because the effect of connectedness may be perceived differently by AAPI mothers and adolescents and the perceptions of connectedness might differ within the dyads, we decided to independently test mother's and adolescent's dyadic connectedness in the model. This approach was to account for the potential intergenerational differences in individualism or collectivism. For example, for many AAPI mothers, cultured by collectivism, the best way to teach their children values and health practices may be by setting an example or by modeling behaviors of themselves on how to preserve their family honor and values (Shek, 1999). Yet AAPI adolescents, cultured by individualism, may emphasize their own personal connectedness and demand directed discussions from their mothers. Hence, straddling between their familial and societal norm, AAPI adolescents may not perceive or respond appropriately to their mothers' nonverbal messages. This potential mismatch in teaching and learning styles could impede how AAPI adolescents perceive their mothers' sexual expectations, which may in turn influence their sexual behaviors. Therefore, one of the first steps of this research project was to understand how AAPI adolescents perceive their mothers' sexual expectations and how the expectancy may affect adolescents' sexual initiation over time.

APMSE

Although extensive research has been conducted (Crosby et al., 2001, 2002; DiClemente et al., 2001; Taris & Semin, 1997) that examines the family functional (e.g., child-rearing style; maternal connectedness, relation, and monitoring; sexual discussion) and structural (e.g., SES, presence of mother, parental marital status, mother's education) variables that can influence mother-adolescent sexual discussions, there is a paucity of documented studies that examine the effects of perceived maternal expectancy on adolescents' sexual behavior. In the past, researchers often examined adolescents' sexual behaviors from the standpoint of individualism, which assumed that adolescents acted independently in their decision-making processes. Although investigating individual characteristics might be important to learn about adolescents' early sexual initiation, understanding factors related to family influences should be recognized (Feldman & Rosenthal, 2002; Jaccard, Dittus, & Gordon, 1996; B. C. Miller, 2002; Schuster et al., 1998; Sieving et al., 2000). Specifically, adolescents' perception of maternal sexual expectancy including perceived disapproval attitudes and affect should be included in the line of investigation about adolescents' sexual behaviors along with maternal sexual attitudes and values or family religious affiliation (Bettinger et al., 2004; Hahm et al., 2008; B. C. Miller et al., 1997; Swanson, 1989).

One representative longitudinal study of British mother-adolescent dyads ($n = 302$ at Time 1 and $n = 255$ at Time 2) examined the relationship among family distal variables, including SES, age of mother and child, and presence of the father, family proximate variables (e.g., child-rearing styles, sexual permissiveness), and the amount of intrafamily conflict and adolescent sexual behavior (Taris & Semin, 1997). The results did not support the notion of delayed sexual initiation of adolescents as a consequence of positive mother-child relationships (connectedness). In contrast, the stronger the maternal desire to maintain a good relationship with their adolescent child, the more likely that their adolescent's sexual initiation would occur at a younger age. These researchers suggested, however, that the mothers might not be clearly communicating their sexual expectations to their adolescents, which in turn may have resulted in those adolescents' having earlier intercourse.

Similarly, in another study (K. S. Miller, Forehand, & Kotchick, 1999) with 907 Black and Hispanic families in three communities (Alabama, New York, and Puerto Rico), the mother–adolescent relationship (as measured by general communication between mother and adolescent) was a good predictor of adolescents' lower levels of sexual behaviors. In the same study, maternal monitoring and maternal sexual attitudes (as a proxy for expectations) emerged as significant predictors for adolescent sexual behavior, whereas the family structural variables (as measured by family income, parent education, and maternal marital status) failed to predict adolescent sexual behaviors. One important finding was that in the Puerto Rican sample compared to either the Alabama or New York samples, maternal attitudes (expectations) were more strongly related to adolescent sexual activities, suggesting that other family factors, such as different cultural values, acculturation experiences, and language variations may influence the sexual behaviors of Puerto Rican adolescents.

Moreover, Shek (2005), who framed maternal expectations as part of the maternal control process, suggested that traditional Asian parents with collective perspectives expected their children to have attributes such as good character, obedience, and other virtues and to not dishonor the family name. These expectations are heavily emphasized in many Asian cultures. Consequently, AAPI mothers may rely heavily on the high expectations, expressed by disapproval attitudes and affects about sexual activities for their children. Thus, it is important to empirically test how AAPI adolescents perceive their mothers' sexual expectations (APMSE) from the prolonged interactions with their mothers and how the mother–adolescent interactions and APMSE might play a role in AAPI adolescents' sexual initiation over time.

Method

The current study conducted a secondary analysis of the nationally representative, longitudinal Add Health data set (Udry, 1998) across the first two waves of data collection. The study used a longitudinal design to examine the relationships among mother–adolescent interactions, APMSE, and adolescents' sexual initiation. The social ecological model and the expectancy violation–realignment model informed the underlying theoretical framework to examine how AAPI adolescents' sexual initiation was related to intra- and interpersonal influences. Structural equation modeling (SEM), specifically EQS 6.1 for Windows (Bentler, 2006), was used to examine the fit between the longitudinal data and the model, which was built on a preliminary qualitative study (Kao et al., 2007). Prior to conducting the data analysis, approval for exemption from IRB review (HUM00011883) was obtained through the University of Michigan Health Science Institutional Review Board.

Because the sample size of AAPI students in the Add Health data set was limited, collapsing AAPI as a single group and including only relevant elements from micro- and mesosystems were necessary to have sufficient power to analyze the dyadic interactions. For example, variables from the microsystem (i.e., APMSE) and the mesosystem (i.e., mothers' and adolescent's perceptions of interactions) were examined for their influences on adolescents' sexual initiation. Other factors, such as acculturation influences and gender variations on AAPI adolescents' sexual behaviors, are explored in other studies. The relationships between independent variables and dependent variables were examined in two time periods, Wave 1 (September 1994 to December 1995) and Wave 2 (April 1996 to August 1996), to examine any longitudinal effects across waves. Because many of the variables of interest were not assessed in Wave 3 (August 2001 to April 2002), data from that wave were not included in the analysis.

Add Health Study and Data Set

The Add Health study, using a stratified cluster sampling design, included an in-school questionnaire that was administered to a nationally representative sample of students in Grades

7 through 12. The subsequent studies were a series of in-home interviews of students and one of their parents (or parent figures) held approximately 1 (Wave 1), 2 (Wave 2), and 6 years (Wave 3) later. Written informed consent was obtained from the parent or legal guardian and assent from the adolescents prior to the Wave 1 interview. For 85.6% of the adolescents who participated, a resident parent (preferably the mother) completed a 30-min in-home interview. The in-home interview for adolescents was administered using both computer-assisted self-interviewing (CASI) and audio-CASI systems for sensitive sex-related questions and lasted approximately 90 min. The response rate for the Wave 2 survey was about 88%.

Sample

A series of inclusion and exclusion criteria were established to select the AAPI sample for this analysis. The inclusion criteria included adolescents (a) who identified themselves as being AAPI, (b) who had completed both the Wave 1 and Wave 2 in-home interview survey, (c) whose ages were between 15 and 17 years at Wave 1, and (d) whose mother participated in the Wave 1 in-home interview. Adolescents younger than 15 years of age at Wave 1 were excluded because many sex-related questions only were asked of adolescents older than age 15. Adolescents older than age 17 at Wave 1 also were excluded because those participants who had completed high school were not included in the Wave 2 interview. Additional exclusion criteria were those adolescents (a) whose mothers did not participate in the Wave 1 in-home interview and (b) whose report on sexual initiation were prior to their birth date or age 10. These exclusion criteria were set to eliminate cases with potentially confounding factors. For example, those adolescents who reported that their sexual intercourse had occurred at or before age 10 had likely experienced nonconsensual sex; hence, such adolescents were excluded to avoid biased results. Also, because the purpose of this study was to understand maternal influences, adolescents whose fathers or grandparents, instead of the mother, had participated in the study also were excluded. The final AAPI sample consisted of 433 adolescents aged 15 to 17 years ($M = 16.06$, $SD = 0.773$) and their mothers. The descriptions of the sample are listed at Table 1. Parental educational level and their annual income were similar to general demographics reported for the entire sample at that time. However, these two variables were not included in the modeling because of the insignificance noted in the literature (Crosby et al., 2001; Crosby et al., 2002; DiClemente et al., 2001; Taris & Semin, 1997) and during preliminary model testing. Missing data (about 10%) were handled by the built-in algorithm (Pair) of EQS 6.1 (Bentler, 2006).

Measures

Four latent factors were constructed to measure mother and adolescent interaction with regard to sexual health information provided at home, including maternal sexual discussion and perceived connectedness and adolescents' perceived general communication and connectedness. Two dependent variables were measured over the two time points using one latent construct (APMSE) and one observed variable (sexual initiation). Table 2 provides the descriptive statistics for the observed variables, internal reliabilities (Cronbach's alpha), and the confirmatory factor analysis of the measurement model.

Dependent Variables

A composite of three items (using the standardized mean) was selected to assess APMSE related to sexual timing. This latent factor assessed adolescents' perceptions of their mothers' attitudes (approval or disapproval) and affect (i.e., expected distress) about them having sex at this time of their life. The three items were (a) How would your mother feel about you having sex at this time in your life? (b) How would your mother feel about you having sexual intercourse with someone who is special to you and you know well—like a steady girlfriend/boyfriend? (1 = *strongly disapprove* to 5 = *strongly approve*); and (c) If you had sexual

intercourse, would it upset your mother? This was scored on a Likert-type scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). Items were reverse coded to indicate a higher score for the higher level of perceived maternal sexual expectancy for a later sexual onset ($\alpha = .790$ at Wave 1, $\alpha = .799$ at Wave 2). The factor loadings were .89, .83, and .59, respectively, for Wave 1 and .90, .75, and .66, respectively, for Wave 2.

Age of Sexual Initiation

To reflect the onset of sexual initiation, one observed variable was formed by combining several questions to calculate adolescents' age at the first sexual intercourse. The questions included the following: Have you ever been sexually active? In what month [and year] did you have sexual intercourse for the very first time? In what month [and year] were you born? At Wave 1, a 1-to-7 scale was constructed to reflect their first sexual exposure (1 = *no sexual exposure*, 2 = *at age 17*, 3 = *at age 16*, 4 = *at age 15*, 5 = *at age 14*, 6 = *at age 13*, 7 = *at age 11 or 12*). At Wave 2, a 1-to-8 scale was constructed to reflect the onset of sexual initiation (1 = *no sexual exposure*, 2 = *at age 18*, 3 = *at age 17*, 4 = *at age 16*, 5 = *at age 15*, 6 = *at age 14*, 7 = *at age 13*, 8 = *at age 11 or 12*).

Independent Variables

Four independent variables (latent factors) assessed mother–adolescent interactions in our model. Maternal sexual discussion was constructed from the four items to assess mothers' perceptions with regards to the extent, degree, negative consequence, and comfort level of conducting discussion ($\alpha = .825$). For example, the extent of discussion was assessed by questions such as, "How much have you and your child talked about him/her having sexual intercourse and the negative things that would happen if (he got someone/she got) pregnant?" "The dangers of getting sexually transmitted diseases?" and "How much have you talked to your child about sex?" Possible responses were on a Likert-type scale that ranged from 1 (*not at all*) to 4 (*a great deal*). The mothers' comfort with having sexual discussions was assessed by a question such as, "Would it be difficult for you to explain things if you talked with your child about sex and birth control?" These responses could range from 1 (*strongly agree*) to 5 (*strongly disagree*). The factor loadings for these four items were .88, .85, .77, and .45, respectively. Although the factor loading for the last item was only at .45 (still greater than the usual .40 cutoff), we felt it was important to assess mothers' comfort level in engaging sex discussion (Jaccard et al., 2000).

Mothers' Perceived Connectedness

A latent factor represented by three items was selected to assess mothers' perceptions of connectedness with their adolescents ($\alpha = .626$). Because of the low reliability, when error terms were calculated, the alpha was specified at .80. This assumption is a more conservative way in SEM to account for possible error when variance is considered. The three items were "Do you get along with him/her well?" "Do you and he/she make decisions about his/her life together?" and "Do you feel you can really trust him/her?" A 5-point Likert-type scale was used with responses of 1 = *always*, 2 = *often*, 3 = *sometimes*, 4 = *seldom*, and 5 = *never*. The coding was reversed to reflect higher scores representing greater connectedness. The factor loadings for these three items were .62, .63, and .58, respectively.

Adolescents' Perceived General Communication

A latent factor presented by four categorical items (1 = *yes*, 0 = *no*) was selected to assess adolescents' perceived general communication with their mothers in the past 4 weeks. The four items were "Have you done the following activities with your mother in the past 4 weeks— (1) talked about a party you went to, (2) talked about a personal problem, (3) talked about school work (or grade), or (4) talked about other things you are doing in school?" The factor

loadings for these four items were .48, .49, .56, and .54, respectively. This latent factor had low internal reliability ($\alpha = .588$), which probably was due to the nature of the categorical variables and the time frame (in the past 4 weeks) set by the question, which could limit its reliability. For example, the adolescents might not have spoken with their mothers about a party because they had not attended a party during that time period. Hence, this latent factor probably is closer to a formative factor. Thus, when calculating the error terms, the alpha was conservatively set at .80.

Adolescent's perceived connectedness

A latent factor represented by four items was selected to assess adolescents' perceived connectedness with their mothers ($\alpha = .851$). The questions were (1) "How close do you feel to your mother?" (1 = *not at all* to 5 = *a great deal*); (2) "Most of the time, is your mother warm and loving toward you?" (3) "Are you satisfied with the way you and your mother communicate with each other?" and (4) "Overall, are you satisfied with your relationship with your mother?" For Items 2 to 4, a 5-point Likert-type scale was used that ranged from 1 (*strongly agree*) to 5 (*strongly disagree*). Items 2 to 4 were reverse coded to reflect higher scores for higher levels of connectedness. The factor loadings of these four items were .68, .71, .81, and .90, respectively.

Data Analysis

Interval- and categorical-level data with normal distribution patterns based on score ranges, means, standard deviation, skewness and kurtosis, and scatter-plots were assessed with parametric statistics. The multivariate kurtosis was assessed using Mardia normalized estimates (17.28) for the appropriateness of a normal distribution. SPSS 14 for Windows was used to transfer data from the subset data constructed by SAS 9.1. Psychometric tests were performed to assess the reliability and validity of each measure. Internal consistency reliability was assessed using the Cronbach's alpha coefficient. Construct validity was assessed using exploratory and confirmatory factor analysis procedures (Table 2). Table 3 presents the means, standard deviations, and the intercorrelations among the composite variables used in the model.

In our model, there were four dependent variables—APMSE at Wave 1 and Wave 2 and adolescents' onset of sexual initiation at Wave 1 and Wave 2. The model was tested using confirmatory latent structural equation analysis with the EQS 6.1 program (Bentler, 2006). The main reason for choosing SEM was its capability to test the theoretical model simultaneously with all the constructs (McDonald & Ho, 2002). That is, several exogenous and endogenous variables could be assessed at the same time. Another important consideration for using SEM was the recognition that observed variables were measured with error, that is, their reliabilities were known to be less than perfect. Hence, the error terms were taken into account for the estimation. These analyses were performed on the total sample of 433 AAPI adolescents and their mothers. All of the analyses were performed using nonweighted data for the following reasons. First, although there is a consensus for using weighted data in generalizing descriptive statistics for targeted subpopulations, there is no agreement in multivariate analyses (Gelman, 2006). Because only a small portion (3%) of the Add Health sample ($n = 13,568$ at Wave 2) was used in the analysis, adjusting the weight for oversampled AAPI (or the nonresponsive rate) would not necessarily produce unbiased inferences. Second, when sampling weights were only used for a function of independent variables included in the model, using nonweighted data are probably better because the non-weighted estimates are unbiased, consistent, and have much smaller standard errors than weighted estimates (Winship & Radbill, 1994). Third, we performed the analyses using both weighted and nonweighted data, and the results of these analyses were very similar (using normalized weight procedure in EQS 6); hence, the

nonweighted estimates were reported. Cases with missing data (10%) were handled with the built-in Pair algorithm.

Because the data's distribution was within normal parameters, maximal likelihood estimated chi-square (χ^2) was used as one of the indices. In general, a nonsignificant chi-square will indicate a good model fit. However, because χ^2 is sensitive to the sample size, other indices were used to assess the model fit. Following the recommendation of Raykov, Tomer, and Nesselroade (1991), we reported goodness-of-fit measures such as normed fit index (NFI), Joreskog-Sorbom's GFI, nonnormed fit index (NNFI), and comparative fit index (CFI). We also reported one misfit index, root mean square error of approximation (RMSEA). Fit indices that exceeded .90 and the RMSEA misfit that was below .06 are considered to indicate acceptable fit (Bentler, 2006; Raykov et al., 1991). The number of iterations for convergence and the largest standardized residuals were assessed. The level of significance ($p < .05$) of the factor loading for each item, variances of independent factors, error terms, and covariance between each factor were reviewed. The path coefficients were reported in the standardized solution (Figure 2). The Wald test for dropping parameters and the Lagrange multiplier test for adding parameters were considered. The best-fit measurement model was used as a foundation for testing the structural model. Path loadings, error terms, and the amount of variance explained (R^2) for the dependent variables were reported in the standardized solution.

Results

Measurement Model

The measurement (confirmatory) model was assessed using six latent factors (21 variables). The dependent variables (sexual initiation at Wave 1 = Dependent Variable 7, and at Wave 2 = Dependent Variable 8) were not included in the measurement model. The measurement model converged in 94 iterations and the factor loading for each item (range from .45 to .90) is shown in Table 2. The largest standardized residual was less than 0.18. The fit and misfit indices were as follows: $\chi^2 = 331.678$, $n = 433$, $df = 179$, $p = .000$, NFI = .931, NNFI = .966, CFI = .971, GFI = .912, RMSEA = .040. These fit indices were above the recommended .90, and the misfit indices were below the recommended .06, which indicated that the longitudinal data fit the measurement model fairly well (statistically acceptable) and we could proceed to structural (path) model testing.

Structural Model

In the structural model, we not only added the pathways among the factors in the longitudinal data but also added the two observed variables as endogenous variables in the analysis. These two endogenous variables were the age of adolescents' sexual initiation at Waves 1 and 2. They were treated as continuous variables because they were 7- and 8-point variables. The direct, indirect, and total effects of the structural model were assessed and evaluated. The fit and misfit indices for this full longitudinal model were as follows: $\chi^2 = 351.99$, $n = 433$, $df = 34$, $p = .992$, NFI = 1.00, NNFI = 1.10, CFI = 1.000, GFI = 1.000, RMSEA = .000, which suggested a good fit between the data and the model. This model approximately explained 59% of the variance in APMSE and 56% of adolescent sexual initiation at Wave 2.

Although these results supported some of our hypotheses, several hypotheses were not supported. For example, the hypothesis that maternal sexual discussion would have a positive influence on delayed sexual initiation was not supported. To the contrary, maternal sexual discussion was negatively associated with these AAPI adolescents' sexual initiation, at both Wave 1 (direct effect = .128) and at Wave 2 (indirect effect = .110, total effect = .159). Moreover, maternal sexual discussion was significantly and negatively related to APMSE at Wave 2 (direct effect = -.118) but not at Wave 1. Similarly, the hypothesis that adolescents'

perceived general communication with their mothers would have a positive influence on later sexual initiation was not supported. Instead, adolescents' perceived general communication was associated with earlier sexual initiation at Wave 1 (direct effect = .161) and Wave 2 (indirect effect = .109, total effect = .145).

When assessing the effects of connectedness, we found that the results varied between the mothers and adolescents. For instance, although there were no statistically significant direct, indirect, or total effects of adolescents' perceived connectedness on any of the four dependent variables, maternal perceived connectedness emerged as a significant predictor for all four dependent variables through direct, indirect, and total effects. That is, the mothers' perceptions of connectedness were associated with a higher level of APMSE at Wave 1 (direct effect = .217) and at Wave 2 (indirect effect = .179, total effect = .238), and with delayed sexual initiation at Wave 1 (direct effect = -.190, indirect effect = -.059, and total effect = -.248) and Wave 2 (indirect effect = -.174, and total effect = -.229). In addition, APMSE at Wave 1 predicted a later sexual initiation at Wave 1 (direct effect = -.269) and Wave 2 (direct effect = -.208, indirect effect = -.332, and total effect = -.540). The indirect effect suggested that for those adolescents whose mothers reported a higher level of connectedness also perceived a higher level of maternal sexual expectation (APMSE) and also reported a later sexual initiation at Wave 2. This finding is congruent with our preliminary qualitative study (Kao et al., 2007) that Taiwanese American girls' sexual behaviors were influenced by their perceived maternal sexual expectations that are based on a trusting relationship between the mother and adolescent. Figure 2 provides the results (presented in standardized path coefficients) of this path model.

Discussion and Conclusions

The best-fitting plausible model for these data indicated that adolescents' sexual initiation at both Waves 1 and 2 were influenced directly by APMSE at both waves. The study findings suggest that the best way to delay AAPI adolescents' sexual initiation is to promote adolescents' perceived maternal expectancy for later sexual onset by establishing a trusting relationship between AAPI mothers and adolescents. Specifically, promoting AAPI mothers' perceptions of connectedness with their adolescents emerged as a promising element for adolescents to develop such expectancy. This finding is consistent with other research that found maternal connectedness is protective against adolescents' risky behaviors (Hahm, Lahiff, & Guterman, 2003; Lam, Russell, Tan, & Leong, 2008; Sieving et al., 2000). Hence, intervention for delaying AAPI adolescents' sexual initiation should aim to develop adolescents' perceived expectancy by promoting mothers' connectedness with their adolescents.

Although mothers' perceptions of connectedness were found to be protective for AAPI adolescents' sexual initiation and APMSE, adolescents' perceptions of connectedness were not found to be significant with any one of the dependent variables. This insignificant finding might be related to AAPI adolescents' adaptation in a collective family perspective; that is, AAPI adolescents might place more importance on the mothers' perceptions of connectedness rather than those of their own. It would be important in the future to assess acculturation influences on AAPI adolescents' perceptions of connectedness and the development of APMSE.

In terms of maternal sexual discussion, the study findings did not support the notion that mothers' perceptions of sexual discussion would delay adolescents' sexual initiation. Instead, AAPI maternal sexual discussion was correlated with earlier sexual initiation and a lower level of APMSE. This result might be related to mismatched communication styles (e.g., language or cultural barriers) between the dyads. For example, language or cultural barriers between generations might complicate the dynamic process in communicating their expectations for

each other. In this study, AAPI maternal sexual discussion was not significantly correlated with mothers' (or adolescents') perceived connectedness, which suggests that AAPI mothers' sexual discussion was not based on a trusting (or connected) relationship with their adolescents. Hence, the sexual discussion might be perceived by adolescents with "indifference," which might contribute to the negative findings. Moreover, adolescents' perceived general communication was not found to be protective either. In fact, it was associated with adolescents' earlier sexual initiation at Wave 1. This negative association might be related to the unclear expectations within the dyadic communications. It is possible that AAPI adolescents might mistake the general communication as permission or lenient attitudes to having sex. Hence, family interventions to delay AAPI adolescents' sexual initiation should aim to convey clear expectations between the parent-child interactions. In fact, expectancy-focused family interventions focusing on the family strengths (i.e., family values, beliefs, connectedness, and clear expectations) should be encouraged in the parent-child dyadic interactions. For example, from an anticipatory guidance perspective, health care providers should be cognizant of helping mothers understand the importance of establishing and maintaining a trusting relationship with their children prior to adolescence as a means of helping to ensure their adolescents' perceived expectancy for a later sexual onset.

Although the findings are encouraging, several limitations are worth mentioning. First, because of the nature of this secondary data analysis and the lack of validated items in the Add Health data set reflecting maternal monitoring, it was not included in the model testing. Future research should include maternal monitoring as a predictor of sexual initiation. It would be important to evaluate potential cross-cultural variations, so the strength of maternal influences can be manifested in each culture. Ultimately, a culturally specific family intervention can be developed to promote adolescents' positive development in sexual behaviors. Second, the reliabilities of two latent factors (maternal perceived connectedness and adolescents' perceived general communication) were lower than the recommended .70 (.626 and .588, respectively). Although conservative measures were taken with respect to the error terms, it is important to note that these two factors were formative in nature compared to the reflective factors. Third, APMSE is a latent factor created to reflect adolescents' perceived maternal sexual expectations on sexual timing only. It would be important to develop a psychometrically sound measurement to assess other dimensions of APMSE (i.e., expectancy of the use of safety measures and sexuality) to explicitly understand maternal influences on adolescents' other sex-related behaviors (i.e., condom use). Fourth, the data used for this study are more than 11 years old. However, it is important to note that the richness of these longitudinal data is much greater than data available elsewhere, particularly for AAPI families. Using this Add Health data set for model testing to generate preliminary knowledge about maternal influences on AAPI adolescents' sexual behavior is economical to build the knowledge base in this program of research. It would be important to verify findings with a more contemporary sample later. And fifth, to have sufficient sample size for the model testing, we treated AAPI adolescents as a single group for analysis. It is important to note that AAPI is a heterogeneous group consisting of at least 26 subgroups. Each subgroup has its unique cultural emphasis. Hence, the results of this study should not be generalized to any particular subgroup of AAPI. Additional work is needed to explore differences among subgroups of AAPI.

In summary, although some of the study's hypotheses were not supported, the overall results reinforced the findings of the preliminary qualitative study (Kao et al., 2007). AAPI adolescents' sexual behaviors were influenced by how the adolescents perceived their mothers' sexual expectations (as measured by disapproval attitudes and affect), which were related to mothers' perceptions of connectedness with their adolescents. The acceptance of this AAPI model indicates that addressing maternal influences within the family dynamic could be a way to promote AAPI adolescents' sexual health. It also provides evidence to move beyond individual-focused research to consider maternal influences in a collective context.

Although adolescents' perceived maternal expectancy in sexual timing has been verified as an important predictor for AAPI adolescents' sexual initiation in this study, it would be important in the future to empirically examine the potential differences of maternal influences (a) between AAPI adolescent males and females, (b) across different levels of acculturation among AAPI adolescents, and (c) across different cultural and ethnic groups. Finally, more study is needed to explore other aspects of adolescents' perceived parental expectations (i.e., parental expectancy on adolescents' safety behaviors) and their effects on other selected sexual behaviors, such as contraception and condom use.

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Figure 1.
Conceptual framework

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Table 1

Frequency Distribution of Asian American–Pacific Islander Demographic Data

Ethnic subgroups ^a	Age, years			Gender		Subtotal	
	15	16	17	Male	Female	n	Percentage
Chinese	42	38	24	54	50	104	24.0
Filipino	47	97	83	115	112	227	52.4
Japanese	10	13	8	16	15	31	7.2
Asian Indian	2	5	3	4	6	10	2.3
Korean	10	7	2	7	12	19	4.4
Vietnamese	2	2	6	4	6	10	2.3
Other Asian	20	23	24	36	31	67	15.5
Subtotal	116	173	144	223	210	433	
Percentage	26.7	40.0	33.3	51.5	48.5		
Socioeconomic status	<i>M</i>		<i>SD</i>				
Mother's education level ^b	6.25		2.47				
Father's education level ^b	6.46		2.34				
Yearly family income (in \$1,000)	50.87	39.08					

^aNote some adolescents self-identified as belonging to more than one Asian subgroup.

^bEducation level: 0 = no schooling; 1 = eighth grade or less; 2 = more than eighth grade but no high school; 3 = vocational school, no high school; 4 = high school; 5 = GED; 6 = some post-high school training; 7 = some college, but not graduate from college; 8 = college graduate; 9 = beyond 4-year college.

Table 2

Descriptive Statistics of Observed Variables and Measurement Model

	Descriptive			Measurement model		
	N	M	SD	Factor loading	SE	Error
Factor 1: Maternal sexual discussion ($\alpha = .825$)						
Variable 1: Extent of discussion: negative things	422	2.50	1.12	.883	1	.469*
Variable 2: Extent of discussion: STIs	423	2.82	1.14	.851	.032 [†]	.525*
Variable 3: Degrees of discussion: about sex	422	2.41	1.06	.776	.031 [†]	.631*
Variable 4: Sexual discussion: difficult to explain	415	3.66	1.11	.452	.047 [†]	.892*
Factor 2: Maternal perceived connectedness ($\alpha = .626$)						
Variable 5: Getting along well	431	4.40	0.70	.621	1	.784*
Variable 6: Making decisions together	430	3.97	0.99	.625	.127 [†]	.781*
Variable 7: Can really trust adolescents	430	4.39	0.87	.579	.117 [†]	.815*
Factor 3: Adolescents' perceived general communication ($\alpha = .588$)						
Variable 8: Talking about party you attended	415	0.31	0.46	.476	1	.879*
Variable 9: Talking about your personal problem	415	0.29	0.45	.485	.157 [†]	.874*
Variable 10: Talking about schoolwork or grades	415	0.66	0.48	.553	.168 [†]	.833*
Variable 11: Talking about other things you do in school	415	0.57	0.50	.540	.166 [†]	.842*
Factor 4: Adolescents' perceived connectedness ($\alpha = .851$)						
Variable 12: How close do you feel to your mother	415	4.35	0.89	.675	1	.737*
Variable 13: Your mother is warm and loving toward you	415	4.27	0.81	.712	.056 [†]	.702*
Variable 14: Satisfied with the way of communication	415	3.86	1.06	.806	.056 [†]	.591*
Variable 15: Satisfied with the relationship	415	4.20	0.90	.898	.063 [†]	.440*
Factor 5: APMSE at Wave 1 ($\alpha = .790$)						
Variable 16: Your mother's feeling about having sex at this time of your life	415	4.52	0.75	.884	1	.467*
Variable 17: Your mother's feeling about having sex with someone special	415	4.18	0.95	.829	.045 [†]	.559*
Variable 18: Would your mother be upset if you had sexual intercourse?	411	4.29	1.04	.594	.044 [†]	.804*
Factor 6: APMSE at Wave 2 ($\alpha = .799$)						
Variable 19: Your mother's feeling about having sex at this time of your life	401	4.34	0.85	.896	1	.444*

	Descriptive			Measurement model		
	N	M	SD	Factor loading	SE	Error
Variable 20: Your mother's feeling about having sex with someone special	400	4.06	1.02	.749	.044 [†]	.663 [*]
Variable 21: Would your mother be upset if you had sexual intercourse?	399	4.20	0.996	.660	.044 [†]	.751 [*]
Variable 22: Sexual initiation at Wave 1 (1–7 scale)	433	1.88	1.64			
Variable 23: Sexual initiation at Wave 2 (1–8 scale)	433	2.16	1.89			

Note: STI = sexually transmitted infection; APMSE = adolescents' perceived maternal sexual expectations. Fit indices for measurement model: Satorra-Bentler $\chi^2 = 300.29$ ($df = 179$, $n = 433$), $p = .000$, normed fit index = .931, nonnormed fit index = .966, comparative fit index = .971, root mean square error of analysis = .040 (90% CI = .032 to .047).

* $p < .05$.
** $p < .01$.
[†] $p < .001$.

Correlations Between Composite Scales

Table 3

	F1	F2	F3	F4	F5	F6	DV7	DV8
F1: Maternal sexual discussion ($M = -0.0046$, $SD = 0.814$)	1							
F2: Maternal perceived connectedness ($M = 0.0002$, $SD = 0.764$)	-.022	1						
F3: Adolescent's general communication ($M = -0.0119$, $SD = 0.668$)	.236**	.114*	1					
F4: Adolescent's perceived connectedness ($M = -0.0107$, $SD = 0.836$)	-.044	.238**	.331**	1				
F5: APMSE at Wave 1 ($M = -0.0334$, $SD = 0.871$)	.034	.161**	-.029	.009	1			
F6: APMSE at Wave 2 ($M = -0.0302$, $SD = 0.852$)	-.048	.188**	.015	.050	.606**	1		
DV7: Sexual initiation at Wave 1 ($M = 1.8776$, $SD = 1.644$)	.139**	-.221**	.133**	-.046	-.275**	-.304**	1	
DV8: Sexual initiation at Wave 2 ($M = 2.1570$, $SD = 1.888$)	.177**	-.196**	.109*	-.084	-.140**	-.249**	.728**	1

Note: APMSE: adolescents' perceived maternal sexual expectations; F = Factor; DV = dependent variable.

*
 $p = .05$.

**
 $p = .01$ (two tailed).