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Abstract

Parents' influence on young adult sexual behavior receives little attention compared to influence on adolescent behavior. Yet effective parenting should have lasting effects. Even fewer studies examine parents' influence on sexual behavior of both foreign and native-born young adults. Using the National Longitudinal Study of Adolescent to Adult Health (Add Health) Waves I (1994-95) and III (2001-02), we examine longitudinal associations among mother-daughter relationship quality and nativity during adolescence and young adults' risky sexual behaviors of condom use at last intercourse, number of sexual partners, and STI diagnoses (N=4,460). Women, 18 to 26 years old, who had good mother-adolescent daughter relationships have fewer partners and STIs in the past year. Second generation women have worse mother-adolescent daughter relationships, compared to third generation. Relationship quality does not explain associations between nativity and risky behavior. Lasting associations between relationship quality and risk behaviors suggest that reproductive health interventions should enhance mother-adolescent relationships.

Keywords: young adulthood; parent-child relationships; sexual behavior; immigrant families

1. Introduction

Young adults account for half of the 20 million new sexually transmitted infections (STIs) each year and the highest rates of new HIV infections (Centers for Disease Control and Prevention, 2014; Jaccard, 2013). Young adult women, ages 20 to 24, have the highest rates of chlamydia and gonorrhea, and these infections increase the risk of pelvic inflammatory disease and infertility (Centers for Disease Control and Prevention, 2014). A growing percentage of young women, including those in their late teens and early twenties, are first or second generation immigrants, as 22% of the U.S. population is foreign-born or children of foreign-born parents (Grieco et al., 2012). Compared to U.S. natives, some immigrant young adults, primarily Latina immigrants, are found to be at increased risk for STIs (Gfroerer & Tan, 2003; Gordon-Larsen et al., 2003; Pflieger et al., 2013). Asian immigrant young adults are also at greater risk for STIs and HIV because they are less knowledgeable about sexuality, are more likely than other adults to engage in unprotected sex, and are less likely to seek sexual health care (Hahm et al., 2012; So et al., 2005).

Given the long-term implications of STIs for physical and psychological well-being, it is important to understand contextual factors that affect risky sexual behaviors for both native and foreign-born young adults. Early life family context or relationships with parents early in life set the stage for the individuals' relationships in adulthood. The quality of an adolescent's relationship with parents in adolescence predicts intimate partner relationship quality later in life (Johnson & Galambos, 2014; Seiffge-Krenke et al., 2010). However, effects of parent-adolescent relationship quality can vary based nativity and cultural context (Peterson & Bush, 2013). Immigrant women's family environment early in life may provide less preparation for the U.S. dating culture than the family environment of native-born women (Tyrell et al., 2014).

Very few studies have considered nativity when examining the influence of the parent-adolescent relationship on young adult sexual behaviors. To date there are a limited number of studies on the sexual behavior of immigrant young adults (Haderxhanaj et al., 2014; Schwartz et al., 2011; Smith, 2015) and even fewer studies on early life factors, such as relationships with parents, that could influence sexual risk

behavior of young adults from immigrant families (Deutsch & Crockett, 2015). The present study addresses this gap. This study uses the National Longitudinal Study of Adolescent to Adult Health (Add Health) Wave I (1994-95) and Wave III (2001-02) to examine differences in risky sexual behaviors of immigrant and native-born women and the association between their mother-daughter relationships during adolescence and risky sexual behaviors during young adulthood.

2. Background

2.1. Parent-Adolescent Relationships and Risky Sexual Behaviors

Among adolescents, high quality relationships with parents protect against risky sexual behavior for both native born (Halpern et al., 2006; Kao & Manczak, 2013; Markham et al., 2010) and immigrant populations (Kao et al., 2014; Karoly et al., 2015; Lam et al., 2008; Trejos-Castillo & Vazsonyi, 2008). A sense of connectedness to parents and communicating with parents about both general and sexual topics was associated with lower levels of ever having sex, lower likelihood of early sexual debut, less frequent sex, higher rates of contraceptive use, and lower pregnancy and birth rates among adolescents (Markham et al., 2010). In studies that consider nativity, for Hispanic youth of different generations, communication about sex with mothers and maternal support protect against early sexual onset and risky sexual behaviors in adolescence (Karoly et al., 2015; Trejos-Castillo & Vazsonyi, 2008; Velez-Pastrana et al., 2005).

Whether or not the protective benefits of a good relationship with parents continue into young adulthood is not fully understood, in part due to the lack of longitudinal data. Young adulthood, the period between ages 18 to 25 years old, is a time of instability, change, and exploration (Arnett, 2000). Prior longitudinal research suggests a general pattern of risky behavior that increases from mid adolescence to late adolescence and young adulthood – the early 20s (Dariotis et al., 2008). Young adulthood is marked by many unique transitions often including the decision to leave the parental home or to begin higher education or a career (Aquilino, 1997; Furstenberg, 2010). Features of young adulthood such as reduced parental supervision, greater opportunities for experimentation, a broader peer context generally accepting of non-marital sexual activity, and increased sexual activity (Halpern et al., 2006) suggest a disruption in the salutary effects of a strong parent-adolescent relationship. However, Furman

and Winkles (2011) concluded that the supportive aspects of relationships with parents remain quite stable from adolescence into the transition to adulthood despite the influence of other factors like peers.

Parent-child relationships have permanent behavioral implications not present in ever-changing relationships with peers (Grusec & Hastings, 2014). Young adults say that parents have the largest impact on their knowledge, values, and attitudes about sex (Becker et al., 2014; Kirby, 2001; Seiffge-Krenke et al., 2010). Cross sectional studies show that parental acceptance and monitoring during adolescence protects against participation in risky sexual behavior during young adulthood (Padilla-Walker et al., 2008; Schwartz et al., 2009). In a predominately white rural sample, adolescents who participated in an intervention that focused on developing supportive parent-child bonds in high school were found to have fewer partners and lifetime STIs in young adulthood (Spoth et al., 2014). Another intervention study focused on improving the quality of family relationships for adolescents ages 12 to 15 found indirect positive effects in young adulthood by reducing risky sexual behaviors (Caruthers et al., 2014). Parents' warnings about risky sexual activity in adolescence is also associated with a greater number of sexual partners in young adulthood, suggesting that parents' advice may both shape and respond to teenagers' risky behavior (Coley et al., 2013).

These findings suggest that parent-adolescent relationships have lasting effects on sexual decision-making in young adulthood. But the cross-sectional designs used in most studies make it impossible to rule out the possibility that young adults' responsible sexual behavior enhances parent-child relationships rather than good relationships with parents leading to responsible sexual behavior (Padilla-Walker et al., 2008; Schwartz et al., 2009). A growing body of research also has shown that young adults benefit from positive parenting during young adulthood (Booth et al., 2012). Parents' support of young adult children may be significant because parents are addressing their young adult's current circumstances. Moreover, these studies do not consider nativity and how parent-child relationships may affect young adult behaviors differently in immigrant families. Thus, the question remains whether or not there are lasting effects of parent-adolescent relationships on sexual behavior for immigrant and native-born young women.

2.2. Mechanisms Linking Parent-Adolescent Relationships and Young Adults' Risky Behavior

Attachment and socialization theories highlight potential mechanisms for early parental influences on young adult behavioral outcomes, and intergenerational cultural dissonance explains how attachment and socialization are challenged in immigrant families. Attachment theory asserts that people have internal working models based on early experiences with caregivers, especially parents that regulate offspring's reactions and needs for interpersonal closeness and intimacy with others (Bowlby, 1978). Internal models of close relationships are informed by relations within the family of origin (Furman & Winkles, 2011; Seiffge-Krenke et al., 2010). Adolescents' attachment to parents guides expectations about romantic relationships over time (Manlove et al., 2012; Steinberg et al., 2006). Parent-child relationship quality also predicts the quality of a later relationship with a partner (Collins et al., 2002; Fosco et al., 2015; Johnson & Galambos, 2014; Overbeek et al., 2007). Young adults with insecure attachment to parents in adolescence may have diminished capacity for intimate partnerships and more sexual partners.

Socialization theory highlights another mechanism linking parent-adolescent relationships and young adult behaviors. Socialization theory asserts that children and adolescents learn certain behaviors early in life from parents and other adult role models (Peterson & Rollins, 1987). Socialization reproduces social values and norms, and parents shape children's social ideals within the family. In addition to modeling their own relationships on parents' relationships, socialization can operate through effects on the adolescent's self-efficacy. Parent-adolescent relationships contribute to internal working models of self-worth, which highly regulate intimate relationships, communication, and behaviors, including sexual behaviors, in emerging adulthood (Johnson & Galambos, 2014; Kenny & Sirin, 2006). Parent-adolescent relationship quality is associated with increased self-esteem in the transition to adulthood, which predicts greater intimate partner relationship quality as a young adult (Johnson & Galambos, 2014). Parent-adolescent relationships are of particular importance for the self-efficacy and well-being of young adult daughters (Van Wel et al., 2002). If a young adult woman had a positive parent-adolescent relationship, that influence on self-efficacy can protect against risky sexual behavior later in life.

In immigrant families, difficulties of the immigration process can affect attachment to parents or the socialization process and create a stressful parent-adolescent relationship. Immigrant families experience increased distress from both the challenges of adjusting to a new cultural environment and from a sense of familial disconnection as a result of different experiences of incorporation, particularly for foreign-born parents and native-born children (i.e., the second generation) (Dinh & Nguyen, 2006). Intergenerational cultural dissonance (ICD) or the acculturation gap is more common in immigrant families when parents adhere to their traditional beliefs while native-born children endorse dominant Western values. The perceived disconnection between immigrant parents and their children affects the quality of their relationship. Past research suggests that immigrant adolescents' risky behavior is partly attributable to failures in family efficacy or how family members relate to one another. Immigrant youth face problems associated with role strain caused by their exposure to value systems and cultures that differ from those their parents represent (Kao et al., 2014; Trejos-Castillo & Vazsonyi, 2008).

ICD weakens attachment between parents and immigrant children and can lead to problem behaviors (Choi et al., 2007; Chung, 2001). Second generation youth experience higher levels of conflict and strain in their attachment to parents due to dissonance between their cultural norms and those of their parents (Powell et al., 2010; Wu & Chao, 2011). First generation immigrants with strong family cultural identity engage in fewer risky sexual behaviors compared to those in the second generation (Smith, 2015). Although there is vast heterogeneity among immigrant populations, similar pathways between difficult relationships with parents and problem behaviors have been found for immigrant adolescents, regardless of country of origin (Fuligni, 1998). Intergenerational conflict for second-generation youth and their parents decreases family cohesion and, as a result, increases substance abuse, trespassing, and missing curfews during adolescence (Choi et al., 2007; Unger et al., 2009). ICD is also associated with more mental health problems among second-generation young adult women (Lui, 2014). The influence of parent-adolescent relationships on risky sexual behavior among young adults of differing immigrant generations is not yet understood. Because of the discrepancy between their immigrant parents' cultural orientations and the U.S. dating context, second generation adolescents may have weaker attachments to

their parents, and the adolescents may develop misguided expectations of romantic relationships in young adulthood and potentially engage in more risky behavior.

ICD challenges the protective aspects of the socialization process when second generation young adults are unable to apply their own childhood socialization to unfamiliar social challenges and experiences, such as U.S. dating culture. Immigrant parents regard many of the values of the receiving society as threatening to important family values and expectations of girls within the family (Dion & Dion, 2001). Both first and second-generation immigrant women report more difficulty in discussing dating with their parents and more intergenerational conflict on topics of dating and sexual behavior (Chung, 2001). When childhood socialization aligns with social challenges, it is beneficial. Strong parental support for U.S. cultural practices is associated with fewer sexual partners for Latino immigrant adolescents living in southern California (Becker et al., 2014). Socialization experiences of immigrant adolescents that do not align with young adult social challenges leave them unprepared for the greater opportunity for behavioral experimentation presented in young adulthood. This differential socialization strains parent-immigrant adolescent relationships, and could affect young adults' behavior. The strain may be particularly great for second-generation immigrants.

Very little is known about how the quality of the parent-adolescent relationship in immigrant families affects behaviors in young adulthood. Moreover, there is a paucity of longitudinal studies of the sexual behaviors of immigrant youth as they transition to adulthood. This study builds on past work by looking at how mother-daughter relationships during adolescence could decrease risky sexual behaviors using data from a nationally representative sample of immigrants and native-born young adults.

2.3. Research Questions and Hypotheses

We address three research questions about young women who have ever been sexually active: (1) Are higher quality mother-daughter relationships in adolescence associated with decreased risky sexual behaviors during young adulthood net of mother-daughter relationships in young adulthood? (2) Are young women from immigrant families more likely than the native-born to engage in risky sexual

behaviors in young adulthood? (3) Are differences in risky sexual behaviors of foreign and native-born women explained by variation in the quality of their mother-daughter relationships in adolescence?

We hypothesize that higher quality mother-daughter relationships in adolescence are associated with less risky sexual behavior, namely fewer sexual partners in the past year, greater likelihood of condom use at last sex, and a lower chance of STI diagnoses in the last year during young adulthood. We also hypothesize that first generation immigrant women engage in fewer risky sexual behaviors as compared to second generation and young women whose parents are U.S.-born natives. Our final hypothesis is that young women in the second generation are most likely to engage in risky sexual behavior and that strained mother-daughter relationships in adolescence explain the greater risk-taking of second generation women in young adulthood.

3. Method

3.1. Data

We used data from Waves I and III of the National Longitudinal Study of Adolescent to Adult Health (Add Health). Add Health began with a stratified probability sample of adolescents in the United States in grades 7-12 in 1994-1995 (Harris, 2005). The study is ideal for this analysis because it follows individuals from adolescence through the transition to young adulthood, has a sizeable sample of individuals of varying nativity status, and includes detailed information about relationships with parents and sexual behavior. In 1994-95, Wave I, the probability sample included 18,835 respondents who were between the ages of 12 and 19 (Harris et al., 2009). One resident parent was also selected for an interview and approximately, 93% of the parent interviews completed were with biological mothers in the home. Wave III interviews were conducted from August 2001 through April 2002 when participants were between 18 and 26 years old. Of the 18,835 Wave I participants, 76% or 14,322, were located and completed Wave III interviews. The reasons for non-response were split almost equally between respondents who were not located and those who declined to participate in the Wave III interview. An analysis of bias due to nonparticipation found a less than 1% difference across a wide range of variables

for those who participated in interviews at Wave III and those who were eligible to participate (Chantala et al., 2005; Harris et al., 2009).

This study uses reports from adolescents who were interviewed about their mother at Wave I, and who completed the sexual health questionnaire as young adults in Wave III. At Wave III, respondents used computer-assisted self-interviewing (CASI) technology to report their sexual behavior. Add Health reports of sexual health are similar to national statistics from other surveys such as the National Survey of Family Growth and the Youth Risk Behavior Survey (Santelli et al., 2000). We use adolescent reports of relationship quality because adolescent perceptions of relationships with parents have been found to be better predictors of sexual health outcomes as compared to maternal perceptions (Guilamo-Ramos et al., 2006; Jaccard et al., 1998). Theory also suggests that a link between adolescent relationships and young adult behavior operates through the adolescent perception of the parent-child relationship.

The analysis is limited to sexually active females at Wave III with complete data on mother-daughter relationship characteristics, nativity, and risky sexual behaviors (N=4,460). Sexually active is defined as having ever engaged in vaginal intercourse. Ninety percent of respondents, or 7,970 women are sexually active by Wave III. Of these, 6,998 had complete data on mother-daughter relationship characteristics, 5,694 provided information on nativity status at Wave I, and 4,460 had complete data on risky sexual behaviors at Wave III. These 4,460 women with complete data make up the sample. There are a few statistically significant differences between women included in the sample (N=4,460) and those excluded. Those included are younger, more likely to be from two parent families, and to have mothers with higher education (some college or college graduates). There are also small differences in the race-ethnic composition of the samples. Those included are slightly more likely to be Hispanic and slightly less likely to be non-Hispanic Black or White (Appendix Table 1). All analyses use weighted data that take into account unequal probabilities of sample selection and adjust for nonresponse. Results of the preliminary analyses of unweighted data are consistent with the findings reported.

3.2. Measures

3.2.1. Risky Sexual Behavior

We investigate three outcomes: *number of sexual partners in the last 12 months*, *condom use at last intercourse*, and *STI diagnosis in the last 12 months*. *Number of sexual partners in the last 12 months* is based on responses to the question, "With how many different partners have you had vaginal intercourse the past 12 months?" Number of sexual partners is coded as "0=0 partners, 1=1 partner, 2=2 partners, 3=3+ partners." The *condom use at last intercourse* measure is based on one question about the most recent partner "Did you or [your partner] use a condom at last intercourse." The variable distinguishes those who used a condom (coded 1) from those who did not use a condom (coded 0). *STI diagnosis in the last 12 months* is based on responses to "In the past 12 months, have you ever been told by a doctor or nurse that you had an STD" and is coded as "1" if there were any STI diagnoses and "0" if there were no diagnoses. Upchurch et al. (2004) showed that self-reports of STIs accurately capture actual STI test results for the Add Health sample. We use self-reports to maximize sample sizes of important subgroups, such as first generation immigrants. As in recent studies of young adult risk behavior, we examine these three outcomes separately because different types of risky behavior may have distinct policy implications (Khurana & Cooksey, 2012).

3.2.2. Predictor Variables

Mother-daughter *relationship quality* is assessed from the adolescent daughter's response to five questions at Wave I. We build on strategies used by other analysts of the Add Health data (Gillmore et al., 2011; Hernandez et al., 1999; Johnson, 2013; Ream & Savin-Williams, 2005). Items include "how close do you feel to your mother" and "how much do you think your mother cares about you." Both were scored on a 5-point Likert scale ranging from "1 = not at all" to "5 = very much." The additional three items include "you are satisfied with the way your mother and you communicate with each other," "most of the time, your mother is warm and loving to you," and "overall, you are satisfied with your relationship with your mother." These were scored on a scale ranging from "1 = strongly agree" to "5 = strongly disagree." Responses were recoded so that higher scores always indicate a stronger relationship. We summed responses to the items to create an index ranging from 5 to 25, where 5 indicates a weak

relationship with mothers and 25 indicates a strong relationship. Cronbach's alpha reliability for the five items in which adolescents reported about parent-adolescent relationship quality was 0.84.

We combine Wave I adolescent and parent reports about place of birth to indicate *Nativity.* We distinguish among youths who were first generation (foreign born to at least one foreign born parent), second generation (U.S. born to at least one foreign born parent), and third+ generation (U.S. born to U.S. born parents) (Hernandez et al., 1999; King & Harris, 2007).

3.2.3. Control Variables

The following covariates from Wave I (1994-95) are included in the analyses: family structure, mother's education, and race and ethnicity. Family structure identifies four living arrangements: adolescents who lived with two biological parents, those with a biological mother and stepfather; those who lived with only a biological mother; and with a biological mother and another adult such as a cohabiting partner or a grandparent. Adolescent reports of maternal education are used as a measure of socioeconomic status and coded as less than a high school diploma, high school graduate (includes GED or vocational school completion), some college, and college graduate or graduate degree completion. Race and ethnicity categories are Hispanic, Non-Hispanic White, Non-Hispanic Black, Non-Hispanic Asian, and Non-Hispanic Other. Non-Hispanic Other includes respondents who are not Hispanic and who are Native Americans or Other.

Control variables measured at Wave III (2001-02) include age, age at first intercourse, ever having given birth, current marital and cohabitation status, currently using a hormonal or long acting birth control method, and quality of mother-young adult relationship. We controlled for age at Wave III because the age range of 18-26 years old spans a period of variation in sexual activity. Because engaging in vaginal intercourse at or before the age of 15 has been associated with risky sexual outcomes, responses to "How old were you the first time you had vaginal intercourse?" were recoded as "1 = older than the age of 15" and "0 = 15 years old or younger" (Kaestle et al., 2005). Having ever given birth is also dichotomized as "1 = yes has given birth" and "0= no has not given birth." Marital and cohabitation status distinguishes three union statuses: those who are not married and not cohabiting, those who are

married, and those who are cohabiting. Current hormonal or long acting method use is dichotomized to indicate whether or not the respondent was using a hormonal or long acting method.[1]

We included Wave III mother-young adult relationship quality as a covariate because quality of the relationship with mothers in young adulthood could also be associated with young adult risky sexual behavior. Items include "how close do you feel to your mother," which was scored on a 5-point Likert scale ranging from "1 = not at all" to "5 = very much," and "most of the time, your mother is warm and loving to you," which was scored on a scale ranging from "1 = strongly agree" to "5 = strongly disagree." We summed responses to the items to create an index ranging from 2 to 10, where 2 indicates a weak relationship with mothers and 10 indicates strong relationship quality. The Spearman-Brown coefficient for the two items is 0.61 (Eisinga et al., 2013). The summary indices for relationship quality in adolescence and young adulthood are moderately correlated, 0.33.

3.3. Analytic Strategy

The analysis has two parts. First, we examine the frequency distributions of the variables of interest for the entire sample, which is all women who have ever had vaginal intercourse (sexually active hereafter). We also conduct bivariate analyses of the association between each independent variable and the dependent variables to determine if relationship quality in adolescence and nativity status are related to sexual risk behaviors. In the second part of the analysis, we estimate three multivariate models to examine the associations among relationship quality and nativity status, as independent variables, and the three dependent variables, number of sexual partners in the last 12 months, condom use at last intercourse, and STI diagnosis in the last 12 months, while controlling for individual and family background characteristics. We use negative binomial regression models to estimate the net association between the independent variables, mother-daughter relationship quality in adolescence and nativity

[1] We control for the respondent's union status and use of hormonal or long acting contraceptive method to provide a conservative assessment of the net associations of adolescent mother-daughter relationships and to take account of nativity differences in union formation. We recognize, however, that decisions about marriage and cohabitation and contraceptive method and risky sexual behavior may be made jointly.

status, and the outcome, number of sexual partners. We estimate logistic regression models for the outcomes, condom use at last sexual intercourse and STI diagnosis in the last 12 months.

When conducting the multivariate analyses, first, we test the associations between relationship quality and risky sexual behaviors, then, nativity status and risky sexual behaviors, and finally, the full multivariate models. The full models control for quality of mother-daughter relationships in young adulthood, family structure during adolescence, mother's education, race and ethnicity, age, age at first intercourse, having ever given birth, marital and cohabitation status, and using a hormonal or long acting method. We used STATA 13 for all analyses. We conducted extensive preliminary analyses to evaluate whether or not the measures of mother-daughter relationship quality in adolescence had different associations with risky sexual behavior by nativity status. There was no evidence of interactions between nativity and the relationship quality index and nativity. There was also no evidence of interactions between the individual items in the quality index and nativity.

4. Results

4.1. Unadjusted Nativity and Relationship Quality Differences

Table 1 shows the weighted demographic and family characteristics for all sexually active women by Wave III and for sexually active women by nativity. The table shows that only 281 women are in the first generation, 4.6% of the weighted sample. The vast majority, 82.7% of the weighted sample, are third generation or higher.

[Table 1 Here]

Adolescents' reports of mother-daughter relationship quality are very positive. The sample mean for the summary index is close to 22, just short of the 25 maximum. In general, daughters reported that their mothers were warm and loving, that they felt close to their mother, that their mother cared about them, that they were satisfied with the way they communicated with their mother, and that they were satisfied with their overall relationship (not shown). Second generation adolescent reports of mother-daughter relationship quality are the least positive, with a mean score on the summary index of 21.3, compared to first generation and third generation reports, which are slightly more positive (means scores

of 21.6 and 21.8 respectively). This nativity difference in the composite measure is similar to nativity differences in the individual items used in the measure (not shown). Young adult reports at Wave III of mother-daughter relationship quality are also positive with a mean score of 8.9 out of 10, but by young adulthood, second generation women's mother-daughter relationship score is between that of first and third+ generation women.

Fifty-seven percent of women lived with both biological parents during adolescence, while 24.6% resided with their biological mother only. First generation women are significantly more likely to have lived with both parents than those in later generations. There are also nativity differences in mother's education. Mothers of women in the third or higher generation are much more likely to have at least a high school education, compared to those in the first or second generations (Table 1). About two-thirds (66.8%) of the women are non-Hispanic White, 12.8% are Hispanic, and 15.4% are non-Hispanic Black. Very small percentages of the sample are non-Hispanic Asian and Other. A third of first generation and half of the second generation are Hispanic.

At Wave III, the average age of all sexually active women is 22 years. The average age of first generation women is significantly higher than second generation, and third generation. First generation women also were older at first intercourse, although the nativity difference is not statistically significant at conventional levels. By wave III, 30% of women had ever had a child, and a little over 40% were married or cohabiting. A significantly higher percentage of third generation women use a hormonal or long acting method at Wave III, 62.5%, compared to 51.1% of first generation and 50.9% of second-generation women.

Table 2 shows the summary statistics for the dependent variables: number of sexual partners in the last 12 months, condom use at last sex, and STI diagnosis in the last 12 months by mother-daughter relationship quality and nativity status. Women reported an average of 1.43 partners in the last 12 months. Thirty-seven percent used a condom at last sexual intercourse, and 15% had an STI diagnosis in the last 12 months (not shown).

[Table 2 Here]

We categorize relationship quality for ease of presentation, but the multivariate analyses treat it as a continuous variable. There are statistically significant differences in all three outcomes by relationship quality. Table 2 shows that those with high mother-daughter relationship quality (scores between 21 and 25) have significantly fewer partners in the last 12 months; were more likely to have used a condom at last sex, and had fewer STI diagnoses in the last 12 months compared with those with low relationship quality (scores between 5 and 14).

Number of sexual partners in the last 12 months, condom use at last sex, and STI diagnosis in the last 12 months also differ significantly by nativity. Second generation women report 1.36 sexual partners in the past 12 months compared to 1.45 in the first generation and 1.46 in the third generation. First-generation women were significantly more likely to have used a condom at last intercourse, 47%, than either those in the second (37%) or third generation (36%). Consistent with higher condom use, young women in the first generation also are significantly less likely to have had an STI diagnosis in the last year, 5%, compared to third generation women, 17%.

4.2. Multivariate Results

4.2.1. Mother-Adolescent Relationship Quality, Nativity, and Number of Sexual Partners

Table 3 shows estimates from weighted negative binomial regressions of mother-daughter relationship quality, nativity, and other characteristics on number of sexual partners in the last 12 months. Models 1 and 2 show results of the zero-order associations between number of partners and the two key independent variables, relationship quality and nativity. These results mirror those in Table 2, except for the functional form of the association, but we show them in Table 3 to enable a comparison between zero-order and net associations.

[Table 3 Here]

In Model 3, with the addition of the control variables, including mother-daughter relationship quality in young-adulthood, mother-daughter relationship quality in adolescence remains significantly positively associated with number of partners. Contrary to expectation, those who are first generation had a 14% higher number of sexual partners as compared to those who are third generation, all else equal. The

numbers of partners reported by women in the first and second generations were not significantly different. There is no statistically significant association between the current quality of the mother-young adult daughter relationship and number of sexual partners. Those who were older at the time of first intercourse had fewer sexual partners in the last 12 months compared to those who younger than age 15. None of the other background characteristics is significantly associated with number of partners except race-ethnicity. Compared to non-Hispanic Whites, Hispanics had 0.85 times fewer sexual partners. Non-Hispanic Asians also had fewer sexual partners, but the sample size for this group is small. Not surprisingly, women who are married or cohabiting have a lower expected number of sexual partners in the last 12 months compared to those who are not partnered.

4.2.2. Mother-Adolescent Daughter Relationship Quality, Nativity, and Condom Use

In Table 4 we report the results of weighted logistic regression models of condom use at last intercourse. The results for Model 3 in Table 4 show that first-generation women have odds 48% higher of using a condom at last intercourse than third-generation women, even after other individual and family characteristics are taken into account. There is also a net difference between first and second-generation women. All else equal, compared to those who are second generation, first generation women had 64% higher odds of using a condom ($p \leq 0.05$) (not shown). Neither adolescent nor young adult mother-daughter relationship quality has a net statistically significant association with condom use. Non-Hispanic Blacks have higher odds of condom use at last sexual intercourse compared to Non-Hispanic Whites. The nativity and race-ethnic differences hold even when differences in union status and use of hormonal methods of contraception are not in the model (not shown). Using a hormonal or long acting method and being married or cohabiting are associated with lower odds of condom use at last sexual intercourse.

[Table 4 Here]

4.2.3. Mother-Adolescent Daughter Relationship Quality, Nativity, and STI diagnoses

The results of weighted logistic regression models of STI diagnosis in the last 12 months are shown in Table 5. Models 1 and 2 show the zero-order associations between relationship quality and STIs

and between nativity and STIs, with results consistent to those reported in Table 2. These zero-order associations are also similar to the net associations in Model 3.

Having a better mother-daughter relationship in adolescence is negative associated with an STI diagnosis in the last 12 months, net of a wide range of control variables, including the quality of the woman's current relationship with her mother. Nativity differences also remain, net of other factors. Compared to women in the third generation, the odds of an STI diagnosis are .32 for those in the first generation and .69 for those in the second generation. First generation young women are not significantly different from those in the second generation in the net odds of an STI diagnosis. Non-Hispanic Blacks have higher odds of an STI diagnosis in the last 12 months compared to Non-Hispanic Whites. Non-Hispanic Blacks have higher odds of STIs despite also having higher odds of condom use compared to non-Hispanic Whites. Compared to non-Hispanic Whites, non-Hispanic Blacks acquire STIs at a higher rate through low-risk behaviors because the prevalence of infection in the population is much higher (Aral et al., 2008). Neither family structure during adolescence nor current union status has a net association with an STI diagnosis.

[Table 5 Here]

5. Discussion

This study considers whether mother-daughter relationship quality in adolescence is associated with risky sexual behaviors in young adulthood, and whether differences in risky sexual behaviors of foreign and native-born women are explained by variation in the quality of their mother-daughter relationships in adolescence. We extend past research by examining longitudinal links between parent-child relationships and risky behavior of emerging adults of differing generational status. Prior research has shown cross-sectional associations between positive family relationships and adolescent sexual behaviors (Miller et al., 2001) including first and second generation immigrant adolescents (Trejos-Castillo & Vazsonyi, 2008). Our findings add new information on the potentially long reach of good mother-daughter relationships for both immigrant and native-born adolescents as they transition into young adulthood.

We found general support for our expectation that mother-daughter relationship quality in adolescence would be associated with less risky sexual behaviors at young adulthood. A good mother-adolescent daughter relationship is associated with having fewer sexual partners in young adulthood as well as lower risk of an STI diagnosis in the last 12 months, even after other individual and family characteristics are taken into account. The associations between relationship quality and number of sexual partners and between relationship quality and STIs are understandable as STI risk increases with the number of sexual partners a woman has (Rosenberg et al., 1999; Valois et al., 1999).

In contrast to our hypothesis, we find no association between mother–daughter relationship quality and condom use at last intercourse in young adulthood. We do, however show that women who are married or cohabiting are less likely to have used a condom at last intercourse. This is consistent with previous research showing that young women in stable partnerships are less likely to use condoms (Macaluso et al., 2000). Young women in stable partnerships also usually opt for oral contraception and other hormonal methods (Kusunoki & Upchurch, 2011). We find that women who use hormonal and other long acting methods were less likely to report condom use at last sex, perhaps, because the process of deciding about protecting against pregnancy and protecting against STIs differ (Cates & Steiner, 2002; Raine et al., 2003). This suggests that more nuanced models of contraceptive choice may be necessary to capture the influence of mother-daughter relationships on young adult women's use of contraceptives.

That the associations between mother-daughter relationship quality and risky sexual behavior remain significant for number of sexual partners and STI diagnoses even with the addition of statistical controls for age at first intercourse and mother-young adult relationship quality highlights the potential lasting importance of adolescent mother-daughter relationships. By demonstrating that the seemingly protective effects of adolescent relationships persist even after taking into account a wide range of family characteristics and women's current relationship status, we add to a growing body of literature that demonstrates the importance of the parent-adolescent relationship and mother-daughter relationships in particular (Deptula et al., 2010; Henrich et al., 2006; Kao et al., 2014; Kao & Manczak, 2013; Tyrell et al., 2014). Early interventions could strengthen mother-daughter relationships, and thus, decrease

participation in risky sexual situations (Booth et al., 2012; Jaccard, 2013). While we cannot establish causation, our findings from a prospective, longitudinal design complement findings from two experimental intervention studies that have demonstrated success in decreasing risky sexual behaviors in young adulthood by improving the quality of parent-child relationships in adolescence (Caruthers et al., 2014; Spoth et al., 2014).

A second contribution of our study is that we provide new information about nativity differences in sexual risk taking in young adulthood. We hypothesized that first generation immigrants would engage in fewer risky sexual behaviors. Our findings for two dimensions of risk taking support this hypothesis. Women in the first generation were more likely to have used condoms at last intercourse and less likely to have received an STI diagnosis in the last 12 months, compared to women in the third generation. Although women in the first generation had more sexual partnerships in the last year as compared to women in the third generation, the greater use of condoms by women in the first generation, likely reduces their experience of STIs (Pflieger et al., 2013). Our findings are consistent with Deutsch and Crockett's (2015) finding that immigrants are more likely to use a birth control method in sexual partnerships than nonimmigrants. Restrictive norms about non-marital sexual activities among immigrant populations (Kim & Ward, 2007) may reduce first generation women's risk-taking in sexual relationships. Our findings for young adult women extend findings from past research on adolescents showing that foreign-born adolescents engage in less sexual risk taking than the native-born (Becker et al., 2014; Deutsch & Crockett, 2015; Guarini et al., 2015; Hussey et al., 2007; Karoly et al., 2015).

We also hypothesized that due to strained relationships with parents, the second generation would be more likely than either the first or third generation to engage in risky sexual behaviors. We found mixed support for this hypothesis. Women in the second generation had slightly worse relationships with their mothers during adolescence than women in the first and third or higher generations. But second generation women did not stand out from first and third generation women in their risky sexual behavior. The pattern of nativity differences in risky behavior varied across outcomes. We found no difference between first and second generation women in the number of sexual partners, nor was there a difference

in number of partners between those in the second and third generations net of a wide range of control variables. Women in the second generation are less likely to have used a condom than women in the first generation, but the second and third generations do not differ in condom use at last sex, controlling for relationship quality and other nativity differences. First and second generation women did not differ significantly in their likelihood of having an STI diagnosis, but second generation women were more likely than those in the third generation to have had an STI. Our findings do not support the expectation that an acculturation gap puts second generation women at a particular disadvantage in protecting their health in young adulthood (Choi et al., 2007; Lui, 2014; Unger et al., 2009). Measures of acculturation in both the mother and daughter generations would provide further opporunity to look at the associations between intergenerational cultural dissonance and sexual health behavior. That mother-daughter relationship quality is associated with risky sexual behaviors in young adulthood regardless of nativity status aligns with work on adolescents that finds conflict and support from parents has the same influence on adolescent well-being across all immigrant generations and that family cohesion is protective for immigrants despite acculturative stress (Harker, 2001; Kao et al., 2014; Pottie et al., 2014). The significance of the mother-adolescent daughter relationship quality for young adults' sexual behavior is further evidence of the long reach of childhood circumstances for sexual health later in life (Becker et al., 2014; Kirby, 2001; Seiffge-Krenke et al., 2010).

Some limitations of our study should be addressed in new research. We focus exclusively on mother-daughter relationships, leaving out other important relationships, namely those with fathers and male partners. Family systems theory points to other relationships within the family, beyond the mother-child dyad, as important determinants of individuals' behavior at the transition to adulthood (Cox, 1997). Good father-adolescent daughter relationships are associated with less risky behavior in adolescence (Rostad et al., 2014). That we found no association between family structure and the risky sexual behaviors we investigated suggests that the omission of father-daughter relationship quality does not threaten our conclusion about the importance of the mother-adolescent daughter relationship. The lack of information on male partners is a more challenging problem to address. The characteristics of partners

affect women's ability to negotiate about the use of condoms and their exposure to STIs. Our findings that that first generation women have more partnerships, but use more condoms, suggest that future work should focus particularly on the types of partners immigrant young adult women choose.

Another important aspect of decision-making about reproductive health is access to and cost of medical care. Immigrant young women, those in the first and second generations, may have limited access to STI testing and/or hormonal and other long-acting contraceptives (Haderxhanaj et al., 2014). Limited access to medical care may contribute to immigrant women's lower reports about STI diagnoses, but Upchurch et al.'s (2004) finding that self reports about STIs correspond well to actual STI diagnoses from Add Health respondents' biomarker samples suggest that the data we use are still a reasonable representation of this dimension of risky sexual behavior. Future research should take into account how the availability and costs of health care influence these indicators of sexual risk-taking.

Several strengths of our study outweigh these limitations. This study considered multiple sexual risk outcomes and used high quality data on sensitive topics obtained from computer-assisted self-interviews, which better capture reports of sexual risk and STIs (Kurth et al., 2004). The analysis uses data from a prospective, longitudinal design to address weaknesses in cross-sectional studies. By incorporating measures of relationship quality at two points in time, adolescence and young adulthood, we provide new evidence of lasting associations between family context and reproductive health at a critical life stage. By examining these relationships using data with large enough samples of immigrant and native-born women, we are able to provide robust estimates relevant for immigrants. Because immigrants are a growing proportion of the U.S. population (Brown, 2015; Grieco et al., 2012), new research should examine differences among immigrants by country of origin, an undertaking we could not pursue due to sample size limitations. Specific measures of acculturation would also provide insight into factors that contribute to immigrant-native differences in risky sexual behavior in young adulthood. Prevention efforts should continue to focus on fostering positive mother-daughter relationships to help reduce native and foreign-born young adult risky sexual behaviors and rates of STIs in the United States.

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Tables

Table 1. Weighted Demographic and Family Characteristics, Sexually Active Women Interviewed in Waves I (1994-95) and III (2001-02) of the National Longitudinal Survey of Adolescent to Adult Health (N=4,460)

Demographic or Family Characteristics at Wave I or III	All Women N=4,460	Nativity: 1st Generation N=281	2nd Generation N=744	3rd + Generation N=3,345	P-Value
	Mean (SE) or %				
Mother-Child Relationship Quality, Wave I (ranges 5 – 25)	21.8 (0.09)	21.6 (0.33)	21.3 (0.29)	21.8 (0.11)	0.000
Mother-Child Relationship Quality, Wave III (ranges 1 – 10)	8.89 (0.04)	8.76 (0.19)	8.92 (0.10)	9.00 (0.04)	0.026
Family Structure, Wave I					0.019
Two Biological Parents	57.1	77.1	58.0	55.9	
Biological Mother Only	24.6	12.3	26.6	25.0	
Biological Mother/Stepfather	11.1	6.72	7.97	11.8	
Biological Mother/Other Adult	7.17	3.86	7.53	7.30	
Mother's Education, Wave I					0.000
<High School Grad	20.2	38.3	40.2	16.1	
HS Grad/GED/Vocational	35.6	29.0	25.6	37.4	
Some College	21.2	9.82	15.3	22.8	
College Grad/Graduate Degree	23.0	22.8	18.9	23.7	
Race/Ethnicity, Wave I					0.000
Hispanic	12.8	35.0	51.4	5.71	
Non-Hispanic Black	15.4	4.92	6.29	17.4	
Non-Hispanic Asian	3.41	28.1	12.7	0.61	
Non-Hispanic Other	1.46	4.41	2.73	1.10	
Non-Hispanic White	66.8	27.5	26.9	75.2	
Age 18 – 26 years, Wave III***	21.8 (0.12)	22.3 (0.25)	21.9 (0.19)	21.7 (0.12)	0.000
Age at first intercourse, Wave III					0.076
≤15 years old	19.5	12.7	14.9	20.7	
> 15 years old	80.5	87.3	85.1	79.3	
Ever Given Birth, Wave III					0.825
No	69.9	67.5	72.9	69.7	
Yes	30.0	32.5	27.1	30.3	
Marital and Cohabitation Status, Wave III					0.417
Not in a Union	57.6	60.6	54.5	58.0	
Married	21.9	27.9	24.2	21.2	
Cohabiting	20.5	11.6	21.4	20.8	
Hormonal/Long Acting Method, Wave III					0.000
No	38.6	48.9	49.1	37.5	
Yes	61.4	51.1	50.9	62.5	

Note: Sexually active defined as engaging in vaginal intercourse in the past; ANOVA tests for differences among generational groups indicated by p-values; percentages may not add to 100% due to rounding

Table 2. Weighted Means (SE) of Risky Sexual Behavior at Wave III (2001-02) by Mother-Daughter Relationship Quality and Nativity at Wave I (1994-95), All Sexually Active Women, N=4,460

	Relationship Quality				Nativity			
	Low (5-14)	Medium (15-20)	High (21-25)	Group Differences P-Value	1st Generation	2nd Generation	3rd + Generation	Group Differences P-Value
Number of Sexual Partners	1.46 (.08)	1.45 (.04)	1.29 (.02)	0.000	1.46 (.10)	1.36[c] (.05)	1.45 (.02)	0.000
Condom Use at Last Sex	0.34 (.05)	0.35 (.02)	0.38 (.01)	0.020	0.47[a,b] (.06)	0.37 (.02)	0.36 (.01)	0.007
STI Diagnosis Last 12 Months	0.21 (.03)	0.19 (.02)	0.13 (.01)	0.003	0.05[b] (.02)	0.11[c] (.02)	0.17 (.01)	0.000

Note: Sexually active defined as engaging in vaginal intercourse in the past; ANOVA tests for group mean differences indicated by p-values; Individual tests for differences at $p \leq 0.05$ noted by [a] Coefficient differs significantly between 1st Generation and 2nd Generation [b] Coefficient differs significantly between 1st Generation and 3rd Generation and [c] Coefficient differs significantly between 2nd Generation and 3rd Generation.

Table 3. Incidence Rate Ratios from Negative Binomial Regression Models Predicting Number of Sexual Partners in Wave III (2001-02) among Sexually Active Women

	Model 1	Model 2	Model 3
Mother Relationship Quality WI	0.99***	-	0.99***
Nativity (3rd + Generation)			
1st Generation	-	1.01	1.14**
2nd Generation	-	0.93	1.04
Mother Relationship Quality WIII	-	-	0.99
Family Structure (2 Bio)			
Bio Mother Only	-	-	0.97
Bio Mother/Stepfather	-	-	1.02
Bio Mother/Other Adult	-	-	0.96
Mother's Education (< HS)			
High School Grad, GED, or Voc. Degree	-	-	0.97
Some College	-	-	0.94
College Grad	-	-	0.99
Race/Ethnicity (Non-Hispanic White)			
Hispanic	-	-	0.85***
Non-Hispanic Black	-	-	1.01
Non-Hispanic Asian	-	-	0.81***
Non-Hispanic Other	-	-	0.90
Age (years)	-	-	0.99
Age at First Intercourse (≤15 years old)	-	-	0.85***
Ever Given Birth	-	-	0.97
Marital and Cohabitation Status (Not in a Union)			
Married	-	-	0.70***
Cohabiting	-	-	0.81***
Hormonal/Long Acting Method	-	-	0.98

Note: ** $p < 0.05$ *** $p \leq 0.01$; [a] Coefficient differs significantly between 1st Generation and 2nd Generation ($p \leq 0.05$); All predictor and control variables measured at Wave I (1994-95) except quality of relationship with mothers at Wave III, age, age at first intercourse, ever given birth, marital and cohabitation status, hormonal/long acting method, and outcome of sexual partners measured at Wave III (2001-02); Data are weighted. Unweighted N is 4,460.

Table 4. Odds Ratios from Logistic Regression Models Predicting Condom Use at Last Sexual Intercourse in Wave III (2001-02) among Sexually Active Women

	Model 1	Model 2	Model 3
Mother Relationship Quality WI	1.03	-	1.01
Nativity (3rd + Generation)			
1st Generation	-	1.56**[a]	1.48**[a]
2nd Generation	-	1.02	1.01
Mother Relationship Quality WIII	-	-	1.06
Family Structure (2 Bio)			
Bio Mother Only	-	-	0.86
Bio Mother/Stepfather			1.16
Bio Mother/Other Adult	-	-	0.96
Mother's Education (< HS)	-	-	
High School Grad, GED, or Voc. Degree	-	-	1.15
Some College	-	-	1.11
College Grad	-	-	0.88
Race/Ethnicity (Non-Hispanic White)			
Hispanic	-	-	1.13
Non-Hispanic Black	-	-	1.39***
Non-Hispanic Asian	-	-	1.60
Non-Hispanic Other	-	-	0.87
Age (years)	-	-	0.93
Age at First Intercourse (≤15 years old)	-	-	1.60***
Ever Given Birth	-	-	1.21
Marital and Cohabitation Status (Not in a Union)			
Married	-	-	0.27***
Cohabiting	-	-	0.43***
Hormonal/Long Acting Method	-	-	0.71***

Note: ** $p < 0.05$ *** $p \leq 0.01$; [a] Coefficient differs significantly between 1st Generation and 2nd Generation ($p \leq 0.05$); All predictor and control variables measured at Wave I (1994-95) except quality of relationship with mothers at Wave III, age, age at first intercourse, ever given birth, marital and cohabitation status, hormonal/long acting method, and outcome of condom use measured at Wave III (2001-02); Data are weighted. Unweighted N is 4,460.

Table 5. Odds Ratios from Logistic Regression Models Predicting STI Diagnosis in the Last 12 Months in Wave III (2001-02) among Sexually Active Women

	Model 1	Model 2	Model 3
Mother Relationship Quality WI	0.96***	-	0.96**
Nativity (3rd + Generation)			
1st Generation	-	0.27***	0.32**
2nd Generation	-	0.63**	0.69**
Mother Relationship Quality WIII	-	-	0.99
Family Structure (2 Bio)			
Bio Mother Only	-	-	1.12
Bio Mother/Stepfather	-	-	1.19
Bio Mother/Other Adult	-	-	1.15
Mother's Education (< HS)			
High School Grad, GED, or Voc. Degree	-	-	1.19
Some College	-	-	1.19
College Grad	-	-	1.15
Race/Ethnicity (Non-Hispanic White)			
Hispanic	-	-	1.31
Non-Hispanic Black	-	-	2.55***
Non-Hispanic Asian	-	-	1.68
Non-Hispanic Other	-	-	2.14
Age (years)	-	-	0.51***
Age at First Intercourse (≤15 years old)	-	-	0.96
Ever Given Birth	-	-	0.86
Marital and Cohabitation Status (Not in a Union)			
Married	-	-	0.71
Cohabiting	-	-	1.09
Hormonal/Long Acting Method	-	-	1.27

Note: ** $p < 0.05$ *** $p \leq 0.01$; [a] Coefficient differs significantly between 1st Generation and 2nd Generation ($p \leq 0.05$); All predictor and control variables measured at Wave I (1994-95) except quality of relationship with mothers at Wave III, age, age at first intercourse, ever given birth, marital and cohabitation status, hormonal/long acting method, and outcome of STI diagnosis measured at Wave III (2001-02); Data are weighted. Unweighted N is 4,460.

Appendix

Table A.1. Weighted Demographic and Family Characteristics, Included and Excluded Sexually Active Women Interviewed in Waves I (1994-95) and III (2001-02) of the National Longitudinal Survey of Adolescent to Adult Health

	Excluded	Included	P-Value
Mother-Child Relationship Quality, Wave I (ranges 5 – 25)	21.9 (0.12)	21.8 (0.09)	0.392
Mother-Child Relationship Quality, Wave III (ranges 1 – 10)	8.90 (0.05)	8.89 (0.04)	0.000
Family Structure, Wave I			0.000
Two Biological Parents	52.0	57.1	
Biological Mother Only	15.4	24.6	
Biological Mother/Stepfather	3.00	11.1	
Biological Mother/Other Adult	29.6	7.17	
Mother's Education, Wave I			0.040
<High School Grad	17.9	20.2	
HS Grad/GED/Vocational	41.2	35.6	
Some College	18.2	21.2	
College Grad/Graduate Degree	22.8	23.0	
Race/Ethnicity, Wave I			0.000
Hispanic	7.76	12.8	
Non-Hispanic Black	19.0	15.4	
Non-Hispanic Asian	2.15	3.41	
Non-Hispanic Other	0.99	1.46	
Non-Hispanic White	70.1	66.8	
Age 18 – 26 years, Wave III	22.0 (0.12)	21.8 (0.12)	0.000
Age at first intercourse, Wave III			0.615
≤15 years old	18.7	19.5	
> 15 years old	81.3	80.5	
Ever Given Birth, Wave III			0.160
No	67.6	69.9	
Yes	32.4	30.0	
Marital and Cohabitation Status, Wave III			0.121
Not in a Union	62.1	57.6	
Married	19.0	21.9	
Cohabiting	18.9	20.5	
Hormonal/Long Acting Method, Wave III			0.160
No	39.5	38.6	
Yes	60.5	61.4	