Trajectories of sexual risk and their risk factors among Latinx adolescents

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ABSTRACT

Background/Objective: Adolescence is a significant developmental stage for sexual and reproductive health (SRH) behaviors. National data point to the increased vulnerability of Latinx youth to negative SRH outcomes and their engagement in behaviors that heighten their risk. Multi-systemic and longitudinal examination of sexual behaviors are relatively limited in Latinx SRH research. This study investigated the developmental trajectory of several sexual risk behaviors among a sample of Latinx adolescents from the National Longitudinal Study of Youth (NLSY97). The study assessed independent and joint effects of parental and peer influences on sexual risk trajectories and examined differences by nativity/immigration status and sex.

Methods: Age-based latent growth curve analysis was used to assess change in trajectories. Identified base models were conditioned with covariates to determine significant demographic, peer and parental predictors.

Results: The behaviors followed linear and quadratic growth trajectories indicating increased risk taking in mid-adolescence with peak and decrease in young adulthood. Sex differences were found in all behaviors persisting into adulthood. Maternal support and peer delinquency were significant independent predictors at baseline and into adulthood in condom use models. Peer delinquency was identified as a mediator between maternal and paternal support and condom use behavior.

Conclusion: Mid-adolescence was a period of increased risk taking and potential point for early intervention among the sample. Males and females engaged in different risk patterns that should be further studied and considered for intervention efforts. The sample showed evidence for peer socialization through delinquent peers in condom use behavior in independent and mediation models with maternal and paternal support variables. The results provide evidence for additional consideration of multi-systemic and complex peer and parental influences on sexual behaviors among Latinx youth both in empirical research and intervention efforts.

I. BACKGROUND AND SIGNIFICANCE

A.1 Sexual health trends of Latinx youth

Adolescence is an important developmental stage for identity and behavior formation and change.[1] With limited information and resources, young adolescents may engage in behaviors that increase their risk for long term negative health consequences.[2] Nationwide, youth of racial/ethnic minorities are disproportionately affected by overall poorer sexual and reproductive health (SRH) outcomes.[3-5] Of increasing importance is the SRH of Latinx adolescents who currently represent the fastest growing youth group in the United States.[6] National survey data on SRH outcomes of persons 10-24 years of age point to the increased vulnerability of Latinx adolescents and young adults in terms of sexually transmitted infections (STIs), HIV/AIDS and unintended pregnancy rates.[4] Despite considerable declines in their birth rates, Latinas aged 15-19 years still had the highest birth rate in the U.S. in 2015 (34.9 births per 1,000).[7] Additionally, Latinx adolescents between ages 15-19 have notably higher STI rates in comparison to Whites.[3] In 2017, the Chlamydia rate among 15-19 year old Latinx was 1,172.2 per 100,000 in comparison to 889.3 per 100,000 among Whites. Similar trends were reported for gonorrhea (195.5 per 100,000 vs. 133.2 per 100,000) and primary/secondary syphilis (2.9 per 100,000 vs. 6.9 per 100,000).[3] Latinx are also disproportionately affected by HIV/AIDS and have the second highest diagnosis infection rate after Blacks.[8] In 2017, Latinx youth ages 13-24 represented 23% of new HIV diagnoses and 21% of those classified with stage 3 AIDS in comparison to 19% and 13% for Whites, respectively.[9] In 2010, among 13-19 year old adolescents living with HIV/AIDS, 20% were Latinos and

18% were Latinas in comparison to 15% and 13% White males and females, respectively.[10]

Recent national data indicates that Latinx adolescents engage in sexual behaviors that heighten their risk and increase their vulnerability for negative SRH outcomes. Though the proportion of Latinx high school students who reported having had sexual intercourse was relatively similar to that of White students (41.1% vs. 38.6%) in the 2017 Youth Risk Behavior Survey (YRBS), a larger proportion (4%) of Latinx youth reported initiating sex at 13 years of age or younger in comparison to Whites (2%), especially among males (6% vs. 2.3% respectively).[11] A larger percentage of Latinx adolescents, especially males (12%), reported having had four or more sexual partners in their lifetime. Contraception use prevalence has historically been lower among Latinx youth and a smaller proportion of Latinas report using contraception at first sexual intercourse in comparison to girls from other racial/ethnic groups.[12] Among high school students, a larger percentage of Latinx adolescents reported not using any contraception method (19%) during last intercourse (vs. 10% White and 17.8% Black), and a lower proportion reported using dual contraception (condom and another method) during last intercourse which is more effective in preventing unintended pregnancy and STIs (4.2% vs. 11.6% Whites and 6.4% Blacks).[11] Finally, almost 18% of Latinx youth reported being under alcohol or drug influence before last intercourse,[11] which may increase likelihood of engaging in riskier sexual behaviors such as non-condom use.

Although literature on determinants of SRH behaviors and outcomes among Latinx youth has investigated common individual and demographic risk factors, extensive focus has been placed on familial, cultural and acculturation influences, which

may explain Latinx-specific risk and protective factors.[13-19] While the general SRH literature indicates that factors at different social ecological levels affect adolescent sexual behavior,[20] many Latinx-specific SRH studies investigate these relationships separately. Multiple systems of influence affect sexual risk behavior at a time and risk/protective factors may work together by way of moderation or mediation sequences to influence behavioral outcomes.[21-23] Examining a single system of influence (e.g. family, cultural influences) provides an incomplete picture of risk/protective processes, thus, misrepresenting the systems of influences that operate simultaneously. Finally, despite decades of extensive research, longitudinal studies remain scarce[13,18,24] with limited understanding of the developmental trajectory of sexual risk behavior change from adolescence into adulthood among Latinx youth.[24]

A.2 Theoretical foundation

A.2a Ecodevelopmental perspective on adolescent sexual risk behavior

As noted above, the literature on adolescent SRH points to the presence of risky behavior determinants at multiple levels of the social environment.[20] This necessitates a multisystemic investigation of risk and/or protective factors as well as their potential synergistic or antagonistic effects on sexual risk-taking.[20] Moreover, behavioral researchers have conceptualized development in adolescents' sexual cognitions and behaviors as the outcome of the continuous interaction between individual and socio-contextual factors.[25] As such, the ecodevelopmental theory provides an extensive contextual framework for characterizing determinants of adolescent risk behaviors.[21-23] The theory is organized around three main concepts, a social-ecological framework, a developmental framework and a focus on social interactions.[21,26]

The social ecological element of the theory is derived from Urie Bronfenbrenner's work on the social ecology of human and adolescent development (Figure 1).[21,27,28] Bronfenbrenner conceptualized the social ecology of development as four interrelated systems of influence structured by their proximity to the adolescent. *Microsystems* are the innermost level of influence constituting immediate social contexts in which the adolescent participates directly. For adolescents, these proximal social environments (e.g. family, peer networks) represent the largest source of direct attitudinal, informational and behavioral influence.[29] The nature of the relationships and perceptions about the social context within each microsystem may promote or protect against sexual risk behaviors.[21] For example, factors such as parental monitoring[12,14,30] and parental closeness or supportiveness[14,19,25,28] may mitigate engagement in risky sexual behaviors.[12,14,18,30-35] By contrast, involvement with delinquent peers[36,37] and perceptions about peer sexual behaviors [38,39] may increase the likelihood of engaging in risky sexual behavior. *Mesosystems* are the second sphere of influence and they represent the interactions between important members of the different microsystems (e.g. parental monitoring/knowledge of peers). These interactions provide an additional opportunity or platform for promoting or protecting against risky sexual behavior by restricting the individuals and/or situations that may encourage these behaviors. For example, parental knowledge of peers and peers' parents as well as monitoring of peer activities has been found to be associated with lower likelihood of engaging in risky sexual behaviors.[40] Next, *exosystems* are influential social contexts in which the adolescent does not participate directly but may impact the adolescent's life such as parents' social support networks (e.g. family, friends, work). The parents' experiences or functioning within

these systems may directly influence their parenting styles. Parents experiencing low social support may become more harsh in their parenting or more disconnected from their adolescent's other social networks.[21,26] Finally, *macrosystems* are the most distal sphere of influence that maybe defined as larger social or cultural values or ideals that influence behavior. These are acquired indirectly through other spheres of direct/indirect influence (e.g family, school, peers, policies). In some cases, conflicting macrosystem ideals within the different social contexts for an adolescent (e.g. cultural values of immigrant parents vs. norms in country of residence) can affect behavioral patterns of adolescents and increase likelihood of sexual risk taking.[21,26]

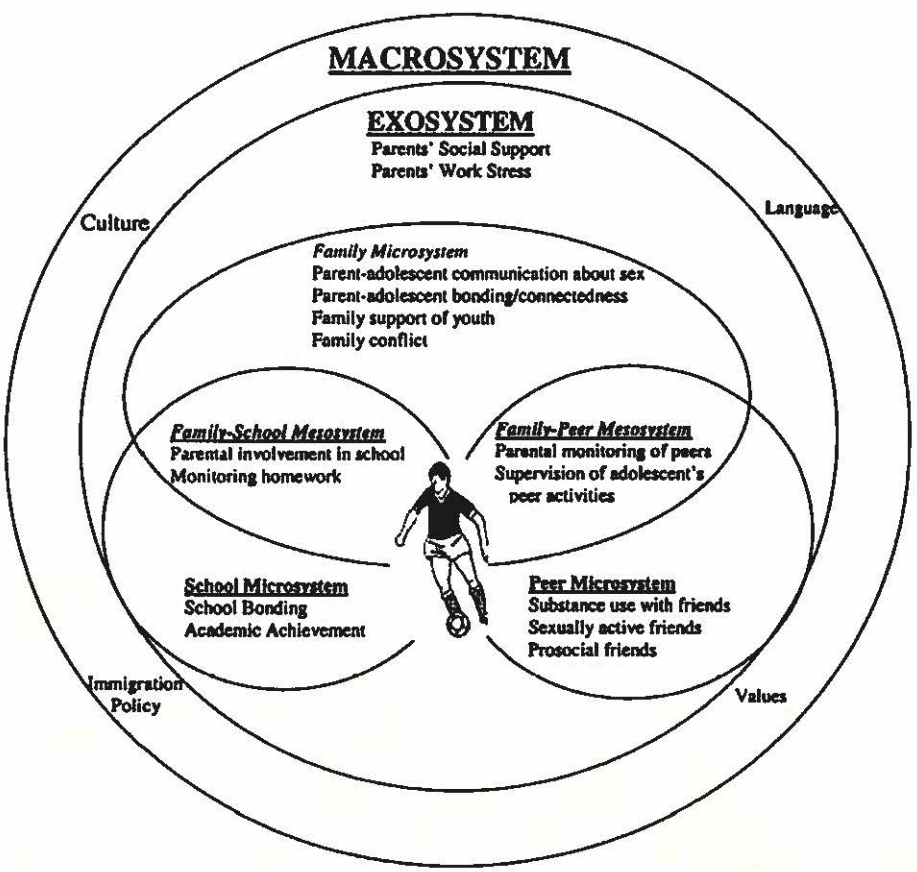


Figure 1: Ecodevelopmental risk/protective factors for risky behaviors in adolescence[21]

The developmental element of the theory provides a temporal perspective of how adolescent behavior develops within evolving social context. The theory posits that adolescents' behaviors are not solely impacted by factors from their current social contexts, but also as a function of their social contexts across time. That is to say that as the social contexts within which an adolescent exists may change, the influence of prior contextual factors may continue to affect behavior.[21-23,26] Finally, the last component of the ecodevelopmental theory is the emphasis on the impact of social interactions on adolescent behavior. As detailed in the social-ecological component of the theory, adolescent behavior develops within various social contexts in which the adolescent participates directly or indirectly. Risk behavior is influenced by the multiple social relationship patterns in which adolescents are involved and the interaction across the various contextual levels that make up their social existence can also fortify or decrease risk engagement.[23,26] Overall, the ecodevelopmental theory provides a multi-perspective approach for delineating adolescent risk and protective factors taking into account the social contexts and interactions in which behavior occurs as well as the temporal development of the behavior within their previous and current social contexts. Finally, the theory has become a relatively novel platform for studying HIV/AIDS-related risk factors among Latinx adolescents from immigrant families in a growing body of acculturation and SRH literature discussed below.

A. 2b Theoretical perspectives on nativity/immigration and sex-related influences

Literature on Latinx adolescents and adults has consistently investigated and linked immigration status and acculturation to SRH outcomes.[12-14] To accommodate these trends, Pantin et al.[21] proposed an extension of the original work of Szapcznik and

Coatworth on the ecodevelopmental theory[23] to understand the HIV/AIDs related risk factors within the context of Latino immigrant families. Their work denotes that at every systemic level delineated by the ecodevelopmental theory there are potential processes that may operate uniquely within the context of immigrant Latino families. At a *macrosystem* level, changes to the sociocultural context associated with an immigration experience and the possible incompatibilities of the cultural norms and values between origin and host countries can have a profoundly large impact on the well-being of adolescents from immigrant families.[41] Based on ample research evidence, ecodevelopmental theorists argue that macrosystem level phenomenon such as immigration can have a domino or trickle-down effect on exosystemic, mesosystemic and microsystemic level processes that increase likelihood of sexual risk behavior among Latinx adolescents.[42] Specifically, an experience such as immigration may lead to parental isolation from available social support networks due to lack of familiarity with such systems in a new country/community (exosystem level). Consequently, lack of social support may affect parenting behaviors such as engaged parenting, thus, cutting off parents from their adolescent's other networks of influence (e.g. monitoring of peers and school; exosystem level). This in turn may lead to issues such as academic difficulty or association with delinquent peers (microsystem level) which have been repeatedly linked to engagement in risky sexual behavior among adolescents.[21,42] Overall, the described interrelatedness of macrosystem level processes such as immigration with more direct processes and factors of influence (i.e. parent microsystem, peer microsystem and peer-parent mesosystem) provide an appropriate theoretical platform for studying the

developmental effect of sexual risk behavior context for Latinx adolescents, which is currently relatively understudied.[13,18,24]

Additionally, a contextual understanding of Latinx adolescent sexual risk behavior must not preclude the study of sex differences. National trends data and extensive research[11,14,15,19,24,35,43-45] has firmly established differing sex-based patterns of sexual risk involvement and sexual health outcomes such as higher rates of risky sexual behaviors among males in comparison to Latina adolescents.[11,14,46-48] Similar sex-based differences in sexual behaviors and outcomes were also identified in relation to immigration/acculturation status[13,16,17,19,35] though some inconsistent findings were found.[43,45] In general, sexual behavior trends may reflect differential gender-based sexual behavior socialization in Latinx cultures and within Latinx families.[14,49] For example, within the Latinx cultural context, traditional norms place a higher emphasis on chastity or abstinence until marriage and motherhood role for girls (*marianismo*), while it looks somewhat more approvingly or with greater acceptability of early sexual activity among young men as an expression of masculinity (*machismo*).[14] These norms are further reinforced through different parenting strategies common among Latinx families such as stricter monitoring of girls' activities as well as differing messages about adolescent sexual activity.[50-52] Accordingly, given the described cultural and parental dynamics and the reported differences in sexual behaviors and outcomes among Latinx youth, studying the sex-based differences in long term sexual risk behavior is warranted.

A.3 Significance

The disparity in sexual health outcomes of Latinx adolescents and young adults[3,4,7,10] is of increasing importance, given the projected racial/ethnic demographic

shift among youth groups in the United States.[6] The reported higher prevalence of sexual risk behaviors among Latinx youth[5,11] warrants additional investigation of influencing factors. Such understanding is particularly needed from a longitudinal developmental perspective considering the ubiquity of cross-sectional designs in Latinx adolescent SRH literature.[13,18,24,35,43] A longitudinal assessment of sexual risk behaviors among Latinx adolescents can provide a better understanding of how these behaviors may change over time, especially among important demographic groups (e.g. immigrant/native, male/female) for which there are established differential behavioral patterns.[13,14,35] Furthermore, the complexity of adolescent SRH determinants requires a multisystem investigation of influencing factors for a broader contextual understanding of behavior development, which is largely underdeveloped in longitudinal Latinx-SRH literature.[18,24,35,43] In particular, a special focus on parental and peer effects on trajectories of sexual risk behaviors is important given that the proximal social environment (e.g. family, peers) represents the largest source of direct attitudinal, informational and behavioral influence for adolescents[29] and because of the significance ascribed to family relationships among Latinx.[49] This study aims to address some of these described limitations by conducting a longitudinal analysis on the developmental trajectory of sexual risk behaviors among a sample of Latinx adolescents in the context of demographic differences and parental and peer influences. The findings from this study may have useful implications for intervention development purposes. Particularly, the results may help to better characterize periods of increased sexual risk, significant interpersonal risk channels as well as potentially important demographic groups for which risk reduction intervention efforts may be particularly needed.

A.4 The proposed study

The objective of this analysis is to determine the mean developmental trajectory of some sexual risk behaviors among a sample of Latinx adolescents. Using data from the 1997 National Longitudinal Study of Youth (NLSY97) and guided by elements from the ecodevelopmental theory, the study investigates the effects of some parental and peer influences during adolescence on the developmental sexual risk trajectories as well as examines potential differences in trajectory by nativity/immigration status and sex. To better characterize the sexual risk among Latinx youth in the NLSY97 sample, the study focuses on STIs and HIV-related risk factors including multiple sexual partnerships, condom use as well as having sex with strangers.

II. LITERATURE REVIEW

Several broad themes are highlighted throughout SRH literature on Latinx adolescents. Specifically, SRH researchers have focused extensively on acculturation influences, sex-specific differences and outcomes and familial and parental determinants of sexual behaviors and outcomes among Latinx youth. The following sub-section summarizes literature on acculturation and sex-related findings from Latino SRH research. Next, the subsequent sections will highlight both general and Latinx SRH literature on parental and peer influences, which were part of the focus of this study.

B. 1 Acculturation and sex-related trends in Latinx adolescent sexual and reproductive health research

Acculturation, the process and degree of adaptation to a new culture,[53,54] is one of the most frequently investigated and identified determinants of SRH-related outcomes among Latinx youth.[12-14] Acculturation was originally conceptualized as a uni-dimensional process through which individuals from a different culture acquire values, practices or beliefs of their receiving culture.[53,54] This view was reflected in wide use of several uni-dimensional acculturation markers in Latino SRH literature.[13] Studies conducted among samples of adult and adolescent Latinx have generally found that greater acculturation, often measured in relation to language use at home,[15,18,31,55,56] generational or nativity/immigration status,[56-58] number of years in US[56] or composition of friends,[13] was associated with increased sexual risk behaviors. Specifically, greater acculturation was found to be associated with having a larger number of lifetime[13,15,18,19,55] or recent partners,[59] younger age at initiation[56,59] and increased risk of STIs.[18] Alternatively, other studies found that less acculturation was associated with

increased likelihood of earlier sexual initiation among first vs. second generation adolescents[31] while greater acculturation, related to language preference, was associated with some protective sexual behaviors such as increased condom or contraceptive use.[55] The variability in defining acculturation across these studies and the subjectivity of some of the indicators (e.g. language preference, composition of friends) may explain some of these inconsistencies.[13]

Recently, a more concerted effort has been made among some acculturation researchers[22,43,60] to utilize better defined acculturation variables and measures including bi-dimensional scales, as proposed by Berry's model of acculturation in the 1970s.[53,54] Under Berry's model, acculturation is considered a bi-dimensional process through which a person may retain elements of his/her cultural heritage and acquire values, norms, or practices of the receiving culture independently.[53,54] The intersection of heritage retentions and culture acquisition leads to four possible acculturation categories including assimilation (complete adoption of receiving culture and discarding of heritage), separation (complete rejection of receiving culture and embracing of heritage), integration or biculturalism (adoption of receiving culture and retaining cultural heritage) and marginalization (rejection of receiving culture and heritage). Thus, a bi-dimensional acculturation model represents a theoretical improvement on uni-dimensional measures because it takes into account that immigrants may view their identification with origin and host cultures independently (i.e. not a single process of assimilation).[61,62] Adolescent health studies utilizing bi-dimensional scales and investigating acculturation mechanisms have produced some mixed findings with regard to sexual health outcomes. For example, most findings indicated that higher adolescent acculturation represented by parent-

adolescent acculturation gap[22] and endorsement of U.S. cultural practices[43] were directly or indirectly associated with higher levels of sexual initiation[22] as well as higher sexual activity and sexual risk engagement[43] among samples of Latinx adolescents. By contrast, higher endorsement of Latinx cultural practices was found to be associated with higher odds of having multiple sexual partners among male Latinx adolescents.[43]

The utility and validity of uni-dimensional and bi-dimensional acculturation measures and scales[61,62] as well as acculturation as a general concept in health research[53] have been challenged. Uni-dimensional measures including ethnic identification, retention of heritage or assimilation[61,62] were found to operate relatively poorly as markers of acculturation. Examination of bi-dimensional scales based on Berry's four acculturation categories revealed significant intercorrelations between the four patterns among samples of Latinx adolescents, which conflicts with the mutual exclusiveness assumption posited by the model.[61] Additionally, some researchers have also suggested that the focus on acculturation may erroneously neglect larger social structures and processes within which behavior develops or in some cases perpetuate cultural stereotypes.[53] Nonetheless, given the overwhelming evidence suggesting the existence of differential risk engagement and SRH outcome patterns across different "acculturation-related" groups among Latinx youth (e.g. immigrant vs. native born), investigation of such indicators is justified. This is particularly supported by the expansion of theoretical frameworks such as the ecodevelopmental theory, which have conceptualized immigration as an overarching process driving multiple potential mechanisms that may affect sexual behavior among Latinx youth.[21] Although the investigation of some of the acculturation-based mechanisms (e.g. parent/adolescent acculturation gap) is beyond the

scope of this study, the exploration of immigration/nativity status as a descriptive demographic characteristic supplements existing literature by assessing potential differences in sexual risk trajectories among immigrant and U.S. born Latinx youth.

In addition, similar to general SRH research, the focus on sex-based differences in behavioral and biological outcomes is prominent in Latinx adolescent SRH studies. Consistent evidence gleaned from numerous studies [14,15,19,24,35,43-45,63] pointed out differing patterns of sexual behaviors among male and female Latinx youth. Overall, male Latino adolescents were generally found to orient toward higher sexual risk engagement such as earlier sexual initiation and greater number of sexual partners than their female counterparts.[11,14,46-48] Yet, despite these trends, the SRH of Latina adolescents were particularly emphasized in research in comparison to males.[12,14,18,64,65] This was likely driven by the higher vulnerability of Latinas to negative sexual health outcomes in comparison to males and the higher rates of teenage childbearing and low contraceptive use rates among Latinas in comparison to female adolescents from other racial/ethnic groups.[11,46-48] Sex-based differences in sexual behaviors have also been investigated in the context of acculturation and immigration. The evidence largely suggests that both male and female adolescents with higher acculturation levels were more likely to engage in risky sexual behaviors than foreign born or less acculturated adolescents;[13,16,17,19,24,35] however, in some cases these differences were noted only among males.[43,45] Though longitudinal studies on Latinx adolescents' SRH are relatively scarce,[13] two longitudinal studies on Latinx youth using nationally representative samples reported interesting findings. In a study by Killoren et al., a stronger gender effect in risk engagement was found among foreign born than U.S. born youth.[35] That is, though boys

had higher sexual risk engagement than girls, the differences were more pronounced for foreign born males and females. Another study also examining immigrant paradox effects (i.e. lower rates of problem behavior among foreign-born youth) on sexual risk engagement by Guarini et al. reported similar findings.[24] Interestingly, they found that although males reported higher risk partaking overall, Latinas displayed significantly greater increase of sexual risk behavior.[24] In general, researchers suggest that these differences likely stem from cultural norms more permissive towards early male sexual behavior or differential gender sexual socialization enforced within families.[14,49-52] Ultimately, ample research evidence denotes the importance of studying sex and immigration/nativity-related differences among Latinx samples.[66]

Additionally, it is important to note that although a wide array of risky sexual behaviors were addressed in Latinx adolescent SRH research, the literature was largely biased towards sexual initiation including early initiation behaviors as outcomes of interest[13,16,22,31,37,67-70] reflecting similar trends within the larger SRH literature. The investigation of other risky sexual behaviors, including in longitudinal studies,[18,24,35,43,45,57] often involved condom and contraceptive use behaviors as well as multiple sexual partnerships,[13,17,18,24,35,43-45,71] which are strong determinants of negative SRH outcomes (i.e. STIs, HIV/AIDS, teen pregnancy) that are widely collected and reported in youth surveys. In addition to these behaviors, susceptibility to negative sexual outcomes that are the focus of this study (i.e. STI, HIV/AIDS) may also increase as a function of other factors present in the individual's sexual network. Specifically, this may include engaging in sexual behaviors such as having sex with strangers. Such indicators are largely understudied in Latinx SRH literature,[72] including in longitudinal

investigations.[35] A more comprehensive assessment of sexual risk among Latinx youth merits the inclusion of such factors in this proposed study.

B. 2 Parental influences on sexual behaviors among adolescents

Theories of behavioral development have widely established the role of the family system and caregivers as significant cognitive, emotional and behavioral socializing agents for children.[21,23,73] Often the first social context within which socialization patterns form, families can directly influence children through parenting styles and/or behavioral modeling or through indirect regulation of other social influence systems (e.g. peers).[73] Recognizing the significance of the familial environment, the influence of familial/parental factors became an increasingly important domain in the study of adolescent health and health behaviors.[74,75] Parental influence is widely recognized as a multidimensional construct encompassing several demographic (e.g. ethnicity, socioeconomic status)[20,76-78] and psychosocial factors (e.g. religiosity, support/closeness, communication, control and monitoring)[20,30,67,73,75] in adolescent sexual health literature. The cognitive, emotional and behavioral transition that children experience during adolescence typically transforms the dynamics of parent-child relationships. This transition period heightens the salience of parenting approaches to which adolescents may be more responsive such as parental support.[25]

Parental support represents a dimension of positive parenting and parental closeness.[73,79] In research, it often reflects the perceptions of the child or parent on a range of parental attitudes and/or behaviors toward the child that may convey parental responsiveness, involvement or connectedness (e.g. praising, encouraging, supporting choices and decisions). Parental relationships characterized by high levels of support may

serve as a channel through which parents convey their views and ethical codes to children as well as guide and transfer decision making skills including involvement in risk behaviors.[73] General research evidence largely suggests that parental support or warmth may act as a protective effect against sexual risk engagement. In a systematic literature review by Kincaid et al.,[73] the majority of studies examining parental warmth found that higher levels of parental support were significantly associated with decreased sexual risk behavior among adolescent boys and girls. The relationship was particularly more salient for females across studies including longitudinal studies among samples of ethnically diverse adolescents and studies using adolescent or parent report of child-parent relationship.[73] Research among Latinx adolescents has generally produced conflicting evidence. Specifically, higher parental support was found to be associated with decreased sexual risk behaviors including higher rates of abstinence,[70] delayed sexual onset,[70] higher condom and contraceptive use[57] and lower number of lifetime sexual partners[57,80] in some cross-sectional[70,80] and longitudinal investigations.[57] By contrast, other studies, including longitudinal investigations[31,35] found no empirical relationship between parental support and risky sexual behaviors including early initiation,[31,81] condom/contraceptive use and risky sexual partnerships (i.e. multiple partners, sex with strangers).[35] This discordance in findings may be reflective of methodological limitations in conceptualization or measurement of parental support or imply that it may operate in a different mechanism (e.g. moderator); nonetheless it necessitates additional investigation of these relationships.

It is important to note that literature on parental determinants of Latinx SRH has focused largely on parental communication as a potential channel for sexual behavior

socialization.[51,52,57] Interest in other parental influences including perceived support has expanded in recent years and thus should be further pursued. Additionally, though the study by Killoren and Deutsch examined similar parental constructs using NLSY97 data for Latinx youth, the study utilized only three waves of data.[35] Also, unlike this proposed study, Killoren and Deutsch did not examine other domains of sexual behavior influence such as peer factors or how peer and parental factors may jointly affect sexual behaviors, which may explain some of the null findings related to parental processes.

B. 3 Peer influences on sexual behaviors among adolescents

In addition to parents, peers represent another major source of behavioral influence on youth. Adolescence is a life stage that is characterized by increased frequency in peer interactions.[82] During adolescence, youth rely largely on peers' feedback and opinions in evaluating their own behaviors and shaping their identities.[83] Peers serve as important socializing agents who set standards of conduct, act as role models who influence sexual attitudes and norms or provide opportunities and settings for sexual behaviors to occur.[29] The influence of peers on shaping adolescent sexual behavior has been repeatedly established in various peer relationship contexts including peer connectedness,[84] level of involvement with peers[85] and communication with peers about sex.[86] It has also been examined in relation to the characteristics of peers such as gender and age of peers,[87] association with pro-social peers[88] and involvement with deviant peers.[36,37]

One of the most consistently significant peer-related predictors of partaking in risky health behaviors is peer norms around the risky behaviors.[29] Multiple forms of peer norms have been investigated and linked to sexual behaviors among adolescents. These

included perceived peer norms (perception of peers' sexual behaviors),[38,39,75,89] descriptive norms (actual peer sexual behaviors)[38,90] and injunctive norms (peer attitudes about sexual behaviors).[90] Several researchers attempted to compare across different types of peer norms, and perceived peer norms were consistently found to be a stronger predictor of engaging in health risk behaviors including risky sexual behaviors.[29,38,39,89,91] Thus the perceptions about peer behaviors, regardless of the true extent of the behaviors among peers, are a more robust determinant than actual behavioral norms. Evidence on significance of perceived peer sexual behaviors is particularly well established in relation to sexual initiation behaviors. A 2007 systematic review by Buhi & Goodson of 69 published articles on predictors of sexual behavior among adolescents noted that most articles reporting on peer norms linked them to intention to initiate sex, early sexual initiation and having had sex.[75] This is similarly evident in some studies among multiethnic and ethnic minority samples, including Latinx adolescents.[22,69] Investigations such as the study by Marin et al. among multiethnic sample of six graders (N = 2829) from Northern California and the ecodevelopmental-based study among a sample of Latinx youth by Prado et al. reported significant associations between perceived peer sexual norms and early sexual initiation[22] as well as likelihood of having had sex.[69] Generally, minimal evidence appears to be available in relation to other sexual behaviors.[75] One study that explored a wider range of risky sexual behaviors was conducted by Miller et al. among a sample of Black and Latinx mother-adolescent dyads (N = 907).[92] The study examined several risky behaviors including condom use, frequency of intercourse, age at first sex and number of lifetime sex partners. Interestingly, the study found peer sex norms (number of friends who ever had sex and

ever/always used condoms) to be associated with lifetime condom use, number of lifetime partners and frequency of intercourse, but not age at first sex.[92] Overall, the results of this study[92] and the apparent literature limitation in examining perceived peer sexual norms in relation to a wider range of sexual behaviors merits additional investigation of these relationships among Latinx youth.

Moreover, adolescent risky sexual behavioral patterns may also be influenced by exposure to peers who engage in unconventional or delinquent behaviors (e.g. antisocial behavior, alcohol/drug use, gang activity, etc.).[36,37,40,92-94] Adolescents involved with delinquent or deviant peer networks may undergo a "deviancy training" through which discussions about negative behaviors or rule breaking are particularly likely to elicit positive reinforcement of such discussions; subsequently increasing engagement in delinquent/deviant behavior overtime.[93,94] As with conventional peer interactions, delinquent peer networks may also act as normative behavioral influences through implicit modeling, peer pressure or shaping attitudes or perceptions about acceptable behaviors.[91,95,96] Though delinquent peer associations have been mostly studied in relation to delinquent behavioral outcomes, several researchers[36,37,92,97-99] have identified links to SRH outcomes including among Latinx youth.[92,97] Parallel to links found in relation to perceived peer sexual norms, delinquent peer involvement was found to be associated with onset of sexual behavior[37,97,98] including early sexual initiation[92,99] as well as other risky sexual behaviors such as non-condom use,[36] frequency of sexual intercourse[92] and multiple sexual partnerships.[36,92]

Overall, the studies highlighted in this section reinforce the importance of more detailed examination of peer context in relation to adolescent sexual behaviors. Given the

relatively limited,[32,33,92,97] yet expanding,[21,22] interest in peer context within Latinx adolescent SRH literature. Additional exploration of how multiple features of peer relationships (e.g. perceived norms, delinquent peer association) affect sexual behavior is necessary for a broader understanding of the extent of peer influence. Literature limitations and inconsistencies in some findings further emphasize the need for moving beyond exploration of direct independent relationships between parental and peer factors and risky sexual behaviors. Assessment of how peer and parental factors may jointly affect sexual behavior among Latinx youth is particularly pertinent and largely lacking in Latinx SRH literature. The next section discusses some of the literature and different models under consideration for this study.

B. 4 Linkage between parental and peer influences on adolescent sexual behaviors

The connection between peer and parental relationships in adolescence has been extensively investigated in behavioral research.[100] A substantive body of literature built on theoretical frameworks such as attachment and social learning theories focused specifically on how parental factors influence types of peers associations (e.g. delinquent vs. prosocial peers). These studies suggest that parental relationships serve as blue prints or models for later peer associations or that adolescents mirror emotional connections, bonds and relationship dynamics they first observe within their family units in later peer relationships.[100] Moreover, competing views exist in behavioral literature with regards to strength of peer vs. parental influences on adolescent behaviors.[101] For example, the perspective proposed by some proponents of control theory suggests that familial influence on behavior is direct and strong regardless of peer influence.[101] By contrast, several frameworks including differential association and subculture theories,[101]

Patterson's *social context model of the development of antisocial behavior* and Ary's *model of adolescent problem behavior development* (Figure 2)[102] provided an opposing view denoting that peer influence is a more proximal determinant of problem behavior among adolescents. These perspectives argue that parental influence on risky or negative behaviors is mediated by exposure to delinquent or deviant peers.[101,102] Specifically, that poor parenting practices provide opportunity for adolescents to socialize into negative behaviors through association with delinquent peers who may promote or encourage these behaviors.

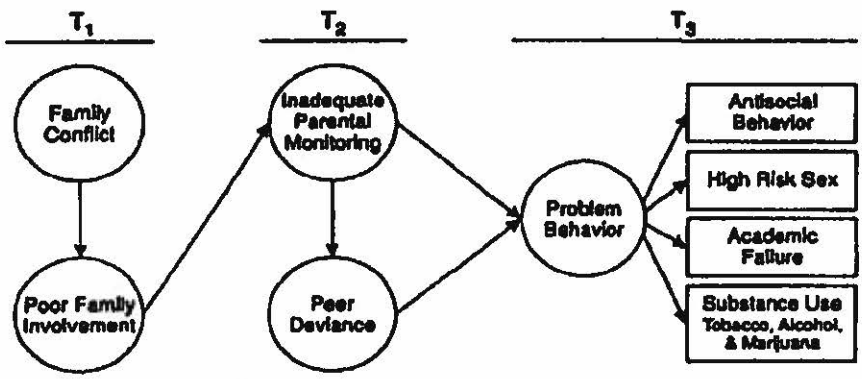


Figure 2: Ary's model of adolescent problem behavior development[102]

Overall, support for peer-related socialization has been repeatedly established by several studies in relation to a range of adolescent behavioral issues including antisocial behavior and poor school performance,[40,102] drug use[40,101-103] as well as risky sexual behaviors such as condom use, multiple sexual partnerships and drug/alcohol use during sex.[36,102] These studies include research among minority youth[40,103] including Latinx adolescents.[40] For example, Barrera et al. tested the replicability of the Ary problem behavior development model across a sample of sample of 1,460 White, Native American

and Latinx seventh graders in rural Oregon. The study found evidence across all ethnic groups, including Latinx, that parental support/involvement and parental monitoring were directly associated with delinquent peer association and problem behaviors and indirectly associated with problem behavior (antisocial behavior, drug use, poor school performance) through delinquent peer associations.[40] They also noted that among Latinx youth, the path was relatively more salient for boys than for girls.[40] Although these results indicate the plausibility of delinquent peer socialization as a mediator for risky behavior among Latinx youth, its link to risky sexual behaviors has not been adequately investigated among this population including in longitudinal research. The concept of socialization through peer influence is suggested within the constructs of the ecodevelopmental theory such that exosystemic processes such as parental monitoring of peers may limit peer influence on sexual behavior.[21,23] An ecodevelopmental-based study among a cross-sectional sample of Latinx adolescents found that family functioning was indirectly associated with early sexual initiation through perceived peer sexual norms; however, delinquent peer associations were not examined.[22] As such, additional investigation of delinquent peer socialization using longitudinal data is pertinent. Exploration of parent-child relationship indicators (e.g. parental support) in relation to delinquent peer association and risky sexual behaviors is also needed to characterize the effect of a relatively understudied facet of parental influence among Latinx youth and mirror new trends in peer-parental research.[100]

Moreover, a competing model with increasing traction in adolescent behavioral literature is the potential role of parental factors as moderators of peer influence on adolescent behavior.[100] Specifically, considering the large body of literature pointing to

the significance of peer influence on adolescent developmental behavior, researchers became increasingly interested in determining whether parental influences can ameliorate peer effects on behavior.[100] To this effect, some studies found supporting evidence for parental effect modification. For instance, a study among a sample of African American adolescents found that parental monitoring moderated the relationship between peer influence, including peer risky behavior and adolescent drug use.[103] Other family processes such as an orientation towards family values (i.e. *familismo*) were found to moderate the association between delinquent peer association and adolescent externalizing behavior among a sample of low-income Mexican American seventh graders.[104] Also among Latinx adolescents, parental communication was found to attenuate the association between perceived peer sexual norms and adolescent sexual behaviors such as ever having sex, age at first sex, and number of lifetime sexual partners.[105] As with the peer socialization model, literature investigating parental factors as moderators of peer influence appears to be relatively limited in the context of Latinx adolescent SRH. Findings from existing studies provide reasonable pretext for the assessment of other parental processes such as parental support as potential moderators of perceived peer norms and delinquent peer association on risky sexual behaviors if these peer and sexual behavior associations exist.

In summary, Latinx adolescent SRH has consistently focused on and identified the importance of the family environment as a direct influence on adolescent behavior. As noted above, the role of peers is relatively less characterized and understudied in Latinx SRH literature, though evidence suggests a direct link to some risky sexual behaviors. Considering the salience of the peer context on adolescent behavioral patterns and the

significance of the family environment in Latinx cultures, it is essential to investigate multiple models of how peer and parental contexts simultaneously affect sexual behaviors among Latinx youth. The general adolescent SRH literature provides multiple reasonable models for how these relationships may work together to affect behavior beyond direct relationships.[22,40,100,102-105] Indeed, exploration of mediational[22] and moderation models[104,105] is growing within Latinx adolescent SRH studies; including ecodevelopmental-based studies.[22] Yet, the scope of such investigations is still relatively limited among this population. Hence, it is necessary to expand these efforts by testing additional models of association between peer and parental-level indicators. Specifically, in addition to direct peer and parental effects, the proposed study also investigates whether peers through delinquent peer associations play a more proximal role in the sample's SRH-related risk behaviors and how parental support influences motivate or moderate peer influences on behavior. Figure 3 and Figure 4 provide an overview of the different models under study in aims 2 and 3.

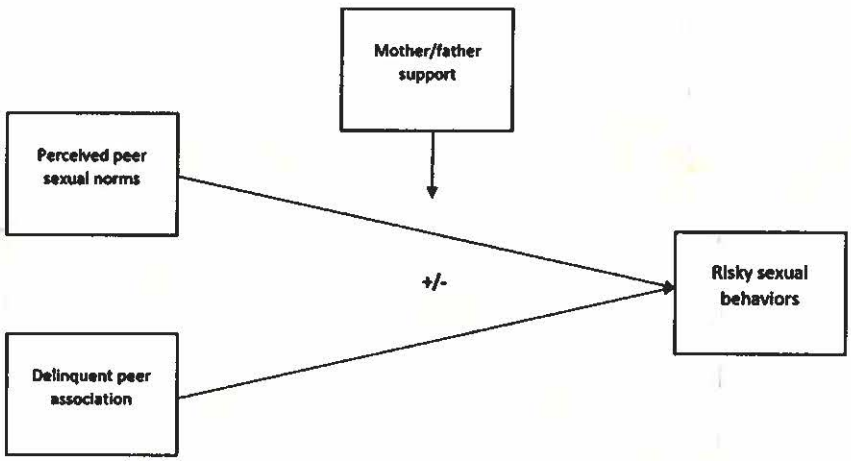


Figure 3: Conceptual model for aim 2

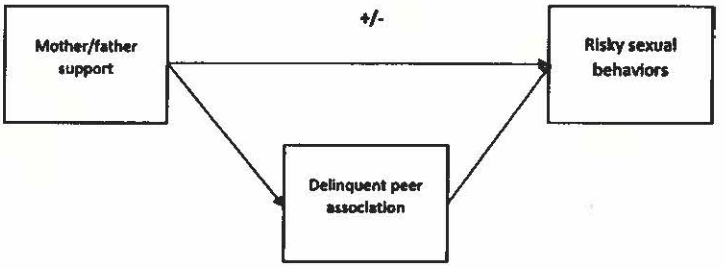


Figure 4: Conceptual model for aim 3

B. 5 Literature review summary

This section provided an overview of some major themes in Latinx adolescent SRH literature. Overall, the literature largely implicated the significance of acculturation or nativity/immigration differences, sex-based differences and parental effects on sexual behaviors. The pertinence of these components as evidenced by a substantive body of literature highlights the importance of including them in any SRH study among Latinx youth. The review also unveiled several limitations and gaps in existing research as well as expanding new trends that warrant further investigation. Specifically, assessment of various facets of peer influence (e.g. perceived norms, delinquent peers) and the linkage between parental and peer factors in relation to sexual behaviors is relatively lacking and should be further expanded in Latinx adolescent SRH research. It is particularly important to assess alternative models of how parental factors may influence behavior in conjunction with peer factors. Ascertaining the role of peer factors in relation to parental factors will provide a better understanding of significant spheres and processes of influence on Latinx youth; thus, providing more extensive evidence for research or intervention development purposes. Moreover, given the literature's proportional bias

towards sexual initiation behaviors as outcomes of interest, more focus should be applied to other risky sexual behaviors, including partner related risk behaviors (e.g. sex with strangers) that may further increase vulnerability to negative SRH outcomes. This study aims to address some of these limitations as well as add to the comparatively smaller body of longitudinal studies on SRH of Latinx youth.

III. AIMS AND RESEARCH QUESTIONS

The objective of this research is to assess the developmental trajectory of three sexual risk behaviors from adolescence into early/mid adulthood among a sample of Latinx in the U.S and potential parental and peer-level risk factors. The specific aims, as they relate to the ecodevelopmental theory are:

C.1 Specific Aim 1

To determine the overall trajectory of sexual risk behaviors among a sample of Latinx adolescents into mid adulthood (between ages 16-32) (*developmental perspective)* and potential differences by sex and immigration/nativity status (*macrosystem process; ecological perspective)*.

C.1a *Research Question 1*: Is there individual variability in initial risk sexual behavior levels (intercept) and mean change (slope) among the sample?

C.1b *Research Question 2*: What is the mean course of change (linear, quadratic) in sexual risk behaviors (multiple sexual partnerships, consistent condom use, and sex with strangers) among the Latinx adolescents over time?

C.1c *Research Question 3*: Is the trajectory of sexual risk associated with sex and/or immigration/nativity status (U.S. born vs. foreign-born)?

C.2 Specific Aim 2

To identify peer-related determinants of sexual risk trajectory (*microsystem processes; ecological/social interactions perspectives)* among a sample of Latinx adolescents and potential parental effect modifiers (*microsystem/mesosystem processes; ecological/social interactions perspectives)*.

C.2a *Research Question 1*: Are delinquent peer associations and/or perceived peer sexual norms associated with sexual risk trajectory?

C.2b *Research Question 2*: Does perceived parental support moderate the relationship between peer-related factors and sexual risk behavior?

C.3 Specific Aim 3

To assess parental factors (*microsystem process; ecological/social interactions perspectives)* associated with sexual risk trajectory among a sample of Latinx adolescents and a potential mediational pathway through peer delinquent associations (*microsystem process; ecological/social interactions perspectives)*.

C.3a *Research Question 1*: Is perceived parental support associated with the trajectory of sexual risk?

C.3b *Research Question 2*: Do delinquent peer associations mediate the relationship between poor perceived parental support and sexual risk behavior?

IV. MATERIALS AND METHODS

D.1 Data sources and measures

D.1a Overview of 1997 National Longitudinal Study of Youth

The 1997 National Longitudinal Study of Youth (NLSY97) is a nationally representative household-based study designed to document the school to work transition as adolescents enter adulthood. Since 1997, the surveys were conducted annually for 14 years (2011-12) and are currently administered biennially. The baseline sample consisted of 8,984 participants born between 1980 and 1984; they were 12-18 years old during round one of the survey in 1997. The cohort was comprised of two subsamples including a cross-sectional nationally representative sample (n=6,748) and a supplemental oversample of Blacks and Latinos (n= 2,236) to allow for more valid statistical analyses of these subpopulations. Of the total unweighted sample at baseline, 21.2% were Latinx/Hispanic (N = 1,899), 26% were non-Hispanic Black (N = 2,335), and 51.9 % were non-Black/non-Hispanic (4,665). Furthermore, approximately 51% (N = 4,599) of the participants were male and 49% (N = 4,385) participants were female in the initial survey. Mean age at baseline was 14.9 years.[106,107] NLSY97 successfully maintained high retention and participation rates during all 16 annual survey rounds ranging from 93% in round 2 to approximately 80% in round 16.[108]

D. 1b Procedures

NLSY97 study procedures were described in detail elsewhere.[106,107,109] Overall, during Wave 1, all eligible youths in a household and one of each youth's parents who agreed to participate were administered an hour-long personal interview. The screening

process also included the administration of an extensive two-part questionnaire to list and collect demographic information on members of the youth's household as well as any immediate (e.g. biological parents, siblings, spouses, children) non-resident family members of the participating youth(s).[106] The parental survey focused on family dynamics and background such as parents' marital histories and partner relationships, household income/assets and parents' employment histories, ethnic and religious background, health (parents and child), youths' early child-care arrangements, custody arrangement for youth, and parental expectations of the youth participant(s). The annual youth surveys covered a range of topics such as youth/parent relationship including contact with absent parents, dating and sexual activity, marital and fertility histories, education, employment and training, participation in government assistance programs, future expectations, time use, criminal behavior, and alcohol and drug use. The personal interviews were completed using computer-assisted personal interviews (CAPI), which automatically lead respondents to particular questions based on their age and prior responses. Questions on sensitive behaviors including sexual and criminal behavior were included in a self-administered module of the survey using audio computer-assisted self-interview (ACASI) technology.[106] This was done in an effort to reduce issues of social desirability and encourage truthfulness in responses. Further description of the NLSY97 public use datasets, measures and procedures, along with the complete survey instruments is available online through the website of the Bureau of Labor Statistics.

D.1c Measures

Sexual risk behaviors – the study investigated the trajectory of change in three sexual risk outcomes including multiple sexual partnerships, condom use, and sex with strangers. All

questions on sexual history were asked of participants 14 years of age and older. For multiple sexual partnerships, participants were asked about the number of sexual partners they had since last interview. For the analysis, the measure was re-categorized into six ordinal categories (0, 1, 2, 3, 4 or 5+ partners) to address convergence issues resulting from having small frequencies of higher numbers, thus, limiting the ability to analyze the variable as a count. Consistent condom use was assessed by asking participants the number of times the participant or partner(s) used a condom in sexual encounters since last interview/year. This variable was used in combination with the number of times the participant had sex in a year to produce a proportion of the number of times condoms were used during sexual encounters (condom use = number of times used a condom / number of times had sex in a year). The reported proportions appeared to follow a mostly dichotomous pattern (i.e. participants mostly either reported 100% use or none/less than 25% use) and the measure was thus defined as 0 = less than always and 1 = always/consistent condom use. Finally, starting at wave 4, participants were asked if they had sex with a stranger since last interview (0 = no, 1= yes). By survey design, sexual behavior questions were limited to people who initiated sex and had sexual intercourse in last year/since last interview.

Perceived parental support – parental support was assessed in waves 1-4. Youth participants were asked about the parental supportiveness of their residential mother and father or residential maternal/paternal figures. Adolescents were asked to rate how supportive their parents generally acted towards them ranging from (1) very supportive to (3) not very supportive. The variable was reverse coded so that higher values represent

higher support. Mother and father support variables used in the analysis were from wave 1.

Peer delinquency/Deviant peer associations – A series of peers' negative behaviors and activities were assessed in wave 1. Youth participants were asked about the percentage of their peers on a five-point scale, ranging from less than 10% = 1, to more than 90% = 5, who a) got drunk at least once a month, b) used illicit drugs, and c) belonged to a gang. An averaged composite index measure that combined these individual risks was utilized in order to provide a summary measure of peer delinquent behaviors and minimize effects of missing data in these indicators. The combined measure had a Cronbach's α of 0.73 and a principal component factor analysis (PCA) using Varimax rotation returned a one factor solution that explains 65% of the overall variance. The factor loadings for individual items were peer drunkenness = 0.836, peer drug use = 0.863, and peer gang involvement = 0.702. These findings suggest that the summary measure of peer delinquency had both structural validity and strong reliability in this sample.

Perceived sexual peer norms – Also in wave 1, youth participants were asked about their perception of the percentage of their peers who ever had sexual intercourse on a five-point scale, ranging from less than 10% = 1, to more than 90% = 5.

Sociodemographic characteristics – age at baseline (wave 1), age at sexual initiation and parental education levels (highest grade completed - numerical) were explored as sociodemographic control variables in all models. A relationship status measure was assessed as a time-varying indicator, but little variability was found across age and was thus eliminated from the analyses.

Immigration/nativity status – In wave 1, participants were asked if they were born in the US (0= U.S. born, 1= foreign born, 2 = Unknown status). About a third of the sample was in the unknown category.

Sex – self-reported sex was obtained from wave 1. For the analysis, male was used as the reference category (0 = male, 1= female).

D. 2 Study design

The study utilized secondary data analysis of the sample of Latinx adolescents participating in the multiple cohort national longitudinal NLYS97 study. Main predictors and control variables employed in the study were obtained from round 1 to establish temporal precedence. This longitudinal analysis analyzes the sexual risk behavior outcomes of interest that were measured over a 16-year time period (1997 to 2013, with the 2012 wave missing). The outcome data was transformed from the original wave format to an age-based set up to better visualize the developmental change in behavior among distinct age groups as the participants aged. Because of high levels of data missingness in the first two years due to younger ages and low prevalence of reported outcome behaviors, the first two waves were dropped and the analysis began at age 16. The data analyzed for the condom use variable spanned ages 16 to 32, while number of sexual partners spanned ages 16 to 30 (the question was replaced in later waves). Sex with strangers was first introduced starting at wave 4, so the analysis spanned ages 17 to 32.

D. 3 Study population

The study included male and female Latinx participants of NLYS97 aged 14-16 years at wave 1 (N =1,023). The analysis was limited to this age group to avoid

overestimating influences of peer sexual norms which may be more common among older participants.

D. 4 Research Methods

The current study utilized latent growth curve (LGC) modeling to assess the growth trajectories of the three risk behaviors and determine predictors of the trajectories. LGC modeling methods allow for the estimation of inter-individual variability (random effects) within intra-individual (fixed effects) trends of change over time.[110] Prior to conducting the analyses, the data was initially cleaned, examined and prepared using STATA V.15 (STATCorp, College Station, TX). Diagnostic analyses were conducted on the original measures to assess the extent of missingness, distribution and normality of the outcome variables and determine if the measures needed to be re-defined. The primary analysis for this study employed the use of LGC modeling with categorical and ordinal outcomes. This analysis is best suited for longitudinal studies that are focused on observing hypothesized growth trajectories on outcomes of interest of individuals over time.[111] Because missing data patterns showed that most data missingness arose from logical skip patterns as well as non-participation, utilizing imputation was not ideal due to concerns of creating bias in the data. Instead, the data was analyzed using Mplus V. 8.1 (Muthen & Muthen 1998-2018) with full information maximum likelihood (FIML), which estimates parameters by maximizing the likelihood function of all available data in the analysis without dropping cases with missing information.[112] Finally, because the analysis focused on a sub-sample selected by both ethnicity and age, existing weights were not applied in order to avoid biasing the estimates.[109]

D. 4a Methods for Aim 1

To determine the appropriate functional form for the sexual behavior trajectories for the sample, unconditional baseline growth models were constructed for each outcome including the random intercept parameter (to estimate averages at baseline) and linear and quadratic slopes to estimate average rate of change and average acceleration or deceleration over time.

Sex and immigration/nativity status were examined as independent predictors of the growth trajectories (RQ C.1c) in separate models including sociodemographic control variables. The research question aimed to assess differences between male/female trajectories as well as the trajectories of U.S. vs. foreign-born participants.

D. 4b Methods for Aim 2

The purpose of aim 2 was to identify potential peer-related determinants on sexual behavior outcomes and how parental support may modify these effects. Using the unconditional base models identified in Aim 1, peer delinquent behavior and peer sexual norms were assessed in separate models with control variables (RQ C.2a) to determine significant independent peer predictors. For the moderation analysis (RQ C.2b), an interaction between peer variables and parental (mother or father) support was assessed to determine if there was a significant modification effect in any of the three trajectories.

D. 4c Methods for Aim 3

Aim 3 examined the independent effect of parental support on the sexual behavior trajectories (RQ C.3a) and the potential mediation pathways through delinquent peer association (RQ C.3b). Similar to aim 2, the analyses started with the aim 1 base models

and examined parental support as a main predictor of the trajectories with appropriate control variables. Next, the assessment of delinquent peer association as a potential mediator between poor parental support and sexual risk trajectory was conducted using Mplus to model the mediation and obtain estimates and significance of total, direct and indirect effects.

V. RESULTS

This section presents results from the descriptive and LGC analyses on the sample of NLSY97 Latinx participants who were between 14 – 16 years old at wave 1. The results are presented by aim/sub-aim and further divided by outcome in the description of the findings for the main models.

E. 1 Sample description

The unweighted frequencies and percentages for the three dependent variables by age are presented in Table 1. For sex with strangers, the frequency slightly increased between late teens and early 20s (highest = 8.4% at age 19) before decreasing in mid-late 20s though the prevalence remained relatively low throughout. Consistent condom use also showed a similar pattern of slightly increasing starting at age 17 (11%) then gradually decreasing as the participants got older; however, a majority of the sample reported inconsistent condom use throughout the 16 years. The highest reported frequency was 19.3% at age 18 and the lowest frequency was only 2.9% of the sample reporting consistent condom use at age 32. Finally, for the number of sex partners, the largest proportion of participants consistently reported having 1 partner at all ages. Over all, reporting of multiple sexual partnerships slightly increased in late teens and early 20s but generally decreased over older ages.

A McNemar test was conducted to compare the differences in proportions between ages 16/17 and 30 for the dichotomous outcomes. The analysis could not be run with either ages 31 or 32 because there were no overlapping observations with the younger ages. For consistent condom use, a participant was 8.3 times less likely to use a condom at 30 compared to 16, which was statistically significant ($p < 0.001$). For sex

with strangers, a participant was 3.3 times less likely to have sex with a stranger at age 30 compared to 17 although the difference was not statistically significant ($p = 0.092$).

Table 1: *Frequencies and Percentages of the Dependent Variables*

Age	*16*	*17*	*18*	*19*	*20*	*21*	*22*	*23*	*24*	*25*	*26*	*27*	*28*	*29*	*30*	*31*	*32*
	N (%)	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*	*N (%)*
Sex with a stranger																	
No	-	*137*	*346*	*529*	*591*	*605*	*576*	*590*	*614*	*620*	*627*	*628*	*636*	*429*	*398*	*217*	*206*
		(13.4)	*(33.8)*	*(51.7)*	*(57.8)*	*(59.1)*	*(56.3)*	*(57.7)*	*(60)*	*(60.6)*	*(61.3)*	*(61.4)*	*(62.2)*	*(42)*	*(38.9)*	*(21.2)*	*(20.1)*
Yes	-	*15*	*43*	*86*	*84*	*64*	*62*	*71*	*51 (5)*	*50*	*55*	*44*	*47*	*35*	*25*	*21*	*11*
		(1.5)	*(4.3)*	*(8.4)*	*(8.2)*	*(6.3)*	*(6.1)*	*(6.9)*		*(4.9)*	*(5.4)*	*(4.3)*	*(4.6)*	*(3.4)*	*(2.4)*	*(2.1)*	*(1.1)*
Total	-	*152*	*389*	*615*	*675*	*669*	*638*	*362*	*665*	*670*	*341*	*672*	*683*	*464*	*423*	*238*	*217*
		(14.9)	*(38)*	*(60.1)*	*(66)*	*(65.4)*	*(62.4)*	*(35.4)*	*(65)*	*(65.5)*	*(33.3)*	*(65.7)*	*(66.8)*	*(45.4)*	*(41.4)*	*(23.3)*	*(21.2)*
Consistent condom use																	
Less than always	*56*	*168*	*312*	*369*	*388*	*358*	*340*	*333*	*327*	*327*	*368*	*371*	*405*	*260*	*279*	*171*	*175*
	(5.5)	*(16.4)*	*(30.5)*	*(35.2)*	*(37.9)*	*(35)*	*(33.2)*	*(32.6)*	*(32)*	*(32)*	*(36)*	*(36.3)*	*(39.6)*	*(25.4)*	*(27.3)*	*(16.7)*	*(17.1)*
Always	*55*	*112*	*197*	*186*	*198*	*172*	*128*	*117*	*133*	*139*	*124*	*122*	*85*	*71*	*53*	*42*	*30*
	(5.4)	*(11)*	*(19.3)*	*(18.2)*	*(19.4)*	*(16.8)*	*(12.5)*	*(11.4)*	*(13)*	*(13.6)*	*(12.1)*	*(11.9)*	*(8.3)*	*(6.9)*	*(5.2)*	*(4.1)*	*(2.9)*
Total	*111*	*280*	*509*	*546*	*586*	*530*	*468*	*450*	*460*	*466*	*492*	*493*	*490*	*331*	*332*	*213*	*205*
	(10.9)	*(27.4)*	*(49.8)*	*(53.4)*	*(57.3)*	*(51.8)*	*(45.8)*	*(44)*	*(45)*	*(45.6)*	*(48.1)*	*(48.2)*	*(47.9)*	*(32.4)*	*(32.5)*	*(20.8)*	*(20)*
Number of sex partners (since last interview)																	
0	-	*3*	*5*	*11*	*11*	*18*	*31 (3)*	*15*	*9*	*2*	*1*	*5*	*1*	-	-	-	-
		(0.3)	*(0.5)*	*(1.1)*	*(1.1)*	*(1.8)*		*(1.5)*	*(0.9)*	*(0.2)*	*(0.1)*	*(0.5)*	*(0.1)*				
1	*53*	*161*	*289*	*337*	*393*	*401*	*404*	*437*	*446*	*458*	*493*	*500*	*523*	*332*	*162*	-	-
	(5.2)	*(15.7)*	*(28.3)*	*(32.9)*	*(38.4)*	*(39.2)*	*(39.5)*	*(42.7)*	*(43.6)*	*(44.8)*	*(48.2)*	*(48.9)*	*(51.1)*	*(32.5)*	*(15.8)*		
2	*26*	*48*	*117*	*91*	*101*	*88*	*90*	*74*	*76*	*86*	*64*	*63*	*53*	*41 (4)*	*12*	-	-
	(2.5)	*(4.7)*	*(11.4)*	*(8.9)*	*(9.9)*	*(8.6)*	*(8.8)*	*(7.2)*	*(7.4)*	*(8.4)*	*(6.3)*	*(6.2)*	*(5.2)*		*(1.2)*		
3	*10 (1)*	*37*	*52*	*62*	*56*	*55*	*36*	*43*	*48*	*39*	*43*	*32*	*36*	*17*	*13*	-	-
		(3.6)	*(5.1)*	*(6.1)*	*(5.5)*	*(5.4)*	*(3.5)*	*(4.2)*	*(4.7)*	*(3.8)*	*(4.2)*	*(3.1)*	*(3.5)*	*(1.7)*	*(1.3)*		
4	*12*	*22*	*33*	*30*	*44*	*23*	*35*	*24*	*20 (2)*	*26*	*20 (2)*	*19*	*10 (1)*	*13*	*5*	-	-
	(1.2)	*(2.2)*	*(3.2)*	*(2.9)*	*(4.3)*	*(2.3)*	*(3.4)*	*(2.4)*		*(2.5)*		*(1.9)*		*(1.3)*	*(0.5)*		
5+	*21*	*43*	*67*	*90*	*73*	*85*	*57*	*64*	*55*	*49*	*54*	*49*	*52*	*47*	*23*	-	-
	(2.1)	*(4.2)*	*(6.6)*	*(8.8)*	*(7.1)*	*(8.3)*	*(5.6)*	*(6.3)*	*(5.4)*	*(4.8)*	*(5.3)*	*(4.8)*	*(5.1)*	*(4.6)*	*(2.3)*		
Total	*122*	*314*	*563*	*621*	*678*	*670*	*653*	*657*	*654*	*660*	*675*	*668*	*675*	*450*	*215*	-	-
	(11.9)	*(30.7)*	*(55)*	*(60.7)*	*(66.3)*	*(65.5)*	*(63.8)*	*(64.2)*	*(63.9)*	*(64.5)*	*(66)*	*(65.3)*	*(66)*	*(44)*	*(21)*		

Percentages are in parentheses. Frequencies not summing to 1023 reflect missing data

The unweighted frequencies and percentages for the time-invariant categorical independent variables are presented in Table 2. A slight majority of the sample was male (51.2%) and less than half were U.S.-born (43.6%). A small proportion of the sample indicated that at least half of their peers were engaging in sexual relationships at the beginning of the cohort (17.9%). Most of the sample reported having very supportive mothers (73.2%), and a little less than half reported having very supportive fathers (47.7%).

Table 2: *Frequencies and Percentages of Categorical Independent Variables*

Variable	*n*	%
Sex		
Male	524	51.2
Female	499	48.8
Immigration		
Citizen, born in the U.S.	466	43.6
Unknown, not born in U.S.	113	11
Unknown, can't determine birthplace	301	29.4
Peer sex norm		
Almost none (less than 10%)	158	15.4
About 25%	151	14.8
About half (50%)	183	17.9
About 75%	95	9.3
Almost all (more than 90%)	55	5.4
Mother support		
Very supportive	749	73.2
Somewhat supportive	216	21.1
Not very supportive	13	1.3
Father support		
Very supportive	488	47.7
Somewhat supportive	197	19.3
Not very supportive	35	3.4

Frequencies not summing to 1023 reflect missing data.

Means and standard deviations of the continuous independent variables are presented in Table 3. Mother's education ranged from 1 (first grade education) to 20 (8th year college or more) with a mean of 10.3 (10th to 11th grade education). Father's education similarly ranged from 1 to 20 with a mean of 10.5. Reported age for first sexual intercourse ranged from 5 to 19 years with a mean of 16. The peer delinquency index ranged from 1 (less than 10%) to 5 (90% or more) of friends engaging in a combination of the three peer negative behaviors (i.e. getting drunk at least once a month, using illicit drugs and belonging to a gang) with a mean of 2.3 or approximately 25% of friends engaging in these behaviors.

Table 3: *Means and Standard Deviations of Continuous Independent Variables*

Variable	*N*	*M*	*SD*	*Min*	*Max*
Mother's Education	884	10.3	3.7	1	20
Father's Education	595	10.5	4.0	1	20
Age First Sex	142	16.0	2.2	5	19
Peer Delinquency	1016	2.3	1.0	1	5

N not equal to 1023 reflects missing data.

E. 2 Results of aim 1

E. 2a Variability and optimal functional form

To test this aim and the requisite research questions, a non-conditional latent growth model was conducted that estimated a latent intercept and slope for each of the ages of each of the sexual risk behavior outcomes. Each of the latent intercepts were set to 1 for each manifest indicator and the latent slopes were set using a consecutive count

(0 , 1 , 2 , 3, 4 . . . etc.) for each manifest indicator in each age in order to set the time metric for a linear slope. The latent intercept indicates inter-individual differences measured by the variance of these constructs and their means represent overall beginning levels in the outcome. The variance of the latent slope indicates inter-individual differences or mean change in the outcome over time. Though the manifest variables for these sexual risk behaviors are either categorical or ordinal, the latent factors that are estimated from these observed indicators are continuous and coefficient estimates are interpreted as a continuous variable.

To test for individual variability in intercept and slope, three unconditional linear models were conducted. The linear model for the consistent condom use outcome showed good fit, Pearson's χ^2 (130786) = 1658.119, p = 1.000, Loglikelihood = -3504.221, AIC = 7018.443, adjusted BIC = 7026.845. There was substantial inter-individual variability in beginning levels of individual consistent condom use (Var = 4.596, $p < .001$). In addition, the mean of the slope factor indicated a significant linear decrease in condom use (M = -.140, $p < .001$). In the linear model for the sex with strangers outcome, the model had good fit, Pearson's χ^2 (65393) = 859.375, p = 1.000, Loglikelihood = -2133.521, AIC = 4277.041, adjusted BIC = 4285.517. There was substantial inter-individual variability in beginning levels of individual sex with strangers (Var = 4.603, $p < .001$). The mean of the slope factor indicated a significant linear decrease in sex with strangers (M = -0.144, $p < .001$). Last, the linear model for the number of sex partners outcome indicated strong fit, Pearson's χ^2 (32753) = 887.450, p = 1.000, Loglikelihood = -12493.518, AIC = 24997.035, adjusted BIC = 25005.464. There was substantial inter-individual variability in beginning levels of individual number of sex partners (Var = .162, p < .001). In

addition, the mean of the slope factor indicated a significant linear decrease in number of sex partners ($M = -.022$, $p < .001$). In sum, the non-conditional linear models all indicated a strong fit of the data in addition to suggesting that all these sexual risk behaviors varied considerably across individual beginning levels and that all behaviors showed a mean decline in these behaviors within individuals over time.

Next, to identify the appropriate functional growth form (linear vs. quadratic) for all three outcomes, a latent quadratic term was added and model fits statistics were compared to the linear model fit. To assess whether a linear or quadratic functional form should be used for the main analyses, loglikelihood, AIC and adjusted BIC model fit measures were compared across linear and quadratic baseline models. Both AIC and adjusted BIC statistics were lower for the quadratic model while the log likelihood values were higher for the quadratic models for both consistent condom use and sex with strangers models, indicating that the quadratic models better fit the data than the linear models. The log likelihood indicated a better quadratic fit for the number of sex partners' model; however, the AIC and adjusted BIC values were lower for the linear model. Since mean parameter estimates from the quadratic model showed a non-significant quadratic change over time, the linear model was selected for this outcome; however, additional time points may have better demonstrated a quadratic change. The model fit statistics for both linear and quadratic forms for each outcome are presented in Table 4.

Table 4: *Functional Growth Form Model Fit Indices*

Outcome	Model	Log Likelihood	AIC	Adj. BIC
Condom Use	Linear	-3504.221	7018.443	7026.845
	Quadratic	-3499.702	7013.405	7025.168
Sex with Strangers	Linear	-2133.521	4277.041	4285.517
	Quadratic	-2125.786	4265.572	4277.438
Sex Partners	Linear	-12493.518	24997.035	25005.464
	Quadratic	-12493.133	24998.267	25008.381

Note. AIC is the Akaike information criteria, adjusted BIC is the sample size adjusted Bayesian information criteria. Log Likelihood, AIC and adjusted BIC are relative fit indexes. Higher log likelihood scores and lower AIC/BIC scores indicate better fit.

Mean and variance parameter estimates of the unconditional models are presented in Table 5. The variance of the quadratic term was set to 0 in all models to address convergence issues. The unconditional sex with strangers' model shows that at age 16 having sex with strangers was significantly different from zero with significant between individual differences at that age. The mean rate of change (slope) shows a slight yet insignificant increase over time with significant intra-individual differences in that rate of change. The quadratic term suggests a decrease in having sex with strangers over time. Similarly, the unconditional consistent condom use model suggests that at age 16, consistent condom use was significantly different from zero and there were significant between-individual differences at that age. The mean rate of linear change over time shows a slight yet insignificant decrease, but with significant individual differences in that rate of change. The quadratic term indicates that there was a downturn in condom use over time. Finally, for the unconditional number of sex partners, the model suggests that the number of sex partners was significantly different from zero at age 16 and that there were significant between individual differences at that age. The mean rate of change

shows a significant decrease over time with significant intra-individual differences.

Table 5: *Means and Variance Estimates of Unconditional Models*

	Means			Variance	
	Intercept	Slope	Quadratic	Intercept	Slope
	Est. (SE)	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*
Sex with strangers	-.815 (.262)**	.029 (.065)	-.016 (.005)***	5.060 (.963)***	.066 (.015)***
Consistent condom use	.512 (.152)***	-.063 (.043)	-.007 (.003)*	4.710 (.688)***	.053 (.009)***
Number of sex partners	.676 (.023)***	-.025 (.003)***	-	.168 (.017)***	.001 (.000)***

Note. $*p < .05$, $**p < .01$, $**p < .001$.

Finally, to provide a graphical depiction of these models, Figures 1 – 3 show the average values for each behavior as the participants got older. Consistent condom use and sex with strangers followed what resembles a relatively linear downward trend over time with some periods of increase in the case of the sex with strangers outcome. The number of sex partners graph depicts a downward trend over time. The graph appears to show a relatively non-linear trend at older ages, so additional time points may have better demonstrated a stronger quadratic shape.

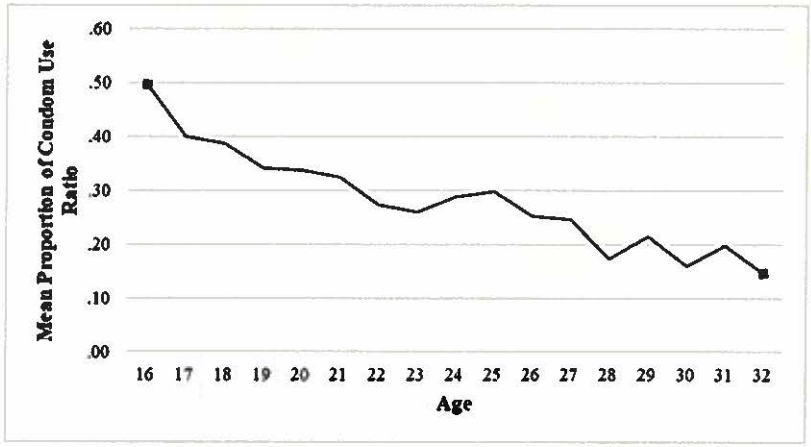


Figure 5: Trend of condom use over time

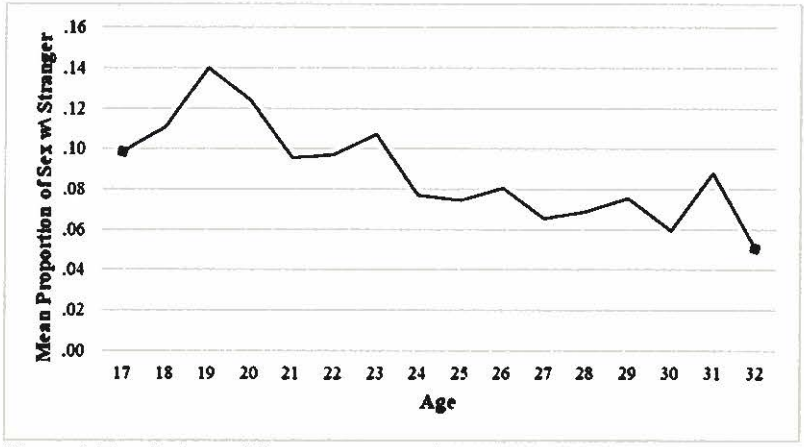


Figure 6: Trend of sex with strangers over time

Figure 7: Trend of number of sex partners over time

E. 2b Effects of sex and immigration/nativity status on trajectories

For research question C.1c, the selected unconditional latent growth models were conditioned regressing the intercept and slope factors on sex and immigration status, in addition to the following covariates: mother's education, father's education, participants' age at wave 1 (baseline age) and age when the respondent first had sex. The estimates of the associations of the predictors with the intercepts and slopes are reported. The results of the analyses are provided in Table 6.

Sex with Strangers

The first set of the sex and immigration models were run with the sex with a stranger outcome. Model fit statistics for the sex model showed good fit, Pearson's χ^2 (65388) = 724.313, p = 1.000, Loglikelihood = -8944.835, AIC = 17963.669, adjusted BIC = 18028.582. The results of the sex model showed that being female (β = -1.82, $p <$ .001) was a negative predictor of starting levels (intercept) of sex with a stranger implying that females had a lower likelihood of having sex with a stranger compared to males at age 17. No sex differences were found in the mean change in trajectory (slope) between females and males over time. Confirmatory unconditional and conditional logistic regression models with the last three ages for the outcome were run to assess persistence of effects into adulthood. The sample sizes were considerably low for the conditional models and could not properly estimate. The unconditional models showed a marginally significant difference at age 30 (p = 0.052), significant difference at age 31 (p = .002), and non-significant effect at age 32 (p = .085) likely due to small sample size.

The model fit statistics for the immigration model were similarly strong, Pearson's χ^2 (65387) =769.436, p = 1.000, Loglikelihood = -9023.315, AIC =

18138.630, adjusted BIC = 18219.332. The main variable of immigration status had no impact on the intercept or the slope in this model.

Consistent Condom Use

The second set of the sex and immigration models were run with the consistent condom use outcome. Model fit indices for the sex model indicated good fit, Pearson's χ^2 (130781) = 1484.745, p = 1.000, Loglikelihood = -10370.258, AIC = 20814.516, adjusted BIC = 20879.429. The results of the sex model showed that being female was a negative predictor of starting levels (β = -.753, p = .001) of condom use implying that females had significantly lower likelihood of consistent condom use compared to males at age 16. Sex was not found to be a predictor of the linear rate of change (slope) of condom use. Confirmatory conditional logistic regression models with the last three ages for the outcome were run to assess persistence of effects into adulthood. The models showed significant effects at age 30 (p = 0.026) and non-significant effects at ages 31 (p = 0.442) and 32 (p = 0.325) likely due to small sample sizes.

The model fit statistics for the immigration model also indicated a good fit, Pearson's χ^2 (130781) = 1492.210, p = 1.000, Loglikelihood = -10391.532, AIC = 20875.063, adjusted BIC = 20955.765. No differences in intercept or slope were found between foreign born and U.S. born participants who were the focus of the analysis. However, the unknown immigration/nativity status was associated with increased likelihood in consistent condom over time (slope) compared to U.S. participants (β = .084, $p < .05$).

Number of Sex Partners

The third set of the sex and immigration models were run with the number of sex partners outcome. Model fit statistics for the sex model showed strong fit, Pearson's χ^2 (32753) = 900.139, p = 1.000, Loglikelihood = -19282.489, AIC = 38634.979, adjusted BIC = 38696.383. The results of the sex model showed that being female is a negative predictor of starting levels (β = -.399, p < .001) and had no impact on the mean change of the number of sex partners. The intercept implies that females were significantly lower on starting levels of number of sex partners compared to males. Confirmatory conditional logistic regression models with the last three ages for the outcome were run to assess persistence of effects into adulthood. The models showed significant effects at age 28 (p = 0.022) and non-significant effects at ages 29 (p = 0.074) and 30 (p = 0.676) likely due to small sample sizes.

The model fit statistics for the immigration model also showed strong fit, Pearson's χ^2 (32753) = 952.757, p = 1.000, Loglikelihood = -19375.770, AIC = 38839.540, adjusted BIC = 38916.734. The findings indicated that foreign born participants were significantly lower on starting levels of number sex partners in comparison to U.S. born participants (β = -.222, p <.05). Immigration status had no impact on rate of linear change in the outcome. Confirmatory unconditional and conditional logistic regression models with the last three ages for the outcome were run to assess persistence of effects into adulthood. The sample sizes were low for both conditional and unconditional models and no significant effects were found.

Table 6: *Sex and Immigration Status Predicting Sex with a Stranger, Condom Use, and Sex Partners*

	Sex Model		Immigration Model	
	Intercept	Slope	Intercept	Slope
DV by Predictor	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*
Sex with stranger				
Sex (female)	-1.82 (.312)***	-.059 (.046)	-	-
Foreign born	-	-	-.142 (.533)	.012 (.075)
Unknown nativity status	-	-	-.252 (.341)	.049 (.045)
Mother's education	.045 (.053)	-.001 (.008)	.068 (.057)	.000 (.008)
Father's education	-.032 (.054)	.003 (.009)	-.062 (.058)	.006 (.008)
Age first sex	-.150 (.074)*	.019 (.012)	-.232 (.079)**	.017 (.011)
Baseline age	.412 (.180)*	-.033 (.025)	.509 (.185)**	-.026 (.025)
Condom Use				
Sex (female)	-.753 (.221)***	-.020 (.027)	-	-
Foreign born	-	-	.335 (.391)	-.025 (.048)
Unknown nativity status	-	-	-.422 (.284)	.084 (.033)*
Mother's education	-.037 (.046)	.003 (.006)	-.031 (.047)	.005 (.006)
Father's education	.045 (.046)	-.011 (.006)	.025 (.046)	-.009 (.006)
Age first sex	-.051 (.063)	.018 (.008)	-.082 (.062)	.018 (.008)*
Baseline age	-.247 (.148)	.012 (.018)	-.198 (.147)	.011 (.017)
Number of partners				
Sex (female)	-.399 (.049)***	.008 (.006)	-	-
Foreign born	-	-	-.222 (.087)*	.014 (.010)
Unknown nativity status	-	-	-.091 (.063)	.011 (.007)
Mother's education	.023 (.010)*	-.002 (.001)	.025 (.011)*	-.002 (.001)
Father's education	-.011 (.010)	.002 (.001)	-.018 (.011)	.002 (.001)
Age first sex	-.055 (.015)***	.005 (.002)*	-.078 (.014)***	.006 (.002)**
Baseline age	.062 (.031)*	-.002 (.004)	.089 (.032)*	-.003 (.004)

*$p < .05$, **$p < .01$, **$p < .001$.

E. 3 Results of aim 2

E. 3a Effects of peer factors on trajectories

For research question C.2a, the baseline LGC models were conditioned regressing the intercept and slope factors on delinquent peer associations and perceived sexual peer norms, in addition to the following covariates: mother's education, father's education, age at first wave (baseline) and age at first sex. The results of these analyses are shown in Table 7.

Sex with Strangers

The first set of the peer influences models was run with the sex with a stranger outcome. Model fit statistics for the peer delinquency model revealed good fit, Pearson's χ^2 (65385) = 859.668, p = 1.000, Log likelihood = -9706.747, AIC = 19487.494, adjusted BIC = 19552.407. Peer delinquency was not a significant predictor of the intercept or slope in the model.

The model fit statistics for the peer norms model were strong, Pearson's χ^2 (32623) = 1118.767, p = 1.000, Log likelihood = -9274.464, AIC = 18622.929, adjusted BIC = 18687.841. Peer norms was also not a significant predictor of the intercept or slope of sex with strangers.

Consistent Condom Use

The second set of the peer delinquency and peer norms models were run with the condom use outcome. Model fit statistics for the peer delinquency model showed good fit, Pearson's χ^2 (130779) = 2115.792, p = 1.000, Log likelihood = -11095.439, AIC = 22264.879, adjusted BIC = 22329.792. Peer delinquency was a negative predictor of beginning levels of condom use (β = -.365, $p < .01$) indicating that participants with

higher levels of peer delinquency associations had lower likelihood of consistent condom use at age 16 than participants with lower levels of peer delinquency associations. The variable did not have an impact on the slope. Confirmatory conditional logistic regression models with the last three ages for the outcome were run to assess persistence of effects into adulthood. The models showed non-significant effects at age 30 ($p = 0.070$) and age 31 ($p = 0.705$) but significant effects were found at age 32 ($p = 0.043$). Non-significant findings were likely due to smaller sample sizes.

The model fit statistics for the peer norms model showed good fit, Pearson's χ^2 (65253) = 1635.185, $p = 1.000$, Log likelihood = -10616.570, AIC = 21307.141, adjusted BIC = 21372.053. Peer norms was not a significant predictor of starting levels or mean change over time in the model.

Number of Sex Partners

The third set of the peer delinquency and peer norms models were run with the number of partners outcome. Model fit statistics for the peer delinquency model showed strong fit, Pearson's χ^2 (32753) = 954.416, $p = 1.000$, Loglikelihood = -20060.847, AIC = 40191.694, adjusted BIC = 40253.098. Peer delinquency was not a significant predictor of either the intercept or slope in this model.

The model fit statistics for the peer norms model also showed good fit, Pearson's χ^2 (16371) = 792.206, $p = 1.000$, Loglikelihood = -19458.283, AIC = 38986.567, adjusted BIC = 39047.970. Similar to peer delinquency, perceived peer sexual norms was not a significant predictor of the intercept or slope in this model.

Table 7: *Peer Delinquency and Peer Sex Norms Predicting Sex with a Stranger, Condom Use, and Sex Partners*

	Peer Delinquency Model		Peer Norms Model	
	Intercept	Slope	Intercept	Slope
DV by Predictor	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*
Sex with stranger				
Peer delinquency	.163 (.141)	-.004 (.017)	-	-
Peer sex norms	-	-	.069 (.139)	.017 (.017)
Mother's education	.067 (.058)	.000 (.007)	.082 (.057)	-.001 (.008)
Father's education	-.046 (.061)	.003 (.008)	-.055 (.060)	.004 (.008)
Age first sex	-.245 (.083)**	.018 (.011)	-.232 (.077)**	.019 (.011)
Baseline age	.419 (.191)*	-.016 (.024)	.457 (.201)*	-.034 (.026)
Condom Use				
Peer delinquency	-.365 (.124)**	.014 (.015)	-	-
Peer sex norms	-	-	-.138 (.110)	.002 (.013)
Mother's education	-.027 (.053)	.004 (.006)	-.029 (.045)	.005 (.006)
Father's education	.033 (052)	-.011 (.006)	.028 (.044)	-.011 (.006)
Age first sex	-.091 (.071)	.019 (.008)*	-.066 (.060)	.017 (.008)*
Baseline age	-.122 (.171)	.011 (.020)	-.063 (.156)	.005 (.019)
Number of partners				
Peer delinquency	.035 (.024)	-.002 (.003)	-	-
Peer sex norms	-	-	.032 (.023)	.001 (.003)
Mother's education	.028 (.011)**	-.002 (.001)	.026 (.010)**	-.002 (.001)
Father's education	-.015 (.011)	.002 (.001)	-.014 (.010)	.002 (.001)
Age first sex	-.077 (.014)***	.005 (.001)**	-.069 (.014)***	.005 (.002)**
Baseline age	0.076 (.032)*	-.002 (.004)	.070 (.033)*	-.004 (.004)

*$p < .05$, **$p < .01$, **$p < .001$.

E.3b Moderation of parental support on peer effects

For research question C.2b, the linear slope LGC models were conditioned regressing the intercept and slope factors on delinquent peer associations and perceived sexual peer norms with these variables moderated by maternal and paternal support. The models also included the following control covariates: mother's education, father's education, age at wave 1 (baseline) and age when the respondent first had sex. Only one model found a significant interaction term. The results of this model are included in Table 8 which provides the results for all three outcomes. The results of the additional non-significant models are provided in Tables A – C in the appendix.

The only significant interaction was found between maternal support and perceived peer sexual norms on the sex with strangers outcome. The model fit statistics were strong, Pearson's χ^2 (32627) = 833.476, p = 1.000, Log likelihood = -10357.410, AIC = 20826.820, adjusted BIC = 20925.067. Perceived peer sex norms (β = -.269, $p <$ .05) and mother's support (β = -.247, $p <$ .05) were both negative predictors of the slope. The interaction between peer sex norms and mother's support was a positive predictor of the slope (β = .100, $p <$ .05). The main effects and interaction revealed unexpected patterns. While both independent predictors were negatively associated with the slope, a positive association between peer norms and the slope of the outcome would have been more plausible. The interaction lessened the degree of the negative effect of both predictors. A graphical depiction of the results is displayed in Figure 4 below. The graph shows that at high maternal support levels, low peer sex norms were associated with decreased likelihood of sex with strangers over time while high peer sex norms were associated with increased likelihood of sex with strangers over time. By contrast, at lower

maternal support levels, low peer sex norms were associated with decreased likelihood of sex with strangers over time and high peer sex norms were associated with increased likelihood of sex with strangers over time.

Table 8: *Peer Sexual Norms Moderated by Mother's Support Predicting Sexual Behaviors*

	Sex with Stranger		Condom Use		Number of Partners	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Predictor	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*
Peer sex norms	-1.127 (.954)	-.269 (.128)*	.677 (.888)	-.033 (.096)	-.266 (.158)	.001 (.020)
Mother's support	-1.125 (1.002)	-.247 (.131)*	1.357 (.916)	-.099 (.099)	-.307 (.170)	-.004 (.021)
Peer sex norms * Mother's support	.420 (.329)	.100 (.044)*	-.281 (.308)	.011 (.033)	.105 (.055)	.000 (.007)
Mother's education	.090 (.053)	.000 (.007)	-.036 (.045)	.005 (.006)	.030 (.010)	-.002 (.001)
Father's education	-.069 (.056)	.002 (.007)	.032 (.044)	-.010 (.005)	-.018 (.010)	.002 (.001)
Age first sex	-.221 (.069)**	.016 (.010)	-.073 (.059)	.019 (.008)*	-.070 (.014)***	.005 (.002)**
Baseline age	.441 (.189)*	-.027 (.025)	-.118 (.157)	.010 (.020)	.076 (.034)*	-.004 (.004)

• barely significant (p=0.50). *$p < .05$, **$p < .01$, **$p < .001$.

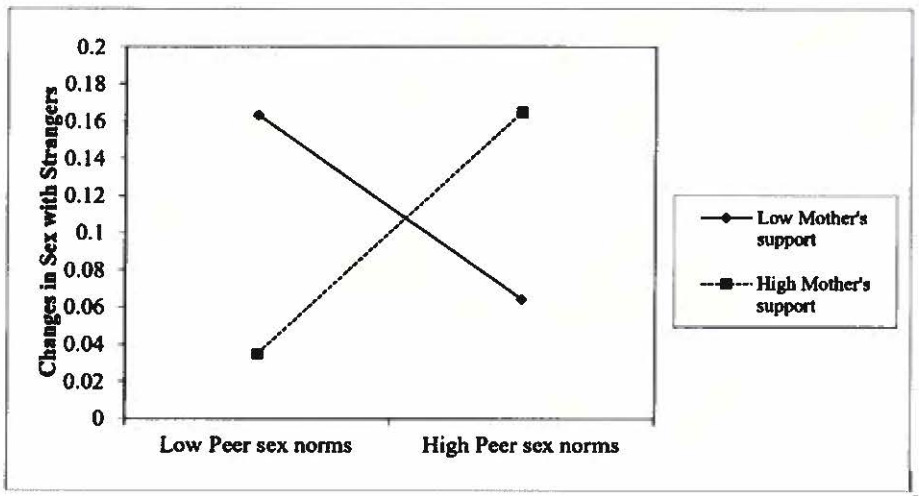


Figure 8: Moderation of peer sex norms by mother's support on change in sex with strangers

E. 4 Results of aim 3

E. 4a Effects of parental factors on trajectories

For research question C.3a, the linear slope LGC models were conditioned regressing the intercept and slope factors on mother's and father's support with the following covariates: mother's education, father's education, age at wave 1 (baseline) and age when the respondent first had sex. The results of these analyses are shown in Table 9.

Sex with Strangers

The first set of the maternal and paternal support models was run with the sex with a stranger outcome. The results showed good model fit statistics for the maternal support model were strong, Pearson's χ^2 (65386) = 668.125, p = 1.000, Loglikelihood = -8904.380, AIC = 17882.761, adjusted BIC = 17947.674. Mother's support was not a significant predictor of the intercept or slope in this model.

The model for paternal support similarly showed strong fit statistics, Pearson's χ^2 (65386) = 667.074, p = 1.000, Loglikelihood = -8902.662, AIC = 17879.324, adjusted BIC = 17944.237. Father's support was similarly not found to be a significant predictor of the intercept or slope in the model.

Consistent Condom Use

The second set of maternal and paternal support models were conducted with the condom use outcome. Model fit statistics for the mother's support model showed good fit, Pearson's χ^2 (130771) = 2301.838, p = 1.000, Loglikelihood = -10310.729, AIC = 20695.457, adjusted BIC = 20760.370. The results of the model showed that maternal support had a significant positive relationship with the outcome at baseline (β = .696, p < .05) and was a negative predictor of mean changes (β = -.072, p < .05) of the consistent condom use outcome. This indicates that at age 16, higher levels of maternal support were associated with increased likelihood in consistent condom use. In turn, higher levels of maternal support were associated with decreased likelihood in consistent condom use over time. Confirmatory conditional logistic regression models with the last three ages for the outcome were run to further assess the indicator's effect on the slope. The models showed non-significant effects at age 30 (p = 0.892), age 31 (p = 0.307) and age 32 (p = 0.759). These findings suggest that the slopes of participants reporting higher maternal support levels and lower maternal support levels converge at older ages.

The model fit statistics for the paternal support model also showed strong fit, Pearson's χ^2 (130782) = 1970.948, p = 1.000, Loglikelihood = -10284.592, AIC = 20643.183, adjusted BIC = 20708.096. The variable was not found to be a significant predictor of the intercept or slope in the model.

Number of Sex Partners

The third set of the maternal and paternal support models was run with the number of partners outcome. Model fit statistics for the maternal support model showed good fit, Pearson's χ^2 (32753) = 943.832, p = 1.000, Loglikelihood = -19259.999, AIC = 38589.998, adjusted BIC = 38651.402. Mother's support was not significant in this model.

The model fit statistics for the paternal support model similarly showed good fit, Pearson's χ^2 (32753) = 948.084, p = 1.000, Loglikelihood = -19258.083, AIC = 38586.165, adjusted BIC = 38647.569. Father's support was also not a significant predictor of the intercept or slope in this model.

Table 9: *Parental Support Predicting Sex with a Stranger, Condom Use, and Sex Partners*

	Mother's Support Model		Father's Support Model	
	Intercept	Slope	Intercept	Slope
DV by Predictor	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*	*Est. (SE)*
Sex with stranger				
Mother's support	.038 (.303)	.004 (.039)	-	-
Father's support	-	-	-.189 (.251)	.013 (.036)
Mother's education	.074 (.054)	-.001 (.007)	.072 (.054)	-.001 (.007)
Father's education	-.052 (.057)	.003 (.007)	-.049 (.057)	.003 (.007)
Age first sex	-.244 (.074)**	.018 (.010)	-.238 (.074)**	.017 (.010)
Baseline age	.489 (.182)**	-.022 (.022)	.488 (.181)**	-.021 (.022)
Condom Use				
Mother's support	.696 (.284)*	-.072 (.032)*	-	-
Father's support	-	-	.189 (.234)	.008 (.028)
Mother's education	-.044 (.055)	.005 (.006)	-.030 (.050)	.004 (.006)
Father's education	.041 (.055)	-.012 (.006)	.035 (.049)	-.011 (.006)
Age first sex	-.078 (.083)	.018 (.010)	-.084 (.068)	.018 (.008)*
Baseline age	-.278 (.177)	.019 (.020)	-.221 (.162)	.013 (.019)
Number of partners				
Mother's support	-.016 (.052)	-.003 (.006)	-	-
Father's support	-	-	-.068 (.046)	.003 (.005)
Mother's education	.030 (.011)	-.002 (.001)	.029 (.011)	-.002 (.001)
Father's education	-.016 (.011)	.002 (.001)	-.015 (.011)	.002 (.001)
Age first sex	-.076 (.014)***	.005 (.002)**	-.077 (.014)***	.005 (.002)**
Baseline age	.088 (.032)**	-.003 (.004)	.088 (.032)**	-.003 (.004)

Note. *$p < .05$, **$p < .01$, **$p < .001$.

E. 4b Peer delinquency and parental support mediation models

For research question C.3b, the linear slope latent growth models were conditioned regressing the intercept and slope factors on maternal and paternal support with these variables mediated by delinquent peer associations. Maternal education, paternal education, respondent age at wave 1 (baseline), and age at first sex covariates were included in these models. The results of the mediation analyses yielded two significant mediational relationships. The results of the non-significant analyses are depicted using path diagrams in Figures A – D provided in the appendix below.

The first model tested mediation by peer delinquency on the relationship between maternal support and consistent condom use. The results, displayed in Figure 5 below, showed a significant direct relationship between maternal support and consistent condom use at the intercept ($\beta = .566, p < .05$) and slope ($\beta = -.064, p < .05$) as well as a significant negative relationship between peer delinquency and consistent condom use at the intercept ($\beta = -.276, p < .01$). A significant negative relationship was also found between peer delinquency and maternal support at baseline ($\beta = -.236, p < .01$). The results show a positive indirect effect through peer delinquency ($\beta = .014, p = .037$) on beginning levels of condom use. Since maternal support continued to have a significant positive direct effect ($\beta = .125, p = .015$) on beginning levels of the behavior, this suggests that the relationship between mother's support and consistent condom use at age 16 is only partially mediated by the level of peer delinquency.

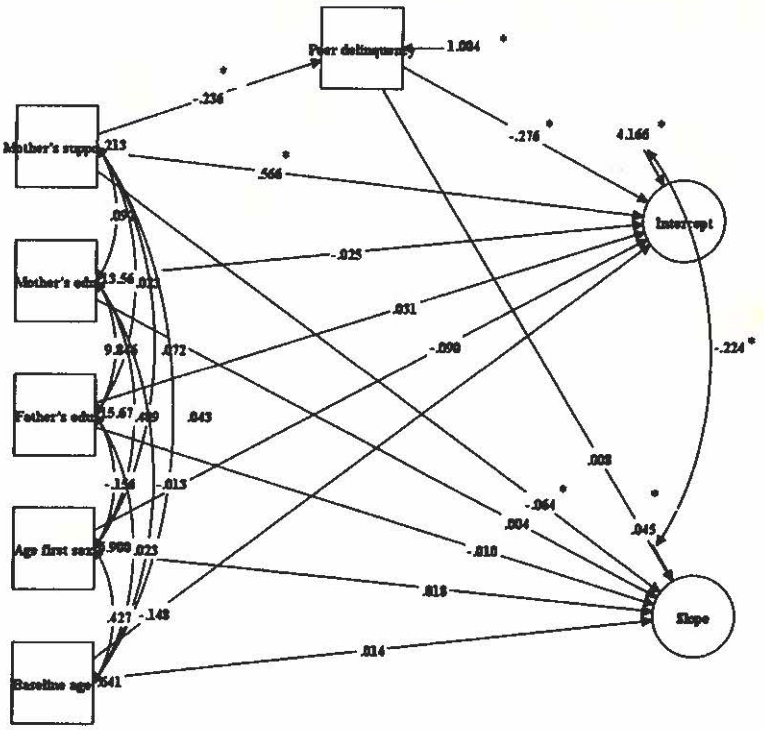


Figure 9: Mediation between mother's support and consistent condom use through delinquent peer

In the second model, mediation by peer delinquency was tested on the relationship between father's support and consistent condom use. The results, displayed in Figure 6, showed an insignificant positive direct relationship between paternal support and condom use at both the intercept ($\beta = .096, p = .698$) and slope ($\beta = .013, p = .662$). There was a significant negative relationship between peer delinquency and consistent condom use at the intercept ($\beta = -.281, p < .05$). A significant negative relationship was also found between peer delinquency and paternal support ($\beta = -.260, p < .001$). The results show a positive indirect effect through peer delinquency ($\beta = .073, p = .041$) on beginning levels of condom use. Since the direct effect ($\beta = .096, p = .698$) of paternal support on the intercept of consistent condom use was not significant, this suggests that

the relationship between paternal support and consistent condom use at age 16 is fully mediated through the level of peer delinquency.

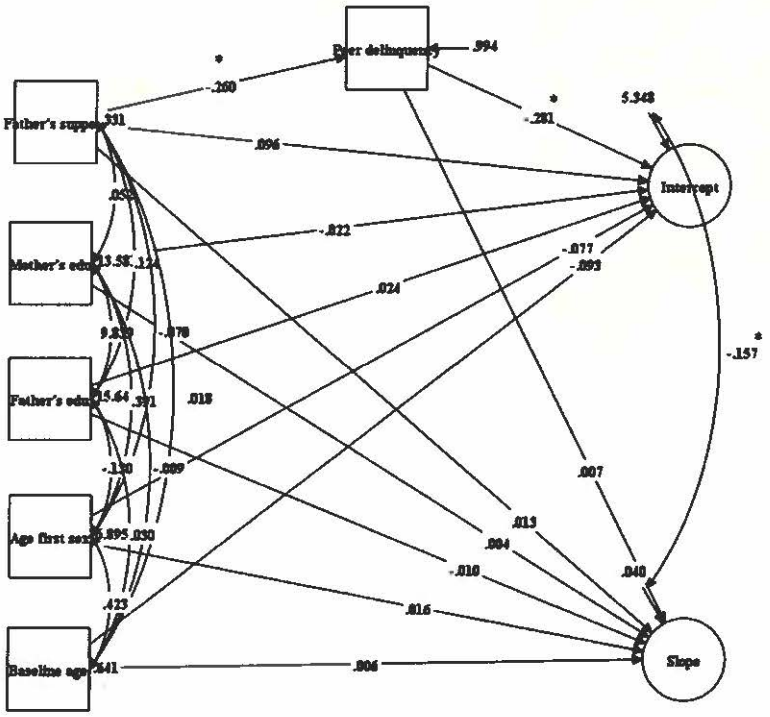


Figure 10: Mediation between father's support and consistent condom use through delinquent peer associations

E. 5 Summary

In sum, the analyses did not show many independent variables to be consistent predictors of the intercepts or slopes of all three outcomes under study. The analyses of sex status revealed that being female was associated with lower starting levels for all three of the sex risk behaviors (i.e. sex with stranger, condom use, and number of partners) compared to males, but no sex differences were found over time. For immigration/nativity status, foreign born participants were found to have significantly

lower starting levels of number of sex partners in comparison to U.S. born participants. The condom use analysis did not reveal any foreign-born vs. U.S. born differences; however, participants with unknown status had significantly lower likelihood of consistent condom use at age 16 but higher likelihood of consistent condom use over time compared to U.S. born participants. In terms of peer factors, peer delinquency was only found to be a negative predictor of initial levels (intercept) of consistent condom use, while peer sexual norms did not predict any of the outcomes. Similarly, maternal support was a significant positive predictor of initial levels (intercept) of consistent condom use. Paternal support was not found to be a significant predictor in any of the independent models. Finally, testing the mediation and moderation models returned results for both moderation by mother's support and mediation by peer delinquency. Maternal support was found to moderate the relationship between peer sex norms and sex with strangers over time (slope), although the analysis showed unexpected patterns. At higher levels of mother's support, lower peer sex norms were associated with decreased likelihood of having sex with a stranger over time and higher peer sex norms were associated with increased likelihood of the behavior over time. The analysis also surprisingly revealed the opposite effect at low maternal support levels where higher peer sex norms were associated with decreased likelihood in sex with strangers over time and lower peer sex norms were associated with increased likelihood of the behavior over time. In terms of mediation models, peer delinquency was found to partially mediate the relationship between maternal support and consistent condom use at age 16. Peer delinquency also indirectly mediated the relationship between paternal support and consistent condom use at age 16. Discussion of these findings and their implications follows in the next section.

VI. DISCUSSION AND CONCLUSION

This section discusses the findings from chapter 4 and their implications. The discussion is presented by aim and followed by a description of limitations and final remarks/conclusions.

F. 1 Discussion

F. 1a Trajectories of sexual behaviors

The first objective of the current study was to assess how the sexual risk trajectories changed over time. The results of the unconditional LGC models revealed that the three behaviors followed either quadratic or linear downward trend over time, which is an expected pattern as participants aged and likely entered long term relationships. Although the majority of the sample generally reported low levels of consistent condom use throughout the span of the study, the participants also reported lower levels of engaging in sex with strangers and multiple sexual partnerships making them a relatively low risk group. Nonetheless, examining the shapes of the trajectories and the patterns at each age shows a period of relatively increased risk taking among participants between mid-late teens and early 20s. These findings are consistent with patterns noted in other longitudinal adolescent behavioral research. A longitudinal analysis focusing on a primarily African American sample from ages 18 to 25 found a similar pattern of acceleration of sexual risk taking in later adolescence with a peak and eventual deceleration in young adulthood.[113] Similar trends have also been noted in research on other risk behaviors including drug[114] and alcohol use.[115] The similarity of the age-based risk taking patterns found here with other research suggests that early to

mid-adolescence may be an important period for introducing targeted sexual health behavior interventions among Latinx adolescents prior to the period of increased risk, which often starts in mid-late adolescence. Additional research among similar national samples may be useful to assess whether similar patterns arise to those found in this study. Further, to better understand changes in sexual risk behavior engagement, additional research can utilize group-based trajectory approaches such as latent transition analysis to delineate latent classes of sexual risk behaviors at different time points and assess transitions in latent class membership over time. Finally, since this study focused on how individual sexual behaviors change over time, future research can examine combined sexual risk-taking behavior outcomes (e.g. composite sexual risk indices), which may provide more insight into differences between high and low risk takers in the sample.

F. 1b Sex and immigration effects on sexual risk trajectories

A second sub-aim of the study was to assess the influence of sex differences and immigration/nativity status on the trajectories of sexual behaviors. The results revealed sex differences as consistently significant predictors of starting (intercept) levels of all three behaviors. Except for consistent condom use, males were found to engage in more risky sexual behavior at age 16/17 than their female counterparts. The results further showed that these pronounced sex differences were maintained into adulthood as confirmed by logistic regression models run with outcome data for the last three ages for each outcome. Overall, these findings are consistent with general research and national sexual behavior trends on Latinx adolescents. Adolescent Latino males are generally found to engage in riskier sexual behaviors than adolescent Latinas.[11,14,46,48] Latina

adolescents also generally report lower levels of contraceptive use in comparison to other female groups,[11,14] and national youth trends indicate that male adolescents of all ethnic groups typically report higher prevalence of condom use at last sex than their female counter parts.[116] In general, while low levels of consistent condom use among the sample, particularly females, does not preclude the possibility of use of other contraceptives, condoms are the most effective method in preventing STIs. The results thus reveal that both males and females in the sample were potentially vulnerable to negative sexual health outcomes during adolescence. Further research can investigate whether these earlier sex differences are linked to any differences in negative health outcomes among the sample such as STIs or teenage pregnancies. Additionally, while SRH research has generally emphasized health outcomes of Latina adolescents, the results of this and other studies suggest that an expanded focus on the sexual health of Latino adolescent males is warranted both in empirical and intervention efforts. Finally, more longitudinal investigation of sex differences is needed on nationally representative samples to assess and compare to the current findings and address generalizability limitations of this study.

In terms of immigration/nativity influences, the current study did not identify many differences between U.S. and foreign-born participants. The only significant finding was a lower likelihood of having multiple sexual partners at age 16. Logistic regression models did not confirm persistence of differences into adulthood, which was likely due to considerably decreased sample sizes affected by listwise deletion of cases with missing data in these models. Similar patterns of lower sexual risk taking among foreign-born youth have been found in other longitudinal studies among Latinx samples.[24,35] In the Add-Health based study by Guarini et al., foreign-born Latinx youth

were found to have lowest levels of sexual risk taking at each time point across adolescence and early adulthood.[24] Immigration/nativity status was also found to be a significant independent predictor as well as moderator of sex effects on sexual risk taking in the longitudinal NLSY97-based study by Killoren et al.;[35] however, several differences exist between this and the current study. First, the current study examined a smaller sub-set of the participants while Killoren et al. included all Latinx participants of NLSY97. The current study also looked at 16 years of data in comparison to the three distinct time points included in the analysis by Killoren et al. Additionally, almost a third of the Latinx sample had an unknown immigration/nativity status, which likely reduced the power of the current analysis to detect differences. This limitation also obscures the meaning of the difference found between participants with unknown status and U.S. born participants in terms of consistent condom use both at baseline and over time. Given the uncertainty about their status, it is unclear whether an actual difference exists between two distinct demographic groups from which conclusions can be drawn. Nonetheless, the mixed nature of immigration/nativity status-related findings of this study are common in acculturation-related research on SRH outcomes of Latinx youth. Yet, despite these inconsistencies, the current results suggest that immigration/nativity-related differences should continue to be examined, especially in longitudinal investigations of nationally representative samples. In light of the limitations of the immigration/nativity status variable utilized here, there are possibly differential patterns in sexual behavior between U.S. and foreign born Latinx youth that need to be further explored and elucidated including the evaluation of the interaction between immigration/nativity status and sex to compare the risk patterns across specific demographic sub-groups. Overall, the findings

from this and other longitudinal research among Latinx youth suggest that U.S. born youth appear to engage in higher sexual risk taking than foreign-born youth and the disparity persists into adulthood. Research and intervention efforts aimed at addressing this disparity are warranted.

F. 1c Peer and parental effects on sexual risk trajectories

The second and third objectives of the study were focused on identifying significant peer or parental influences on the sexual trajectories of the participants. The analyses of peer and parental factors as independent predictors of the sexual risk trajectories did not return many significant results. In terms of peer factors, all perceived peer norm models and most peer delinquent models produced non-significant results and only one significant finding emerged. Specifically, higher peer delinquency was found to be associated with a significantly decreased likelihood in consistent condom use at age 16 which persisted into adulthood as confirmed by logistic regression models run with the last three ages of the outcome. These findings suggest that it was an important behavioral formation influence during the pivotal period of adolescence. Linking delinquent peer associations to low or none condom use has been found in research among other youth groups,[36] although it is relatively understudied in the Latinx youth context. With relation to perceived peer norms, the objective was to assess whether perceptions about higher frequency of engagement in sex among one's peers may influence other risky sexual behaviors, but the results did not reveal such links. Perceived peer norms around a particular sexual behavior have been consistently identified as strong predictors of actual sexual behaviors among adolescents;[29,38,39,89,91] however, research on peer norms has largely focused on sexual initiation-related behaviors[29,38,39,75,89,91] rather than consistent

sexual behavior. Overall, the findings of the peer-related models indicate that exploring delinquent peer association as an influence of sexual behavior development in adolescence is warranted among samples of Latinx youth. Particularly, the maintained effect of delinquent peer associations on condom use and other sexual behaviors into adulthood should be further confirmed since it can potentially be an important target for Latinx adolescent sexual risk reduction efforts. Additionally, despite the non-significance of the other peer related models, studying the various peer influences (e.g. sexual norms, delinquency, communication, peer pressure, etc.) on sexual behaviors and outcomes of Latinx youth remains relevant. The focus on peer context is increasingly expanding[21,22] in SRH literature on Latinx youth, yet it is still relatively limited[32,33,92,97] especially in comparison to parental and partner influences. Future research should look at individual and personality-based factors related to peer environment (e.g. tolerance/acceptance of peer delinquency, susceptibility to peer pressure, etc.) and how they may impact sexual behavior both during and beyond adolescence.

Similar to the peer models, analyses on the influence of maternal and paternal support as independent predictors of sexual trajectories only identified a single significant association. Mother's support was found to be a significant predictor of consistent condom use at age 16; however, the variable was associated with decreased likelihood of consistent condom use over time. Other NLSY97-based SRH research on Latinx adolescents found no links between maternal or paternal support and sexual risk taking at both waves 3 (2000) and 5 (2002).[35] Although the results revealed maternal influences on the slope, the effects were larger at baseline. These findings suggest that mother's support may be a more salient influence for behavior formation at younger ages when the child is

developmentally less mature and thus more under maternal influence. Similar patterns were found in research on heavy episodic drinking in early adulthood (ages 18-25).[117] Protective maternal influences against heavy episodic drinking were only observed at ages 18 and 19 diminishing at later ages, and while paternal influences were significant throughout early adulthood, the earlier maternal influences were stronger than paternal influences.[117] Although the current analysis also revealed a small negative maternal support influence on the slope, further logistic regression analyses suggest that the negative effect of maternal support on the slope appeared to converge over time and condom use behavior became more similar among those reporting higher and lower maternal support levels as the participants aged. This may be reflective of participants entering long term relationships over time and further emphasizes the salience of maternal influences on the behavior in adolescence. Overall, the significance of parental support as an influence on sexual behavior should not be completely discounted because of the limited significant findings from the independent models. Several studies among Latinx adolescent samples found links between parental support, particularly mother's support, and adolescent sexual behavior.[57,70,80] Additionally, the current variables were indicators of general support and lacking specificity, which may have underestimated associations. Also, despite the definition limitations and lack of variability in the mother's support indicator (73% reporting high variability), it still emerged as a strong independent predictor in one of the models. This suggests that parental support, as a construct, should continue to be further explored in Latinx youth SRH research. Additional discussion of parental support factors follows in the next section on joint peer and parental influences.

F. 1d Linkage between peer and parental influences

An important focus of the current study was the investigation of the effect of more complex joint relationships between peer and parental influences on sexual risk behavior trajectories. Moving beyond direct independent relationships, the study examined both mediation and moderation models. Examining the role of maternal and paternal support as moderators of peer effects on sexual behavior trajectories did not identify many significant findings. In fact, the single significant model revealed unexpected results. While no significant main effects were found, mother's support was found to moderate the relationship between perceived peer sex norms and the mean change of sex with strangers over time. The patterns were mostly unexpected such as low sex peer norms being associated with increased likelihood of sex with strangers over time at low levels of mother's support while high sex peer norms being associated with decreased likelihood in the behavior over time. These findings are incompatible with what theories suggest, so they may be influenced by other parenting facets such as parenting style (e.g. permissive parenting) or limited parental monitoring. The current study was not able to test differences by factors such as parental monitoring since NLSY97 monitoring variables represent perceived parental knowledge as opposed to active monitoring and due to practical issues of data missingness in the variables. Further research should investigate the impact of other factors such as parenting style and strictness to assess whether these relationships may explain the current discrepancies. Additionally, the current findings may also have been influenced by issues in the data such as limited variability in the mother's support indicator (i.e. only 1% of respondents reported low mother's support), which may have obscured its impact on the effect of peer norms. Moreover, since peer

sex norms was a general measure of perceived peer engagement in sexual intercourse at baseline, it was not directly related to sex with strangers which may have produced the null findings. Utilizing more robust and specific indicators of parental support and peer sex norms related to the sexual behaviors in future research may be useful in delineating any moderating role of parental support on peer sexual norms. Finally, baseline indicators of the parental support variables were utilized here to establish temporality; however, it may be useful to assess the pattern of response on this indicator over the first four waves to determine consistency of responses among participants and perhaps utilize an averaged summary indicator instead.

Unlike the moderation models, the mediation analyses revealed that parental support and dynamics of peer environment such as delinquent peer associations jointly had a significant influence on aspects of sexual behavior among the sample. Specifically, peer delinquency was found to partially mediate the relationship between maternal support and consistent condom use at age 16. Peer delinquency also fully mediated the relationship between paternal support and consistent condom use at age 16. The results indicated that poor maternal and paternal support increased the risk of delinquent peer association and indirectly affected condom use behavior in adolescence among the sample. Additionally, mother's support levels also continued to directly affect condom use behavior beyond the effect of delinquent peer association. These findings provide some evidence of peer socialization on condom use behavior during adolescence among the sample. Peer socialization through delinquent peer association has been commonly identified as a mechanism for negative behavior[36,40] including risky sexual behavior such as non-condom use and multiple sexual partnerships[36] among adolescent samples. As

such, further confirmation of the effect of peer socialization during adolescence on risky sexual behaviors is needed among more representative Latinx samples. The assessment should also expand to include other parental factors (e.g. monitoring, strictness, communication) as influences on delinquent peer association.

F. 2 Limitations

Several limitations should be considered in evaluating the findings of this study. First, because of the study's longitudinal design, attrition and potential differential loss to follow up represented the largest generalizability and bias threat for the results. Although NLSY97 had relatively high retention rates over the years,[108] loss to follow up and decreased sample size was considerably noticeable as the sample aged. Overall, the analysis sought to decrease the impact of missing data and address issues of model convergence by creating summary measures when possible (i.e. peer delinquency index) as well as utilizing the FIML estimation method and including variance of covariates, which allows for the use of all available data without dropping cases with missing information. Nonetheless, reduced power due to smaller sample sizes may have impacted the ability of the analysis to detect significance of some variables and/or some of the complex relationships under study.

Second, because the analysis focused on an ethnicity and age-based sub-sample of NLSY97 participants, weights were not applied to avoid biasing estimates.[109] Although this limits generalizability of the results, the findings provide rationale for additional investigations among nationally representative samples of Latinx adolescents. Third, the self-report nature of the measures may have relatively impacted the accuracy of the data. NLSY97 modules on sensitive behaviors including sexual and criminal behaviors were

collected using computer-assisted self-interview. Yet, it is still possible that the participants, especially at younger ages, may have not accurately reported sexual activity due to social desirability bias or lack of understanding about the confidentiality of the data collection process.

Finally, as a secondary data analysis, the study was limited by type and quality of the available data. For example, the measures on parental support used in this study relied solely on participant data and could not be confirmed with parental report to assess concordance/discordance between the measures, which could have provided better context for understanding the findings. Also, as noted above, the parental support variables were assessed using a single-item variable focusing on general support. A multi-item construct may have better captured how parental support is perceived in multiple dimensions (e.g. support in decision making, life goals, relationships, etc.) and helped further disentangle relationships between parental support and sexual behaviors. The perceived peer sexual norms variable was also limited to assessing percentage of friends who engaged in sex, which may explain some of the null findings since it was not directly related to the sexual behaviors understudy. Although a similar construct has been linked to multiple risky sexual behaviors in other analyses among Latinx adolescents,[92] additional measures on peer sexual norms around the examined behaviors (e.g. condom use, having multiple sexual partners, etc.) may have provided a better understanding of how peer sexual norms around risky sexual behaviors impact the actual behaviors among participants during adolescence and/or over time. Finally, almost a third of the sample had an unknown immigration/nativity status, which limited the ability of this analysis to

detect differences or draw meaningful conclusions from some findings on distinct demographic groups.

F. 3 Conclusion

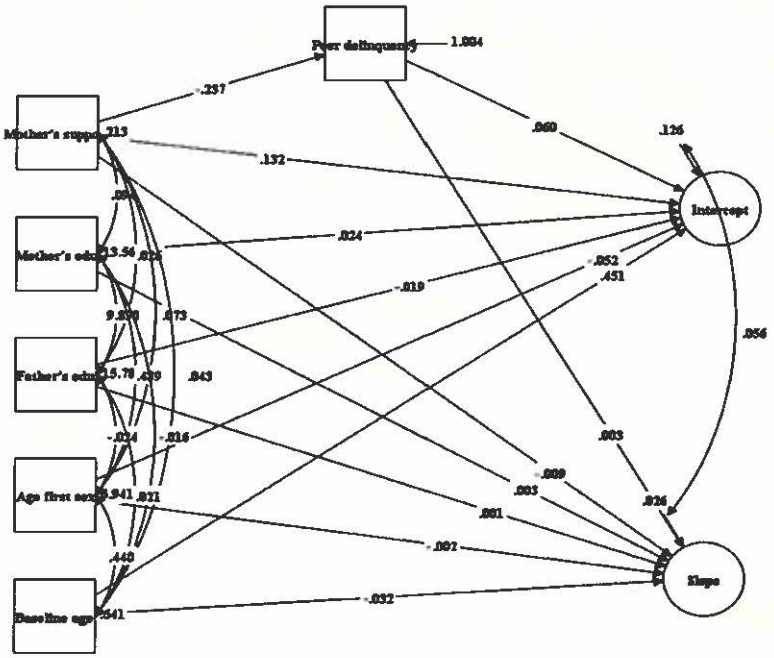
Despite the described limitations, several important findings were gleaned from the current study. The results of this research point consistently to the importance of the adolescence period in sexual behavior development. Most of the significant findings were more salient during adolescence (i.e. baseline of analysis at 16/17 years of age) and disparities based on most of these characteristics continued to be significant over time. The age trends of the examined behaviors also showed some increase in late adolescence and early 20s with a general decrease over time. As such, these results indicate that early to mid-adolescence presented an opportunity for early intervention to ensure a healthy sexual development among this group. Several intervention efforts introduced during early-mid adolescence aimed at reducing youth problem behaviors have indeed found significantly decreased likelihood in behaviors such as drug or alcohol use[118-121] and sexual risk behaviors[119-123] among intervention groups.

As noted previously, although the findings of this study should not be thought of as representing all U.S. Latinx adolescents/young adults, most of the results were relatively consistent with prior research conducted among Latinx and other youth groups. The results thus can provide useful suggestions for research or intervention efforts, especially in areas with limited research among Latinx youth such as peer effects. The identification of delinquent peer association as a significant predictor of condom use behavior during adolescence stresses the importance of exploring peer socialization as a negative influence on sexual behavior among other Latinx youth samples. Additionally,

the significant parental support findings suggest that exploration of familial support can be an important facet of understanding sexual behavior of Latinx adolescents beyond the traditional focus on monitoring and communication. The salience of mother's support as an important direct and indirect predictor of condom use in this analysis also indicates that continued focus on maternal influences in Latinx youth SRH literature is warranted; however, paternal influences, both direct and indirect, should continue to be investigated in research or intervention efforts on SRH of Latinx youth. Finally, beyond the independent role of peer and parental influences, the findings of the study suggest that peer and parental effects can jointly affect aspects of sexual behavior among some Latinx youth and hence the interrelatedness of these influences should be an important focus of research and prevention efforts. Existing programs integrating multi-systemic components that focus on improving parental engagement (e.g. positive parenting, parental involvement and support) and promoting proactive connections between the family and other important systems of influence (e.g. peers, schools) such as the program, *Familias Unidas,* consistently had positive effects on reducing youth behavior problems, including risky sexual behaviors among Latinx youth.[119,120,123,124]. Future research and prevention efforts should build on and expand such integrative sexual risk behavior prevention frameworks.

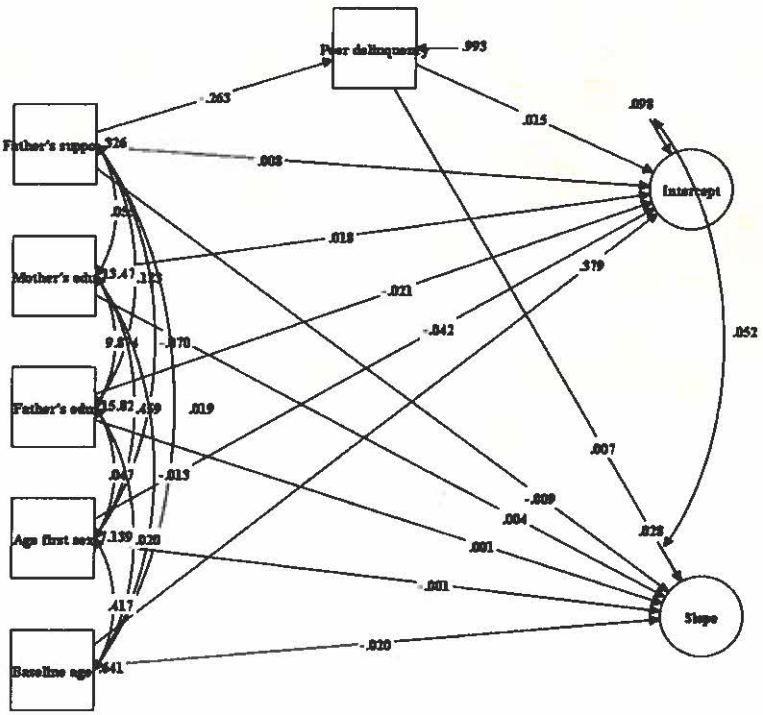
APPENDIX

Figure A



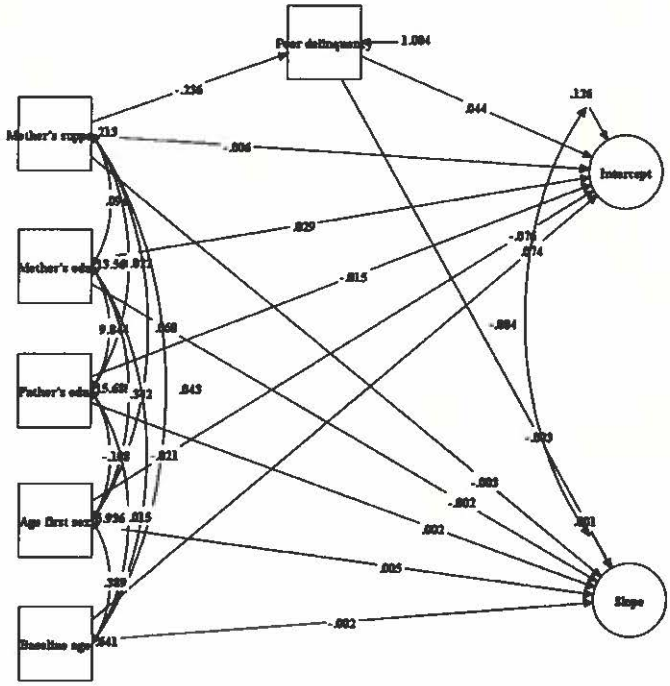
Mediation between mother's support and sex with strangers through delinquent peer association

Figure B



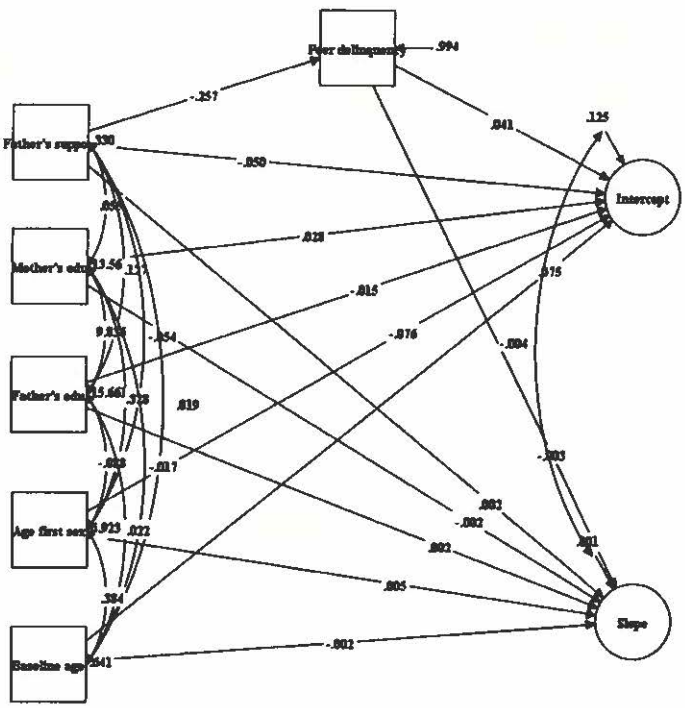
Mediation between father's support and sex with strangers through delinquent peer association

Figure C



Mediation between mother's support and number of sex partners through delinquent peer association

Figure D



Mediation between Number of Sex Partners and Father's Support Through Delinquent Peer Associations

Table A

Peer Delinquency Moderated by Mother's Support Predicting Sexual Behaviors

	Sex with Stranger		Condom Use		Number of Partners	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Predictor	*Est.*	*Est.*	*Est.*	*Est.*	*Est.*	*Est.*
Peer delinquency	-.294 (.346)	.076 (.044)	.038 (.615)	.003 (.075)	.019 (.156)	.025 (.246)
Mother's Support	-.090 (.327)	.031 (.041)	.878 (.607)	-.070 (.071)	-.019 (.059)	-.038 (.085)
Peer delinquency * Mother's support	.179 (.120)	-.031 (.015)	-.122 (.223)	.002 (.027)	.052 (.161)	-.074 (.255)
Mother's Education	.069 (.054)	-.001 (.007)	-.031 (.047)	.004 (.006)	.234 (.089)	-.178 (.130)
Father's Education	-.056 (.057)	.005 (.007)	.035 (.046)	-.010 (.005)	-.125 (.098)	.200 (.145)
Age First Sex	-.254 (.076)**	.020 (.010)*	-.090 (.064)	.019 (.008)*	-.448 (.091)***	.415 (.164)
Baseline age	.407 (.186)*	-.016 (.023)	-.147 (.155)	.013 (.018)	.160 (.060)**	-.061 (.087)

Table B

Peer Delinquency Moderated by Father's Support Predicting Sexual Behaviors

	Sex with Stranger		Condom Use		Number of Partners	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Predictor	*Est.*	*Est.*	*Est.*	*Est.*	*Est.*	*Est.*
Peer delinquency	-.177 (.671)	.027 (.109)	-1.357 (.633)*	.061 (.075)	-.079 (.138)	.015 (.016)
Father's Support	-.433 (.677)	.041(.101)	-.899 (.606)	.061 (.072)	-.156 (.134)	.018 (.015)
Peer delinquency * Father's support	.128 (.256)	-.012 (.041)	.397 (.237)	-.018 (.028)	.041 (.051)	.006 (.006)
Mother's education	.071 (.054)	-.001 (.007)	-.015 (.046)	.003 (.006)	.029 (.011)	-.002 (.001)
Father's education	-.049 (.057)	.004 (.007)	.026 (.045)	-.010 (.006)	-.015 (.011)	.002 (.001)
Age first sex	-.240 (.075)**	.018 (.010)	-.092 (.061)	.018 (.008)*	-.077 (.014)**	.006 (.002)
Baseline age	.441 (.185)*	-.020 (.023)	-.076 (.152)	.005 (.018)	.081 (.033)*	-.003 (.004)

Table C

Peer Sexual Norms Moderated by Father's Support Predicting Sexual Behaviors

	Sex with Stranger		Condom Use		Number of Partners	
	Intercept	Slope	Intercept	Slope	Intercept	Slope
Predictor	*Est.*	*Est.*	*Est.*	*Est.*	*Est.*	*Est.*
Peer sex norms	.419 (.468)	.022 (.058)	-.958 (.608)	-.005 (.064)	.033 (.076)	.001 (.009)
Father's support	-.194 (.326)	.025 (.048)	-.724 (.660)	.001 (.069)	-.051 (.052)	.002 (.006)
Peer sex norms * Father's support	-.025 (.172)	-.002 (.021)	.316 (.223)	.003 (.024)	-.003 (.027)	.000 (.003)
Mother's education	.096 (.066)	-.002 (.008)	-.022 (.044)	.004 (.006)	.027 (.010)**	-.002 (.001)
Father's education	-.056 (.069)	.003 (.009)	.024 (.043)	-.011 (.006)	-.014 (.010)	.002 (.001)
Age first sex	-.264 (.086)**	.020 (.012)	-.083 (.059)	.018 (.008)*	-.069 (.014)***	.005 (.002)**
Baseline age	.478 (.226)	-.033 (.028)	-.050 (.156)	.004 (.019)	.074 (.033)*	-.004 (.004)

REFERENCES

1. Dixon-Mueller R. The sexual and reproductive health of younger adolescents. 2011.
2. International Women's Health Coalition. *Overlooked and Uninformed:Younger Adolescent's Sexual and Reproductive Health and Rights.* New York, NY: International Women's Health Coalition;2007.
3. Centers for Disease Control. *Sexually Transmitted Disease Surveillance 2017.* Atlanta: GA: Division of STD Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention, Centers for Disease Control and Prevention, U.S. Department of Health and Human Services; 2018.
4. Gavin L, MacKay AP, Brown K, et al. Sexual and reproductive health of persons aged 10-24 years - United States, 2002-2007. *MMWR Surveill Summ.* 2009;58(6):1-58.
5. Centers for Disease Control and Prevention. Teenagers in the United States: Sexual activity, contraceptive use, and childbearing, 2006–2010 National Survey of Family Growth. *Vital and Health Statistics.* 2011;23(31):1-44.
6. U.S. Census Bureau. Table 1. Projected poulation by single year of age, sex, race and hispanic origin for the United States: 2014 to 2060. https://www.census.gov/population/projections/data/national/2014.html. Published 2015. Accessed January 20, 2019.
7. Martin JA, Hamilton BE, Osterman M, Driscoll AK, Mathews TJ. Births: Final Data for 2015. *Natl Vital Stat Rep.* 2017;66(1):1-70.
8. Centers for Disease Control and Prevention. *HIV Surveillance Report, 2017.* Atlanta, GA: Division of HIV/AIDS Prevention, National Center for HIV/AIDS, Viral Hepatitis, STD, and TB Prevention, Centers for Disease Control and Prevention (CDC), U.S. Department of Health and Human Services; 2018.
9. Centers for Disease Control and Prevention. NCHHSTP AtlasPlus. https://www.cdc.gov/nchhstp/atlas/index.htm. Published 2017. Accessed April 9, 2019.
10. Centers for Disease Control and Prevention. HIV among youth. http://www.cdc.gov/hiv/group/age/youth/index.html#footnotes. Published 2015. Accessed January 26, 2019.
11. Kann L, McManus T, Harris WA, et al. Youth risk behavior surveillance - United States, 2017. *MMWR Morb Mortal Wkly Rep.* 2018;67(8):1-479.
12. Frost JJ, Driscoll AK. *Sexual and reproductive health of U.S. Latinas: A literature review.* New York: NY: Guttmacher Institute;2006.
13. Afable□Munsuz A, Brindis CD. Acculturation and the sexual and reproductive health of Latino youth in the United States: a literature review. *Perspect Sex Reprod Health.* 2006;38(4):208-219.
14. Driscoll AK, Biggs MA, Brindis CD, Yankah E. Adolescent Latino Reproductive Health: A Review of the Literature. *Hisp J Behav Sci.* 2001;23(3):255-326.

15. Edwards LM, Fehring RJ, Jarrett KM, Haglund KA. The influence of religiosity, gender, and language preference acculturation on sexual activity among Latino/a adolescents. *Hisp J Behav Sci.* 2008;30(4):447-462.
16. Guilamo-Ramos V, Jaccard J, Pena J, Goldberg V. Acculturation-related variables, sexual initiation, and subsequent sexual behavior among Puerto Rican, Mexican, and Cuban youth. *Health Psychol.* 2005;24(1):88.
17. Haderxhanaj LT, Dittus PJ, Loosier PS, Rhodes SD, Bloom FR, Leichliter JS. Acculturation, sexual behaviors, and health care access among Hispanic and non-Hispanic white adolescents and young adults in the United States, 2006-2010. *J Adolesc Health.* 2014;55(5):716-719.
18. Lee J, Hahm HC. Acculturation and sexual risk behaviors among Latina adolescents transitioning to young adulthood. *J Youth Adolesc.* 2010;39(4):414-427.
19. Sabogal F, Perez-Stable EJ, Otero-Sabogal R, Hiatt RA. Gender, ethnic, and acculturation differences in sexual behaviors: Hispanic and non-Hispanic white adults. *Hisp J Behav Sci.* 1995;17(2):139-159.
20. Kotchick BA, Shaffer A, Forehand R, Miller KS. Adolescent sexual risk behavior: a multi-system perspective. *Clin Psychol Rev.* 2001;21(4):493-519.
21. Pantin H, Schwartz SJ, Sullivan S, Prado G, Szapocznik J. Ecodevelopmental HIV Prevention Programs for Hispanic Adolescents. *Am J Orthopsychiatry.* 2004;74(4):545-558.
22. Prado G, Huang S, Maldonado-Molina M, et al. An Empirical Test of Ecodevelopmental Theory in Predicting HIV Risk Behaviors Among Hispanic Youth. *Health Educ Behav.* 2010;37(1):97-114.
23. Szapocznik J, Coatsworth JD. An ecodevelopmental framework for organizing the influences on drug abuse: A developmental model of risk and protection. In: Glantz MD, Hartel CR, eds. *Drug abuse: Origins & interventions.* Washington, DC, US: American Psychological Association; 1999:331-366.
24. Guarini TE, Marks AK, Patton F, Coll CG. The immigrant paradox in sexual risk behavior among Latino adolescents: Impact of immigrant generation and gender. *Appl Dev Sci.* 2011;15(4):201-209.
25. Smetana JG, Campione-Barr N, Metzger A. Adolescent development in interpersonal and societal contexts. *Annu Rev Psychol.* 2006;57:255-284.
26. Trejos-Castillo E. *Parenting processes and risky sexual behaviors in first and second generation Hispanic immigrant youth.* Auburn, AL: Human Development and Family Studies, Auburn University; 2006.
27. Bronfenbrenner U. *The ecology of human development: Experiments by nature and design.* Cambridge, MA: Cambridge University Press; 1979.
28. Bronfenbrenner U. Ecology of the family as a context for human development. *Am Psychol.* 1986;32:513-531.
29. Crockett LJ, Raffaelli M, Moilanen KL. Adolescent sexuality: Behavior and meaning. In: Adams GR, Berzonsky MD, eds. *Blackwell handbook of adolescence* Malden: MA: Blackwell; 2003:371-392.
30. DiClemente RJ, Wingood GM, Crosby R, et al. Parental monitoring: association with adolescents' risk behaviors. *Pediatrics.* 2001;107(6):1363-1368.

31. Bámaca-Colbert MY, Greene KM, Killoren SE, Noah AJ. Contextual and developmental predictors of sexual initiation timing among Mexican-origin girls. *Dev Psychol.* 2014;50(10):2353.
32. Christopher FS, Johnson DC, Roosa MW. Family, individual, and social correlates of early Hispanic adolescent sexual expression. *J Sex Res.* 1993;30(1):54-61.
33. Gilliam ML, Berlin A, Kozloski M, Hernandez M, Grundy M. Interpersonal and personal factors influencing sexual debut among Mexican-American young women in the United States. *J Adolesc Health.* 2007;41(5):495-503.
34. Deptula DP, Henry DB, Schoeny ME. How can parents make a difference? Longitudinal associations with adolescent sexual behavior. *J Fam Psychol.* 2010;24(6):731-739.
35. Killoren SE, Deutsch AR. A Longitudinal Examination of Parenting Processes and Latino Youth's Risky Sexual Behaviors. *J Youth Adolesc.* 2014;43(12):1982-1993.
36. Boislard MA, Poulin F, Kiesner J, Dishion TJ. A longitudinal examination of risky sexual behaviors among Canadian and Italian adolescents: Considering individual, parental, and friend characteristics. *Int J Behav Dev.* 2009;33(3):265-276.
37. French DC, Dishion TJ. Predictors of early initiation of sexual intercourse among high-risk adolescents. *J Early Adolesc.* 2003;23(3):295-315.
38. Kinsman SB, Romer D, Furstenberg FF, Schwarz DF. Early sexual initiation: the role of peer norms. *Pediatrics.* 1998;102(5):1185-1192.
39. Santelli JS, Kaiser J, Hirsch L, Radosh A, Simkin L, Middlestadt S. Initiation of sexual intercourse among middle school adolescents: the influence of psychosocial factors. *J Adolesc Health.* 2004;34:200-208.
40. Barrera M, Biglan A, Ary D, Li F. Replication of a Problem Behavior Model with American Indian, Hispanic, and Caucasian Youth. *J Early Adolesc.* 2001;21(2):133-157.
41. McCarthy K. *Adaptation of immigrant children to the United States: A review of the literature.* The New Jersey Immigrant Youth Project;1998.
42. Schwartz SJ, Pantin H, Szapocznik J. The Hispanic immigrant experience. In: Miller JR, Lerner RM, Schiamberg LB, Anderson PM, eds. *Human ecology: An encyclopedia of children, families, communities and environments.* Santa Barbara, CA: ABC-CLIO; 2003:360-363.
43. Becker D, Thing JP, Baezconde-Garbanati L, Schwartz SJ, Soto DW, Unger JB. Cultural measures associated with risky sexual behaviors among Latino youth in Southern California: A longitudinal study. *Perspect Sex Reprod Health.* 2014;46(4):193-201.
44. Cordova D, Huang SHI, Lally M, Estrada Y, Prado G. Do Parent–Adolescent Discrepancies in Family Functioning Increase the Risk of Hispanic Adolescent HIV Risk Behaviors? *Fam Process.* 2014;53(2):348-363.
45. McDonald JA, Manlove J, Ikramullah EN. Immigration measures and reproductive health among Hispanic youth: findings from the national longitudinal survey of youth, 1997-2003. *J Adolesc Health.* 2009;44(1):14-24.

46. Kaestle CE, Halpern CT, Miller WC, Ford CA. Young age at first sexual intercourse and sexually transmitted infections in adolescents and young adults. *Am J Epidemiol.* 2005;161(8):774-780.
47. Miller KS, Clark LF, Moore JS. Sexual initiation with older male partners and subsequent HIV risk behavior among female adolescents. *Fam Plann Perspect.* 1997:212-214.
48. O'Donnell L, O'Donnell C, Stueve A. Early sexual initiation and subsequent sex-related risks among urban minority youth: the reach for health study. *Fam Plann Perspect.* 2001;33:286-275.
49. Cauce AM, Domenech-Rodriguez M. Latino families: Myths and realities. In: Contreras JM, Kerns KA, Neal-Barnett AM, eds. *Latino children and families in the United States: Current research and future directions.* Westport, CT: Praeger; 2002:3-26.
50. Ayala J. Confianza, consejos and contradictions: Gender and sexuality lessons between Latino adolescent daughters and their mothers. In: Denner J, Guzman BL, eds. *Latina girls: Voices of adolescent strength in the United States.* New York: NY: New York University Press; 2006:29-43.
51. Murphy-Erby Y, Stauss K, Boyas J, Bivens V. Voices of Latino parents and teens: Tailored strategies for parent–child communication related to sex. *J Child Poverty.* 2011;17(1):125-138.
52. Guilamo-Ramos V, Bouris A. *Parent-adolescent communication about sex in Latino families: A guide for practitioners.* National Campaign To Prevent Teen and Unplanned Pregnancy;2008.
53. Hunt LM, Schneider S, Comer B. Should "acculturation" be a variable in health research? A critical review of research on US Hispanics. *Soc Sci Med.* 2004;59(5):973-986.
54. Schwartz SJ, Unger JB, Zamboanga BL, Szapocznik J. Rethinking the Concept of Acculturation: Implications for Theory and Research. *Am Psychol.* 2010;65(4):237-251.
55. Ford K, Norris AE. Urban Hispanic adolescents and young adults: Relationship of acculturation to sexual behavior. *J Sex Res.* 1993;30(4):316-323.
56. Reynoso TC, Felice ME, Shragg GP. Does American acculturation affect outcome of Mexican-American teenage pregnancy? *J Adolesc Health.* 1993;14(4):257-261.
57. Trejos-Castillo E, Vazsonyi AT. Risky sexual behaviors in first and second generation Hispanic immigrant youth. *J Youth Adolesc.* 2009;38(5):719-731.
58. Brindis C, Wolfe AL, McCarter V, Ball S, Starbuck-Morales S. The associations between immigrant status and risk-behavior patterns in Latino adolescents. *J Adolesc Health.* 1995;17(2):99-105.
59. Edwards LM, Fehring RJ, Jarrett KM, Haglund KA. The Influence of Religiosity, Gender, and Language Preference Acculturation on Sexual Activity Among Latino/a Adolescents. *Hisp J Behav Sci.* 2008;30(4):447-462.
60. Sullivan S, Schwartz SJ, Prado G, Shi Huang, Pantin H, Szapocznik J. A Bidimensional Model of Acculturation for Examining Differences in Family Functioning and Behavior Problems in Hispanic Immigrant Adolescents. *J Early Adolesc.* 2007;27(4):405-430.

61. Unger JB, Ritt-Olson A, Wagner K, Soto D, Baezconde-Garbanati L. A comparison of acculturation measures among Hispanic/Latino adolescents. *J Youth Adolesc.* 2007;36(4):555-565.
62. Schwartz SJ, Pantin H, Sullivan S, Prado G, Szapocznik J. Nativity and Years in the Receiving Culture as Markers of Acculturation in Ethnic Enclaves. *J Cross Cult Psychol.* 2006;37(3):345-353.
63. Centers for Disease Control and Prevention. Youth risk behavior surveillance - United States, 2013. *MMWR Surveill Summ.* 2014;63(4):1-168.
64. Foulkes R, Donoso R, Fredrick B, Frost JJ, Singh S. Opportunities for Action: Addressing Latina Sexual and Reproductive Health. *Perspect Sex Reprod Health.* 2005;37(1):39-44.
65. Rocca CH, Doherty I, Padian NS, Hubbard AE, Minnis AM. Pregnancy Intentions and Teenage Pregnancy Among Latinas: A Mediation Analysis. *Perspect Sex Reprod Health.* 2010;42(3):186-196.
66. Phinney JS. Ethic identity and acculturation. In: Chun KM, Organista PB, Marin G, eds. *Acculturation: Advances in theory, measurement, and applied research.* Washington, DC: American Psychological Association; 2003:63-82.
67. Caminis A, Henrich C, Ruchkin V, Schwab-Stone M, Martin A. Psychosocial predictors of sexual initiation and high-risk sexual behaviors in early adolescence. *Child Adolesc Psychiatry Ment Health.* 2007;1(1):14.
68. Coker AL, Richter DL, Valois RF, McKeown RE, Garrison CZ, Vincent ML. Correlates and Consequences of Early Initiation of Sexual Intercourse. *J Sch Health.* 1994;64(9):372-377.
69. Vanoss Marín B, Coyle KK, Gómez CA, Carvajal SC, Kirby DB. Older boyfriends and girlfriends increase risk of sexual initiation in young adolescents. *J Adolesc Health.* 2000;27(6):409-418.
70. Velez-Pastrana MC, Gonzalez-Rodriguez RA, Borges-Hernandez A. Family functioning and early onset of sexual intercourse in Latino adolescents. *Adolescence.* 2005;40(160):777-791.
71. Castillo-Mancilla J, Allshouse A, Collins C, Hastings-Tolsma M, Campbell TB, MaWhinney S. Differences in Sexual Risk Behavior and HIV/AIDS Risk Factors Among Foreign-Born and US-Born Hispanic Women. *J Immigr Minor Health.* 2012;14(1):89-99.
72. Minnis AM, Doherty I, vanDommelen-Gonzalez E, Cheng H, Otero-Sabogal R, Padian NS. Immigration and sexual partner risk among Latino adolescents in San Francisco. *J Immigr Minor Health.* 2010;12(6):900-908.
73. Kincaid C, Jones DJ, Sterrett E, McKee L. A review of parenting and adolescent sexual behavior: The moderating role of gender. *Clin Psychol Rev.* 2012;32(3):177-188.
74. Jessor R, Turbin MS, Costa FM. Protective factors in adolescent health behavior. *J Pers Soc Psychol.* 1998;75(3):788-800.
75. Buhi ER, Goodson P. Predictors of adolescent sexual behavior and intention: A theory-guided systematic review. *J Adolesc Health.* 2007;40(1):4-21.
76. Longmore MA, Eng AL, Giordano PC, Manning WD. Parenting and adolescents' sexual initiation. *J Marriage Fam.* 2009;71(4):969-982.

77. Pires R, Araújo-Pedrosa A, Pereira J, Canavarro MC. Preventing Adolescent Pregnancy: Biological, Social, Cultural, and Political Influences on Age at First Sexual Intercourse. *J Prim Prev.* 2014;35(4):1-16.
78. Smith C. Factors Associated with Early Sexual Activity Among Urban Adolescents. *Soc Work.* 1997;42:334-347.
79. Markham CM, Lormand D, Gloppen KM, et al. Connectedness as a Predictor of Sexual and Reproductive Health Outcomes for Youth. *J Adolesc Health.* 2010;46(3, Supplement):S23-S41.
80. Kerr MH, Beck K, Shattuck TD, Kattar C, Uriburu D. Family involvement, problem and prosocial behavior outcomes of Latino youth. *Am J Health Behav.* 2003;27(1):S55-65.
81. Upchurch DM, Aneshensel CS, Mudgal J, McNeely CS. Sociocultural contexts of time to first sex among Hispanic adolescents. *J Marriage Fam.* 2001;63(4):1158-1169.
82. Brown BB, Dolcini MM, Leventhal A. Transformations in peer relationships at adolescence: Implications for health-related behavior. In: Schulenberg J, Maggs JL, Hurrelman K, eds. *Health Risks and Developmental Transitions During Adolescence* New York: NY: Cambridge University Press; 1997:161-189.
83. Hergovich A, Sirsch U, Felinger M. Self-appraisals, actual appraisals and reflected appraisals of preadolescent children. *Soc Behav Personal.* 2002;30(6):603-611.
84. Markham CM, Lormand D, Gloppen KM, et al. Connectedness as a predictor of sexual and reproductive health outcomes for youth. *J Adolesc Health.* 2010;46(3):S23-S41.
85. Barnes GM, Hoffman JH, Welte JW, Farrell MP, Dintcheff BA. Adolescents' time use: Effects on substance use, delinquency and sexual activity. *J Youth Adolesc.* 2007;36(5):697-710.
86. Busse P, Fishbein M, Bleakley A, Hennessy M. The role of communication with friends in sexual initiation. *Comm Res.* 2010;37(2):239-255.
87. Cavanagh SE. The sexual debut of girls in early adolescence: The intersection of race, pubertal timing, and friendship group characteristics. *J Res Adolesc.* 2004;14(3):285-312.
88. Manlove J, Logan C, Moore KA, Ikramullah E. Pathways from family religiosity to adolescent sexual activity and contraceptive use. *Perspect Sex Reprod Health.* 2008;40(2):105-117.
89. Potard C, Courtois R, Rusch E. The influence of peers on risky sexual behaviour during adolescence. *Eur J Contracept and Reprod Health Care.* 2008;13(3):264-270.
90. O'Donnell L, Myint□U A, O'Donnell CR, Stueve A. Long□term influence of sexual norms and attitudes on timing of sexual initiation among urban minority youth. *J Sch Health.* 2003;73(2):68-75.
91. Prinstein MJ, Wang SS. False consensus and adolescent peer contagion: examining discrepancies between perceptions and actual reported levels of friends' deviant and health risk behaviors. *J Abnorm Child Psychol.* 2005;33(3):293-306.

92. Miller KS, Forehand R, Kotchick BA. Adolescent sexual behavior in two ethnic minority groups: a multisystem perspective. *Adolescence.* 2000;35(138):313-333.
93. Dishion TJ, Owen LD. A longitudinal analysis of friendships and substance use: bidirectional influence from adolescence to adulthood. *Dev Psychol.* 2002;38(4):480-491.
94. Dishion TJ, Spracklen KM, Andrews DW, Patterson GR. Deviancy training in male adolescent friendships. *Behav Ther.* 1996;27(3):373-390.
95. Prinstein MJ, Cillessen AH. Forms and functions of adolescent peer aggression associated with high levels of peer status. *Merrill-Palmer Quarterly.* 2003;49(3):310-342.
96. Simons-Morton B, Haynie DL, Crump AD, Eitel P, Saylor KE. Peer and parent influences on smoking and drinking among early adolescents. *Health Educ Behav.* 2001;28(1):95-107.
97. Perkins DF, Luster T, Villarruel FA, Small S. An ecological, risk-factor examination of adolescents' sexual activity in three ethnic groups. *J Marriage Fam.* 1998:660-673.
98. Biglan A, Metzler CW, Wirt R, et al. Social and behavioral factors associated with high-risk sexual behavior among adolescents. *J Behav Med.* 1990;13(3):245-261.
99. Black MM, Ricardo IB, Stanton B. Social and psychological factors associated with AIDS risk behaviors among low-income, urban, African American adolescents. *J Res Adolesc.* 1997;7(2):173-195.
100. Brown BB, Bakken JP. Parenting and Peer Relationships: Reinvigorating Research on Family–Peer Linkages in Adolescence. *J Res Adolesc.* 2011;21(1):153-165.
101. Aseltine RH, Jr. A reconsideration of parental and peer influences on adolescent deviance. *J Health Soc Behav.* 1995;36(2):103-121.
102. Ary DV, Duncan TE, Biglan A, Metzler CW, Noell JW, Smolkowski K. Development of adolescent problem behavior. *J Abnorm Child Psychol.* 1999;27(2):141-150.
103. Clark TT, Belgrave FZ, Abell M. The Mediating and Moderating Effects of Parent and Peer Influences Upon Drug Use Among African American Adolescents. *J Black Psychol.* 2012;38(1):52-80.
104. Germán M, Gonzales NA, Dumka L. Familism Values as a Protective Factor for Mexican-origin Adolescents Exposed to Deviant Peers. *J Early Adolesc.* 2009;29(1):16--42.
105. Whitaker DJ, Miller KS. Parent-Adolescent Discussions about Sex and Condoms: Impact on Peer Influences of Sexual Risk Behavior. *J Adolesce Res.* 2000;15(2):251-273.
106. Bureau of Labor Statistics. National Longitudinal Surveys - NLSY97 Summary. http://www.bls.gov/nls/y97summary.htm. Published 2006. Accessed August 26, 2018.
107. Bureau of Labor Statistics. The NLSY97 sample: An introduction. https://www.nlsinfo.org/content/cohorts/nlsy97/intro-to-the-sample/nlsy97-sample-introduction-0. Accessed August 26, 2018.

108. Bureau of Labor Statistics. Retention and reasons for non-interview. https://www.nlsinfo.org/content/cohorts/nlsy97/intro-to-the-sample/retention-reasons-non-interview. Accessed August 26, 2018.
109. Moore W, Pedlow S, Krishnamurty P, Wolter K. *National Longitudinal Survey of Youth 1997 (NLSY97): Technical Sampling Report.* Chicago, IL: National Opinion Research Center;2000.
110. Curran PJ, Obeidat K, Losardo D. Twelve Frequently Asked Questions About Growth Curve Modeling. *J Cogn Dev.* 2010;11(2):121-136.
111. Bollen KA, Curran PJ. *Latent curve models: A structural equation perspective.* Vol 467: John Wiley & Sons; 2006.
112. Enders CK, Bandalos DLJSem. The relative performance of full information maximum likelihood estimation for missing data in structural equation models. 2001;8(3):430-457.
113. Abma JC, Martinez GM, Copen CE. Teenagers in the United States: Sexual activity, contraceptive use, and childbearing, National Survey of Family Growth 2006-2008. *Vital Health Stat.* 2010;23(30).
114. Chen K, Kandel DB. The natural history of drug use from adolescence to the mid-thirties in a general population sample. *Am J Public Health.* 1995;85(1):41-47.
115. Muthen BO, Muthen LK. The development of heavy drinking and alcohol-related problems from ages 18 to 37 in a US national sample. *J Stud Alcohol.* 2000;61(2):290-300.
116. Centers for Disease Control and Prevention. *Youth Risk Behavior Survey: Data Summary and Trends Report 2007 - 2017.* Atlanta, GA: Division of Adolescent and School Health, National Center for HIV/AIDS, Viral Hepatitis, STD and TB Prevention, Centers for Disease Control and Preventions; 2017.
117. Madkour AS, Clum G, Miles TT, et al. Parental Influences on Heavy Episodic Drinking Development in the Transition to Early Adulthood. *J Adolesc Health.* 2017;61(2):147-154.
118. Brody GH, Murry VM, Kogan SM, et al. The Strong African American Families Program: a cluster-randomized prevention trial of long-term effects and a mediational model. *J Consult Clin Psychol.* 2006;74(2):356-366.
119. Pantin H, Prado G, Lopez B, et al. A randomized controlled trial of Familias Unidas for Hispanic adolescents with behavior problems. *Psychosom Med.* 2009;71(9):987-995.
120. Prado G, Pantin H, Briones E, et al. A randomized controlled trial of a parent-centered intervention in preventing substance use and HIV risk behaviors in Hispanic adolescents. *J Consult Clin Psychol.* 2007;75(6):914-926.
121. Wolchik SA, Sandler IN, Millsap RE, et al. Six-year follow-up of preventive interventions for children of divorce: a randomized controlled trial. *JAMA.* 2002;288(15):1874-1881.
122. Murry VM, Berkel C, Brody GH, Gerrard M, Gibbons FX. The Strong African American Families program: longitudinal pathways to sexual risk reduction. *J Adolesc Health.* 2007;41(4):333-342.
123. Prado G, Pantin H, Huang S, et al. Effects of a family intervention in reducing HIV risk behaviors among high-risk Hispanic adolescents: a randomized controlled trial. *Arch Pediatr Adolesc Med.* 2012;166(2):127-133.

124. Pantin H, Coatsworth JD, Feaster DJ, et al. Familias Unidas: the efficacy of an intervention to promote parental investment in Hispanic immigrant families. *Prev Sci.* 2003;4(3):189-201.