ABSTRACT

Title of Document:	LATINO ADOLESCENT SEXUAL BEHAVIOR: DO CONTEXTUAL EFFECTS CONTRIBUTE TO ETHNIC GROUP DIFFERENCES?
	Courtenay Anna Barrett, Ph.D., 2012
Directed By:	Professor, Gary Gottfredson, Department of Counseling, Higher Education, and Special Education

Latino youths are at a higher risk of contracting sexually transmitted infections or becoming pregnant during adolescence than their non-Latino peers. Research has focused mainly on individual sociopsychological predictors of adolescent sexual behavior or on contextual effects of neighborhoods. The present study investigates potential contributions of school effects to the explanation of ethnic group differences in sexual behavior. Data from the National Longitudinal Study of Adolescent Health (Add Health) are examined to answer the following questions: (a) Are Latino adolescents concentrated in areas where there is a more sexually permissive school culture? (b) Are sexually permissive school cultures positively related to sexual initiation? (c) To what extent do school characteristics or sexual norms moderate the relationship between Latino self-identification and motivations to engage in sex through a person-environment interaction? (d) To what extent do school

characteristics or sexual norms moderate the relationship between Latino self-identification and sexual initiation through a person-environment interaction? Results suggest that Latinos are not concentrated in areas with a more permissive sexual culture and that the higher the proportion of Latinos in the school, the lower the proportion of students having had sex. Latino ethnicity is not related to motivations to engage in sex, but is positively related to sexual initiation. This positive relationship is attenuated in schools where there is a sexually permissive school culture. Across ethnicities, sexually permissive school cultures increase sexual initiation.

LATINO ADOLESCENT SEXUAL BEHAVIOR: DO CONTEXTUAL EFFECTS CONTRIBUTE TO ETHNIC GROUP DIFFERENCES?

By

Courtenay Anna Barrett

Dissertation submitted to the Faculty of the Graduate School of the
University of Maryland, College Park, in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
2012

Advisory Committee:
Professor Gary D. Gottfredson, Chair
Associate Professor Brian D. Johnson
Associate Professor Laura M. Stapleton
Associate Professor William O. Strein
Assistant Professor Matthew J. Miller

Dedication

To my parents. Thank you for always encouraging me to do my best, no matter what the outcome. I'm forever grateful for your support through good times and bad. I know that I would not be where I am today without you.

Acknowledgements

These past five years of graduate school have been long and difficult, and I would like to acknowledge several people for their support. Many more people have helped me through the process, but the following people were especially critical in my success.

To Gary, you have been an extraordinary mentor to me since my first year. Through chairing my thesis and dissertation, providing invaluable guidance during the job search, taking the time on nights and weekends to work with me, teaching me about advanced methods and statistical analyses, and sending comforting emails when I was frustrated, I cannot thank you enough for your time, hard work, and confidence in me. I would not have had the same graduate school experience without you.

To the "coh," I am not sure if I could have survived graduate school without you. Each of you contributed a unique gift to our group and I have a special place in my heart for all of you. From our monthly cohort potlucks to long work sessions at Panera on the weekends, I am so happy that I got to know you all professionally and personally. I am grateful that our future students will be in your hands.

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Chapter 1: Introduction

The Latino population is a fast growing ethnic group in the United States, with disproportionally high rates of adolescent sexual behavior (ASB; Lee & Hahm, 2010). Sexual behavior is difficult to measure due to its sensitive nature, and differences in measurement operations from study to study have resulted in disputes concerning quantitative estimates of the sexual behavior of Latino youths. Nevertheless, studies comparing Latino adolescent sexual behavior to the behaviors of non-Latino White or Black adolescents, or persons of other ethnicity, are overwhelmingly consistent in the patterns of sexual behavior they reveal.

Specifically, the Centers for Disease Control and Prevention (2009) found that Latino high school students report higher rates of having had sexual intercourse (approximately 49%) than White non-Latino students (approximately 42%), but lower rates than African American students (approximately 65%). Latino adolescents also report earlier sexual initiation and more lifetime partners than White non-Latino students (hereafter sometimes referred to as *Anglo*). Approximately 6.7% of Latinos have had sexual intercourse before the age of 13, compared to only 3.4% of White adolescents (CDC, 2009). Another study investigating adolescent birth rates found that 52% of Latina adolescents (age 13 to 19) have had sexual intercourse, with 48% reporting intercourse in the last 12 months (Ventura, 2000).

Latina adolescents tend to have a later sexual debut, but are less likely to use contraception once they begin having sex, resulting in higher rates of adolescent pregnancy than non-Latina peers (Deardorff et al., 2010; Kirby, 2007). For males, a higher percentage of Latino adolescents have had more than four sexual partners than

their Anglo counterparts (approximately 23% vs. 12%, respectively) and are more likely to have sex before the age of 13 than Anglo males (approximately 12% vs. 6%, respectively).

The prevalence and treatment of sexually transmitted infections (STIs) provides an alternate approach to measuring sexual behavior, for which service utilization studies can be used in addition to self-reports. The literature is consistent in finding that Latino youths are at a disproportionally high risk for contracting STIs (Guilamo-Ramos, Bouris, Jaccard, Lesesne, & Ballan, 2009; Lee & Hahm, 2010). Latino males are almost twice as likely as Anglo males to become infected by chlamydia (Dariotis et al., 2011). Latina females are significantly more likely to contract human papillomavirus (HPV, one cause of cervical cancer; Kepka, Coronado, Rodriguez, & Thompson, 2010), chlamydia, and gonorrhea than are Anglo women (CDC, 2009).

Latina women are also more likely to become pregnant during adolescence than their non-Latina peers (Deardorff, Tschann, Flores, & Ozer, 2010). Henshaw (1997) found that the rate at which Latina adolescents were bearing children had doubled between 1987 and 1997, and in 1997 Latina adolescents had the highest birthrate of any ethnic group in the United States. Teenage pregnancy may lead to negative outcomes for the adolescent mother (Kerr, Leve, & Chamberlain, 2009) such as decreased likelihood of completing school (Ahn, 1994), and greater risk of negative outcomes for the baby (AGI, 2010) possibly due to the likelihood of being uninsured (Zambrana & Logie, 2000).

The disproportionally high rates of sexual behavior and associated negative outcomes among this fast-growing population warrant scientific research to inform prevention or intervention initiatives. Many studies have investigated the individual sociopsychological characteristics (i.e. traits with both sociological and psychological components), such as school attachment or parental influence, of adolescents that are correlated with sexual behavior or other problem behaviors. Cultural characteristics that are stereotypically associated with Latinos, such as religiosity and strong family values (*familismo*; Guilamo-Ramos, Bouris, Jaccard, Lesesne, & Ballan, 2009) would be expected to *restrain* adolescent sexual behavior. Other characteristics, such as low socioeconomic status, might be expected to *increase* problem behavior. Latinos are one of the most economically disadvantaged ethnic groups in the US (Bean & Tienda, 1987) and tend to have low levels of education (US Census Bureau, 2006). Therefore, the relationship between Latino ethnicity and adolescent sexual behavior is particularly complicated.

Contextual effects have been found to influence adolescent sexual behavior and other problem behaviors. Specifically, research has suggested that having a high proportion of foreign-born residents in the community may restrain against adolescent sexual initiation (Kirby, 2007). Community disorganization (e.g. having high rates of substance abuse or hunger) and concentrated poverty are correlated with adolescent sexual behavior (Browning, Leventhal, & Brooks-Gunn, 2004; Kirby, 2007). Investigations into the contextual effects of the *school* environment, as opposed to the effects of the neighborhood, are limited. Therefore, the present study examines the contextual effects of school characteristics on adolescent sexual behavior.

Individual psychosocial explanations may not account for all the observed ethnic group differences in rates of adolescent sexual behavior; additional explanatory mechanisms must be investigated. One such potential explanation is that Latino youths tend disproportionally to inhabit social environments that would increase sexual behavior. Another possible explanation is that Latino youths are differentially influenced by social environments that increase their sexual behavior compared to other ethnic groups. Put another way, contextual effects of adolescent Latino environments may be of help in explaining ethnic group differences in adolescent sexual behavior.

Theory concerning the socialization of individuals suggests that socialization occurs in concentric circles of influence (e.g. parents, peers, schools, or neighborhoods; Bronfenbrenner, 1979), potentially resulting in diverse social-emotional outcomes for social groups. Schools are important to investigate as a socializing agent as schooling is related to individual sociopsychological predictors linked to sexual behavior (e.g. educational aspirations). Furthermore, schools provide opportunities for peer interaction and socialization, may provide mental health services through individual or group counseling, and schools may be attached to health clinics that serve physical needs. Schools may be one of the most influential socialization agents of our children, as children are typically in schools more than most other social environments. One might argue that the purpose of schools, even more so than teaching academics, is to socialize our children to adhere to social norms. Therefore, the school must be examined as a social environment that may influence adolescent sexual behavior.

The present study explores the ethnic group differences in sexual behavior between Anglo, Black, and Latino adolescents. It explores whether, controlling for individual sociopsychological covariates of adolescent sexual behavior, Latino rates of adolescent sexual behavior are elevated if the sexual norms and common sexual practices that characterize schools they attend are also elevated. This is not to say that individual characteristics or the expectations of family and immediate peers, are not influential. Instead, the study is guided by a theory of contextual socialization that posits an influence of the school social environment.

The theoretical framework for this study, a theory of contextual socialization, is twofold: Latino adolescents may be segregated into communities where sexual permissiveness is the norm, or Latinos are socialized differentially than members of other ethnic groups, or both. Contextual effects of the neighborhood or schools may contribute to ethnic group differences above and beyond the combination of individual sociopsychological factors common for different ethnic groups. Latinos may be differentially socialized because they experience a different culture than Anglo adolescents, or because they are concentrated in areas characterized by sexual permissiveness or social disorganization. Or, Latinos may be exposed to environments with similar social norms as other ethnic groups but are differentially affected by the social norms, stereotyping, or others' expectations for that group of people. I theorize that this differential socialization process may be one contributing factor to ethnic group differences in adolescent sexual behavior.

Not only is it important to examine the main effect of school contexts on adolescent sexual behavior or the differences in adolescent sexual behavior between

schools, but school context may also change the relationship between ethnic group membership and sexual behavior. This change in the relationship between ethnic group membership and sexual behavior as a result of school context is referred to as a moderating effect on sexual behavior. This moderation is also referred to as a cross-level interaction between school contexts and individual ethnicity. Few studies have investigated moderation by the school social environment of the influence of individual characteristics on sexual behavior. Even fewer studies have assessed whether moderating effects of school contexts may explain divergent outcomes for youths of different ethnicities. A search for studies that have investigated how school characteristics influence the sexual experience of Latino adolescents specifically using appropriate statistical models of environmental effects on individual behavior revealed no such investigations; the present study aims to do so.

In order to investigate the validity of the this proposed theory of differential socialization as an explanatory mechanism for ethnic group differences in sexual behavior, it is necessary to: (a) statistically adjust for individual predictors of sexual behavior, (b) measure the effect of Latino ethnicity net of other sociopsychological characteristics, (c) determine whether Latinos inhabit areas where sexual permissiveness is more normative than the areas inhabited by other groups (e.g. are socialized by a different social environment than peers of other ethnicities), and (d) examine the extent to which school norms and practices influence individual sexual behavior for Latinos compared to Anglo or Black counterparts net of individuals' sociopsychological characteristics. Despite the substantive focus on Latinos in this study, it is important to include other ethnic groups in the analyses to provide

statistical control and a frame of reference for the interpretation of findings. In short, research must examine whether Latinos are differentially socialized because they inhabit different environments as well as whether adolescent Latinos are differentially susceptible to environmental influences on sexual behavior.

Specifically, the present secondary analysis of data from the National Longitudinal Study of Adolescent Health (Harris & Udry, 2002; Add Health) aims to answer the following research questions: (a) Are Latino adolescents concentrated in areas where there is a more sexually permissive school culture? (b) Are sexually permissive school cultures positively related to sexual initiation? (c) To what extent do school characteristics moderate the relationship between Latino self-identification and motivations to engage in sex through a person-environment interaction? (d) To what extent do school sexual norms moderate the relationship between Latino self-identification and sexual initiation through a person-environment interaction?

Figure 1 illustrates the relationship between the research questions and support for this theory of differential socialization.

		Research Question #1: Are Latinos concentrated in areas where sexual permissiveness is normative?	
		No	*Yes*
Research Questions #2 through 4: Differential influence by school sexual norms?	*No*	Differential socialization is not supported; differences in Latino sexual behavior may be explained through other theories.	Latino adolescents are not differentially socialized (i.e. are equally influenced) by school-level sexual norms as other groups, they just happen to be concentrated in areas where sexual behavior is the norm.
	Yes	Latinos are not concentrated in areas with sexually permissive norms, but are differentially socialized (i.e. more influenced by them) than other racial groups.	Latino adolescents are both concentrated in areas where sexual behavior is the norm, compounded by being differentially socialized or more influenced by those norms.

Figure 1. Relationship between the research questions and support for a theory of differential socialization.

Subsequent sections of this document review evidence and related theory concerning Latino adolescent sexual behavior. Then, the predictors, response variables, and statistical models to be examined in the present research are described.

Chapter 2: Adolescent Sexual Behavior and Other Problem Behaviors

Several theories have been put forth to explain why adolescents may engage in problem behavior. Problem behaviors are behaviors that are a source of social concern and may result in undesirable social outcomes such as disapproval or legal sanctions for the individual who engages in the behavior. Research has linked similar predictive factors to a wide range of problem behaviors (e.g. adolescent sexual behavior, drug or alcohol abuse, or criminal acts; Hawkins et al., 1988).

Jessor (1991) conceptualized factors related to problem behavior as either (a) restraining problem behavior or (b) instigating problem behavior. As Jessor (1991) used the terms, factors that restrain against problem behaviors are called protective factors; factors that instigate or facilitate problem behavior are called risk factors. Protective factors restrain against problem behavior through mechanisms such as self-control or attachment to school. Risk factors increase the opportunity to engage in problem through the presence of drugs or weapons, for example. Or, depletion of self-control as a result of fatigue has been more recently discussed as a risk factor. As such, adolescent sexual behavior may be the result of a combination of individual social or psychological risk factors (e.g. low parental control) and protective factors (e.g. religiosity).

Jessor's (1991) view of protective and risk factors can be expanded to include contextual factors (e.g. sexually permissive school norms) in addition to individual sociopsychological predictors. Specifically, in schools where sexual permissiveness is the norm, there may be (a) an increase in opportunity for the individual to engage

in sexual acts or (b) modeling of problem behavior or normative beliefs favoring adolescent sexual behavior. Accordingly, it is important to investigate the school social environment as a potential protective or risk factor.

Hawkins, Catalano, and Miller (1992) reviewed the literature regarding problem behavior, specifically adolescent alcohol abuse, and defined risk factors to be precursors of alcohol abuse and those that are statistically associated with an increase in the problem behavior. Accordingly, risk-focused approaches to prevention and intervention aim to mitigate risk factors and may help to alleviate additional problem behaviors as well because of the common set of risk and protective factors for many specific problem behaviors.

Social control theorists (Hirschi, 1969; Gottfredson & Hirschi, 1990) have argued that bonds or attachments to the family or society result in social control and prevent delinquency. Initially, Hirschi (1969) emphasized the role of social relationships suggesting that given weak or broken bonds with society, any individual would engage in delinquent behavior. Social control, in Hirschi's account, may arise out of four areas: attachment to others (particularly the family), commitment to conventional laws or guidelines, involvement in conventional activities, and belief in societal norms or values. Later, Hirschi and Gottfredson (1990) shifted some of the emphasis to the individual's self-control and other personality traits. Self-control, taught early in life by the family, could restrain against delinquent acts, even if social bonds are weak. Individual differences in personality traits, such as impulsivity and ability to delay gratification, may also act as restraints. In relation to Latino adolescent sexual behavior, social control theorists might argue that Latino

adolescents may engage in this problem behavior because of weak bonds to society, perhaps because of recent immigration or social marginalization.

In contrast, social learning theorists of delinquent behavior (Burgess & Akers, 1966; Sutherland & Cressey, 1974) suggest that an individual is unlikely to engage in problem behavior unless that behavior is learned and reinforced. Specifically, criminal behavior must be learned, including techniques used to engage in the behavior and motivations for engaging in the behavior, through both verbal and non-verbal communication. Consequently, weakened bonds with society are insufficient in producing adolescent problem behavior; rather exposure to models of delinquent behavior is needed. Social learning theorists might hypothesize that Latino adolescents engage in sexual behavior as a behavior learned from their peers. This learning hypothesis is plausible because it is clear that youths who engage in problem behavior tend to have peers who also do so (Dishion, Andrews & Crosby, 1995; Thornberry, Lizotte, Krohn, Farnworth & Jang, 1994).

There is much dispute regarding which of these conceptualizations of adolescent problem behavior (social control or social learning) is "right." Further complicating the issue, there is not always a clear link between characteristics of the individual, family, or society and these theories. The following literature review discusses empirical studies and other reviews of the literature connecting specific variables (e.g. individual, family, peers, school, and neighborhood) to problem behavior.

First, characteristics of the individual that have been examined as predictors of adolescent sexual behavior or other problem behavior will be discussed. These

include personality traits and other individual characteristics (e.g. religiosity, educational values, or *perceptions* of interpersonal relationships) that are linked with socialization by the family.

Second, contextual or environmental factors are considered. Environmental factors are *characteristics of the environment* that may influence the behavior of individuals who inhabit those environments. Social environments differ, for example, in size, heterogeneity, nature and clarity of expectations for behavior, the affordances they provide, and so on. Some of the ways social environments differ are derived from or related to the human aggregates who inhabit them. For instance, environments differ in average social class, ethnic group composition, the age distribution of inhabitants, and so on. When measures of social environments derived by aggregating the characteristics of the environments' inhabitants influence the behavior of individuals net of the individuals' own personal characteristics, these influences are commonly called *contextual effects*. *Contextual effects* of environments are thus distinguished from the *compositional effect* of differences among environments that arise simply from the differences in the characteristics of the individuals who inhabit them.

Individual Factors

Personality. Many studies have found a significant relationship between engaging in delinquent behavior (e.g. substance abuse or truancy) and adolescent sexual behavior (Boislard & Poulin, 2011; Browning, Leventhal, & Brooks-Gunn, 2004), presumably as the result of an underlying disposition for problem behaviors (Boislard & Poulin, 2011). This underlying disposition may include antisocial

behavior (Hawkins et al., 1988), rebelliousness (Hawkins, Catalano, & Miller, 1992), aggression, external locus of control, sensation-seeking behavior (Kirby, 2007), attitudes and beliefs about delinquent behavior (Hawkins, Catalano, and Miller, 1992), or low self-control (Gottfredson & Hirschi, 1990).

Personal beliefs. Kirby (2007) claimed that an adolescent's personal beliefs about sex are the strongest predictor of sexual behavior. If an adolescent has sexually permissive beliefs about sex, then he or she is more likely to engage in sex. On the other hand, if an adolescent has taken an abstinence pledge for personal reasons, then he or she is less likely to engage in sex.

Emotional factors. Several studies have investigated emotional factors and found that the relationship between depressive symptomology and sexual behavior is unclear. Some studies have found significant relationships between the two outcomes, others have found non-significant relationships between the two outcomes, and still others are unclear if there is a causal relationship between the two or if a third variable accounts for the variation in each (see Jamieson & Wade, 2011 for a review of the literature). Jamieson and Wade (2011) used the Add Health dataset to investigate this relationship and found that depression did not significantly predict adolescent sexual behavior, but that adolescent sexual behavior was a minimal predictor of subsequent depression. Using a different dataset, Boislard and Poulin (2011) found a non-significant relationship between sexual behavior and depression. Therefore, there is not replicated evidence about the relation between depression and sexual behavior.

Similarly, studies have mixed findings regarding the relationship between self-esteem and sexual behavior (Kirby, 2007). The majority of studies have revealed no substantial relationship between self-esteem and sexual behavior. However, a few studies cited in Kirby (2007) have found that high self-esteem is a protective factor against risky sexual behavior, such that higher self-esteem is correlated with delayed sexual initiation and a higher probability of contraception use.

Religiosity. Adolescents who have a strong religious affiliation are less likely to engage in sexual behavior (Kirby, 2007) or abuse drugs or alcohol (Hawkins, Catalano, and Miller, 1992). Several studies have found that religiosity significantly restrains sexual behavior, specifically sexual initiation and the number of lifetime partners (Edwards et al., 2008; Lammers et al., 2000). Edwards and colleagues (2008) noted that this is consistent with existing literature (Holder et al., 2000; Lefkowitz et al., 2004; Rostosky, Regnerus, & Wright, 2003; Thornton & Camburn, 1989 as cited in Edwards et al., 2008). According to social control theory, religiosity or attachment to a religious institution restrains against problem behavior by increasing social control.

Family and Peer Factors

It is widely accepted that family factors are related to children's behavior. Family factors may include but are not limited to, maternal or paternal support or care (e.g. Lammers et al., 2000), maternal or paternal communication (i.e. general communication or communication about sex; e.g. Trejos-Castillo & Vazsonyi, 2009), maternal or paternal education (e.g. Dehlendorf et al., 2010), family socioeconomic status (SES; Hawkins et al., 1988), family connectedness or disorganization (e.g.

Fraser, 1984), and maternal or paternal control or discipline (e.g. Jensen, 1972; Patterson, 1982). Some reviewers (e.g. Hawkins et al., 1988) who discuss family factors include both characteristics *of the family* (e.g. SES, parental supervision, or conflict) and characteristics *of the individual* (e.g. attachment to parents or *perceptions* of parental supervision). The latter, are more properly considered individual factors. First, the connection between the role of the family and theories of delinquency previously described will be discussed, followed by family-related characteristics of the individual, and finally characteristics of the family itself will be discussed last.

There is dispute regarding the way in which family characteristics affect problem behavior (Fraser, 1984), mirroring the controversy about social control and social learning theories. Social control theorists would interpret lack of parent-child connectedness or poor family attachments, a decrease in commitment to conventional activities or norms, as sufficient to lead to problem behavior (Hirschi, 1969). Furthermore, the family is primarily responsible for socializing the child to have self-control which may restrain against future problem behavior (Gottfredson & Hirschi, 1990).

In line with this expectation, Lammers and colleagues (2000) found that parental support or care was a significant restraint against (negative predictor of) adolescent sexual behavior. Other studies have suggested that family conflict leads to problem behavior (i.e. alcohol abuse; Hawkins, Catalano, & Miller, 1992). According to the social control viewpoint, lack of familial bonds or unrest in the home fails to restrain against problem behavior.

On the other hand, social learning theorists (Burgess & Akers, 1966; Sutherland & Cressey, 1974) argued that problem behaviors are learned and that the lack of parental attachment, itself, is insufficient to produce problem behavior. Accordingly, models of problem behavior (i.e. individuals from whom the problem behavior can be learned) are needed to increase the likelihood that the adolescent will engage in such behaviors. Models of problem behavior may occur in the home when parents are alcoholic, for example (Hawkins et al., 1992).

Unhappiness or detachment from the home may also increase the attractiveness of a delinquent peer group, which serves as the model for delinquent behavior. Association with delinquent peers has been shown to predict problem behavior (Burgess & Akers, 1966; Fraser, 1984; Sutherland, 1947). Hawkins, Catalano, and Miller (1992) argued that this statistical correlation between delinquent peers and the individual's likelihood to engage in problem behavior is enough to define it as a "risk factor." However, social control theorists counter-argue that associating with delinquent peers is not a predictor of problem behavior, but a problem behavior in itself (Hirschi, 1969; Gottfredson & Hirschi, 1990).

Family-related characteristics of the individual. Family-related characteristics of the individual include attachment to parents, the adolescent's perceptions of parental supervision (which may or may not reflect actual supervision practices), and the adolescent's perceptions about communication between the parent and child. Specifically, attachment to parents (Hirschi, 1969) and youth perceptions of strong parental supervision (Boislard & Poulin, 2011; Gottfredson & Gottfredson, 1999) are both negatively correlated with problem behavior. Specifically, Trejos-

Castillo and Vazsonyi (2009) found that Latino adolescent self-reports of increased maternal communication about sex was significantly associated with a decrease in risky sexual behavior for Latino adolescents, across generational status and level of acculturation.

Characteristics of the family unit. Poverty has been linked with chronic problem behavior, but SES seems to be unrelated to milder problem behaviors, such as occasional alcohol use (Hawkins et al., 1988; Hindelang, Hirschi, & Weis, 1979). SES may also be linked to problem behavior indirectly as children of lower SES may lack parental control because of the financial situation of the parent. Specifically for Latino adolescent sexual behavior, Dehlendorf and colleagues (2010) and Lee and Hahm (2010) both found that lower parental education (which, in these studies, was claimed as a proxy for SES) was related to greater Latino adolescent sexual behavior. Furthermore, Dehlendorf and colleagues found a differential decrease in the odds of teen pregnancy for Latinas and their Anglo counterparts. Adjusting the parental education of Latinas to equal that of their non-Latina peers resulted in a 30% decrease in the odds of Latina birth. Interestingly, Lee and Hahm (2010) found that parental education was related to the number of lifetime sexual partners, but in the opposite direction, such that higher parental educational achievement resulted in having a greater number of lifetime partners.

Boislard and Poulin (2011) found that family structure was also correlated with early sexual initiation. Specifically, they found that adolescents living in intact homes were more likely to be virgins compared to adolescents living in single-parent, separated, or divorced homes, across both urban and suburban settings.

In addition to family SES and structure, poor family management practices, such as unclear expectations about behavior, inconsistent rewards for positive behavior, and inconsistent and severe punishments for unwanted behavior, have been linked to higher levels of problem behavior (Hawkins et al., 1992; Williams et al., 1999). Such family disorganization may weaken the bonds to the family, decreasing social control.

School and Educational Factors

Reviewers of "school factors" (e.g. Hawkins et al., 1988) generally include both school-related characteristics *of individuals* and characteristics *of the schools* without distinguishing the two categories. Individual factors related to school, including academic achievement or attachment to school, are described first. Then, characteristics *of the school* are described.

Individual factors related to school. School failure, truancy, and dropping out are all predictive of problem behavior, including alcohol and drug use (Hawkins et al., 1988). Studies that have specifically investigated adolescent sexual behavior have found that low academic achievement is linked with earlier sexual initiation (Boislard & Poulin, 2011; Lammers et al., 2000). Lammers and colleagues (2000), however, noted that the relation between school performance and sexual behavior is likely to be mediated by school attachment, educational aspirations, or other school-related constructs. Williams and colleagues (1999) also found a significant relation between school attachment or connectedness and delinquent behavior.

Furthermore, personality may account for the relation between school-related constructs and problem behavior through two avenues: difficulty in the classroom and

peer rejection. Fraser (1984) hypothesized that some personality traits, including the ability to work well with others or the tendency to follow directions, make it more challenging to be successful in the classroom. Other personality traits, such as aggressiveness, shyness, or withdrawal, may lead to peer rejection (Hawkins et al., 1992). Specifically, research has shown that peer rejection is associated with school problems, criminality, and substance abuse (Hawkins et al., 1992). Alienation from the school for these reasons may decrease the social bonds between the adolescent and school, in turn decreasing social control.

Even more than academic achievement or peer relationships in the school, educational aspirations or commitment to education may be effective in restraining against adolescent sexual behavior (Hawkins et al., 1992; Kirk et al., 2011; Lauritsen, 1994; South & Baumer, 2000). Educational aspirations may also be related to academic achievement and satisfactory attendance, such that students who have a greater desire to go to college will be more likely to attend school and complete homework than those who do not. Educational aspirations may also restrain against risky behavior as adolescents may feel as though more is at stake if their future expectations are high.

School factors. Fewer reviews have examined school effects, but some have. Often, predictors that describe the school are calculated by aggregating individual student or teacher reports about themselves or about the school environment. Additionally, reports by the principal or other administrator may also be used as a method of measuring school characteristics. Cook, Gottfredson, and Na (2010) reviewed the literature concerning school effects and criminal behavior in schools.

Their review lends support for investigating the relationship between contextual effects of the school and adolescent problem behavior. The Cook et al. review identified the following characteristics of schools as most related to problem behavior: policies and discipline practices, demographic composition, school social organization or attachment, and school climate.

School policies and discipline practices. Schools with clear expectations about behavior, schools that monitor students' behaviors closely, schools with consistent enforcement of rules and regulations, and schools that reward positive behavior have lower rates of problem behavior (Cook et al., 2010; Gottfredson & Gottfredson, 1985). Such conditions may reduce the opportunity to engage in delinquent behavior in schools. However, as the Cook et al. review focused on criminal behavior, the extent to which its findings are generalizable to adolescent sexual behavior is unclear. It is possible that the criminal behavior (e.g. assault, theft, or victimization) upon which these findings are based may be more likely committed during school hours than sexual behavior. Therefore, the relation between student monitoring and delinquent acts may be attenuated for problem behaviors that may be more likely to be committed outside of school hours.

School demographic composition. School demographics include several variables. The average age of students in the school (or grade levels included in the school), percentage of male students in the school, proportion of ethnic minority students in the school, and the socioeconomic composition of the school are all significant demographic predictors of delinquent behavior (Cook et al., 2010; Gottfredson & Gottfredson, 1985). Contrary to popular beliefs, Cook and colleagues'

review (2010) found that, controlling for other school characteristics (e.g. urbanicity), school size is not robustly related to problem behavior and smaller schools do not necessarily restrain against delinquency. However, the National Study for Delinquency Prevention in Schools (Gottfredson et al., 2000) found that small, private schools do have lower rates of delinquency.

Middle schools have higher rates of all types of delinquent behavior than elementary or high schools, except for substance abuse, which peaks in high school. Students who commit crimes may be more likely to have dropped out of high school, explaining the higher crime rates in middle schools (Cook et al., 2010; Gottfredson & Gottfredson, 1985).

Schools with a high proportion of ethnic minority students and low SES schools are also at risk for elevated rates of delinquent behavior. Specifically, gang-related behavior is concentrated in large, urban, and predominately ethnic minority schools. In Cook, Gottfredson, and Na's (2010) review, the studies with statistically significant correlations either measure the percentage of non-Hispanic White students, the percentage of Black students, or the percentage of minority or non-White students. Studies that specifically investigated the percentage of Latino students found a nonsignificant relation. However, other studies have found a significant relation between the proportion of Latino immigrants and gang behavior, such that a higher proportion of Latinos is associated with more gang behavior (Gottfredson & Yiu, 2011). The relation between school ethnic composition and Latino adolescent sexual behavior is unclear.

School social organization or attachment. School social organization, communal social organization (CSO; Cook et al., 2010), and school attachment as a characteristic of the school, all refer to the bonds between students and teachers, and among other adults in the school. School attachment as a characteristic of the school refers to the mean or aggregate of individual school attachment or connectedness. Studies suggest that net of individual characteristics or school attachment, schools high on attachment or affective bonds, restrain against problem behavior (Cook et al., 2010).

School climate. School norms, such as attitudes, beliefs, and behavior expectations, have been found to be a strong predictor of individual problem behavior, despite widely differing operationalizations of school climate. Some studies aggregate individual frequencies of behavior; others ask individuals about the availability of illicit substances. Schools where a high proportion of students engage in problem behavior, have values or beliefs that do not restrain against problem behavior, or where illicit substances are readily available increase problem behavior, net of individual beliefs and behaviors (e.g. Boardman et al., 2008; Hoffman & Ireland, 2004; Kumar et al., 2002 as cited in Cook et al., 2010). That is, in schools where engaging in problem behavior is the norm, there may be an increase in opportunity to engage in risky behavior and an increase in the modeling of delinquent behavior.

Neighborhood Factors

Studies that have investigated contextual effects of adolescent sexual behavior have focused on the influence of the neighborhood more than the school. Studies

have investigated the following community characteristics as they relate to adolescent sexual behavior or other problem behavior: community disorganization (Kirby, 2007), concentrated poverty (Browning, Leventhal, & Brooks-Gunn, 2004; South & Baumer, 2000), and proportion of families with members who are foreign-born (Kirby, 2007).

Areas of community disorganization (Kirby, 2007) and neighborhoods of concentrated poverty (Browning, Leventhal, & Brooks-Gunn, 2004; South & Baumer, 2000) are characterized by higher rates of substance abuse, gangs, violence, hunger, limited financial resources, and frequent residential turnover. Communities with such characteristics are likely to have higher levels of adolescent problem behaviors, including sexual behavior, than would be expected on the basis of individual SES or other sociopsychological characteristics of their inhabitants. These neighborhood characteristics may result in problem behaviors because the transiency of the neighborhood prevents healthy attachments. Furthermore, there may be an increase in opportunities for engaging delinquent behavior because of the lack of parental control or there may be more models of delinquent behavior.

Of late, sociologists seem to have focused on structural characteristics of low SES neighborhoods to explain sociopsychologal outcomes of adolescents, in part because of concern that cultural explanations would "blame" the victim. Studies that have examined the role of culture have potentially over-simplified the culture of disadvantaged neighborhoods to be homogeneous and in opposition to mainstream culture as a reaction to blocked opportunities (Harding, 2007). Harding (2007) challenged these ideas and found that most disadvantaged neighborhoods are actually

ethnically and culturally heterogeneous, have social stratifications within the neighborhood, and are not necessarily engaging in activities in opposition to mainstream culture. This heterogeneity of culture is related to higher rates of adolescent sexual behavior as exposure to several different viewpoints, or scripts, regarding sexual behavior prevented the adolescent from adhering to his or her own sexual script.

Brewster and colleagues (1993) also investigated the effects of neighborhood racial or ethnic composition on adolescent sexual behavior. Neighborhood ethnic homogeneity seemingly restrains against problem behavior as it may produce strong, salient social norms or increase attachments to the community providing social control. Brewster and colleagues (1993) also found that neighborhoods with a higher proportion of Latino immigrants restrained against problem behavior as it presumably created stronger traditional culture and more conservative sexual norms, and increased social integration.

Limitations and Gaps in the Literature

Despite the general consistency among findings, the body of literature on Latino adolescent sexual behavior has several theoretical gaps and methodological limitations. First, many more studies exist that investigate criminal behavior (e.g. assault or theft), substance abuse, truancy, or other problem behaviors than those investigating adolescent sexual behavior. Although the literature consistently demonstrates that similar predictors are related to all types of problem behaviors, it is important to investigate empirically if these predictors can be generalized to adolescent sexual behavior. Furthermore, when delimiting the sexual behavior

research by ethnicity or ethnic group differences, the number of studies decreases dramatically with many more studies needed to examine Latino adolescent sexual behavior.

Studies that do investigate ethnic group differences over-represent Black-White comparisons (e.g. South & Baumer, 2000; Lauritsen, 1994; Williams et al., 1999). Even though Black adolescents have the greatest risk of contracting STIs and engage in the riskiest sexual behavior (e.g. greatest number of lifetime partners and earliest sexual initiation), the Latino population must not be overlooked. As the Latino population is one of the fastest growing in the US and with Latina adolescent pregnancies at the highest rates compared to other ethnic groups, research investigating Latino adolescent sexual behavior is important.

Furthermore, studies focusing on the sexual behavior of ethnic minority adolescents are primarily concerned with individual sociopsychological predictors of the behavior. Specifically, studies tend to investigate the role of sociopsychological predictors within or across ethnic groups, but are limited in their exploration of how the relationship between ethnic group identification and sexual behavior may change across settings. Or, net of individual sociopsychological predictors that restrain against sexual behavior for all ethnic groups (e.g. religiosity), how does this relationship vary depending on the characteristics of the environment?

The present study explores the differential socialization of Latinos as one explanatory mechanism for this phenomenon. Accordingly, it is important to investigate contextual effects. Few studies have investigated the effects of the environment net of individual characteristics on sexual behavior, and those that do

have usually focused on neighborhood characteristics rather than examining the school as a socializing agent (e.g. Browning, Leventhal, & Brooks-Gunn, 2004; South & Baumer, 2000). For example, Brewster and colleagues (1993) found that having a high proportion of Latinos in the neighborhood restrained against Latino adolescent sexual behavior, but it is not known whether these findings regarding neighborhood effects would be found in the school environment.

Most often, when studies consider "school factors," they investigate individual characteristics related to the school, such as academic achievement or school attachment, rather than characteristics of the school itself. The gap between studies investigating individual school-related factors and studies investigating the contextual effects of the neighborhood in which adolescents reside is apparent. Studies that investigate the school as a social agent and its contextual effects are needed. This study aims to fill this gap.

Studies investigating neighborhood contextual effects often investigate predictors that would increase or decrease social control, such as the homogeneity of the ethnic composition of the neighborhood or concentrated poverty. Browning, Leventhal, and Brooks-Gunn (2004) also investigated "collective efficacy" (e.g. "People around here are willing to help their neighbors.") as a measure of affective attachment of the neighborhood. However, the investigation of school climate has been overlooked in the literature, as noted by Harding (2007). Studies that have investigated school climate or norms (such as those reviewed by Cook, Gottfredson, & Na, 2010) have been focused on forms of delinquency other than sexual behavior.

Some have argued that lack of attachment to family, school, or society, or other forms of social control, may not be sufficient to explain problem behavior without also assuming that models of the problem behavior or opportunities to engage in behavior are also explained (Hawkins, Catalano, & Miller, 1992). The present study investigates school sexual norms as a contextual factor that may increase the modeling of sexual behavior, increase the opportunity for adolescents to engage in sexual behavior, or both. Moreover, it is unknown if adolescents of different ethnic groups are differentially socialized by these sexual norms which may account for ethnic group differences in adolescent sexual behavior. Perhaps certain ethnic groups are more "susceptible" to school norms than other groups because of their isolation from or attachment to the more general cultural expectations.

Present Study

Despite all of the limitations and gaps in the literature, there is enough evidence to warrant investigating contextual effects of the school on adolescent sexual behavior. The literature supports the plausibility of the hypothesis that (a) main effects of the school environment exist for adolescent sexual behavior and (b) Latinos may be differentially socialized than adolescents of other ethnic groups.

Studies have not empirically investigated the extent to which explanatory theories of ethnic group differences in adolescent sexual behavior are supported by the data (Afable-Munsuz & Brindis, 2006). The present study examines a prediction from a theory of differential socialization to explain ethnic group differences in adolescent sexual behavior. Moreover, this study also investigates main effects of school environmental influence on adolescent sexual behavior. The present

investigation uses a large national dataset and multilevel modeling to conduct new research to fill this gap in the literature and avoid the methodological limitations described above.

Hypotheses are driven by the rationale that if differential socialization theory is an explanatory mechanism that clarifies the relationship between Latino self-identification and sexual behavior, then Latinos either: (a) are differentially socialized because the sexual norms of the schools they attend are more permissive than other schools (i.e. Latinos are concentrated in schools where sexual permissiveness is the norm), or (b) school characteristics that reflect sexual permissiveness moderate the relationship between ethnicity and sexual behavior. That is, Latinos may be more "susceptible" to permissive sexual norms than other ethnic groups, contributing to the documented ethnic group differences in sexual behavior. Figure 1, again, illustrates the relationship between these overarching research questions and how they relate to providing support for differential socialization theory.

The first research question (i.e. Are Latino adolescents concentrated in areas where there is a more sexually permissive school culture?) investigates the relationship between school racial composition, the aggregate of individual beliefs about sex, and the proportion of students who have had sex in the school. The remaining research questions are answered using multilevel models. The outcome for the third research question (i.e. beliefs about sex) is continuous and, therefore, hierarchical linear modeling (HLM) is appropriate. The outcome for the second and fourth research questions (i.e. sexual initiation) is dichotomous and, therefore,

hierarchical generalized linear modeling (HGLM) is needed to account for the non-normal distribution of the outcome variables.

Chapter 3: Method

The present study involves the secondary analysis of a large national collection of data on adolescent health behavior, individual, and school characteristics. The sample and analytic methods used are described in the following subsections.

Sample

Data from Wave I of the National Longitudinal Study of Adolescent Health (Add Health), which includes four waves of data collection between the 1994-1995 school year and 2008 were used for the analyses. The Wave I In-Home Questionnaire was administered in 1995 and included 20,745 participants in grades 7 to 12 (ages 11 to 21). Eighty high schools were selected from a sampling frame of 26,666 high schools. Prior to sampling, schools were sorted by size, school type, census region, level of urbanization, and percent White. High schools were stratified into 8 strata: region (Northeast, Midwest, South, West), urbanicity (urban, suburban, and rural), school size (≤ 125, 126-350, 351-775, ≥776), school type (public, private, parochial), percent White (0, 1-66, 67-93, 94-100), percent Black (0, 1-66, 67-93, 94-100), grade span (K–12, 7–12, 9–12, 10–12), and curriculum (general, vocational/technical, alternative, special education), such that at most one high school was chosen per stratum (i.e. some strata contained no high schools). Twenty-eight high schools (35%) refused to participate and were replaced by high schools that were matched on the previous eight characteristics (Harris et al., 2009).

High schools identified feeder middle schools that provided at least 5 students to the high school. One feeder school was chosen based on a probability proportional

to the percentage of the high school's entering class that came from the feeder. Several schools had no feeder as they contained 7th and 8th grades, and 4 schools had no eligible feeder as students came from a large number of middle schools.

These sampling procedures resulted in 80 high schools and 52 middle schools (*N* = 132 schools; Harris et al., 2009). Some schools were deemed core schools in which approximately 200 students were selected from each school (although16 schools administered the questionnaire to all students), and other schools were selected to over-represent related persons (to enable research on genetic influences). Students from each school were stratified by grade and sex, with approximately 17 students chosen from each stratum. At Wave I, the response rate for the Add Health study was 79%. Data regarding response rates for different ethnicities at Wave I could not be found. However, response rates at Wave IV differed by ethnicity, urbanicity, region of the country, parental education, immigration status, and genetic relatedness, with Latinos having the lowest response rates of any ethnicity (approximately 71%; Brownstein et al., n.d.). Different response rates by ethnicity may skew the measurement of school-level predictors as they were created by aggregating level-1 responses. Students with disabilities and members of certain other groups (i.e. high education Black, Cuban, Puerto Rican, and Chinese students) were also oversampled from some schools.

Sample weights were utilized in order to correct for the over-sampling of certain groups, with the aim of yielding unbiased estimates of the population parameters. To be representative, analyses must exclude students without individual-level sampling weights (*n* = 1,821; Chantala, 2006), so these cases are excluded in the

present research. Students did not have individual-level sampling weights when they were not chosen probabilistically through their school but to assist in assessing a genetic influence (e.g. as a twin). Weights may be generally interpreted as the number of people one individual represents. When conducting multi-level models Chantala (2006) recommended using sampling weights at both the individual-level (W1_WC) and school-level (SCHWT1; Harris & Udry, 2002). The individual-level sampling weights ranged from 1.00 to 119.98 (M = 6.18, SD = 7.41). School-level sampling weights ranged from 35.89 to 4170.13 (M = 165.31, SD = 210.48).

The Wave I In-Home Interview Data were utilized because this wave included respondents in the target age group (i.e. adolescence, including children under the age of 13) and had the largest sample size of the four waves of data collection. It is important to include children under the age of 13 because the risk of negative outcomes increases as the age of sexual initiation decreases. Furthermore, between 4 and 11% of heterosexual students have had intercourse before the age of 13 (with a higher percentage of Latinos having had sex before the age of 13, compared to Anglo peers) and between 13 and 28% of lesbian and gay students have had intercourse before the age of 13 (Centers for Disease Control, 2001).

Missing data. Cases that were missing responses to variables of interest (e.g. school identification or sexual initiation), or were ambiguous or inconsistent in their responses to the ethnic self-identification prompt were considered to have missing data. Additionally, difficulties in imputing a mix of continuous and categorical data *and* multilevel data contributed to the decision to use listwise deletion for these cases (Enders, 2010). Listwise deletion of these participants would reduce measurement

error for the covariates, but it would provide biased estimates as individuals who are multiracial or felt uncomfortable answering some questions would be underrepresented. Nevertheless, the listwise deletion of this small percentage of cases was performed. Details regarding the coding of the ethnic self-identification can be found in the Measures section. Table 1 illustrates the missing data leading to listwise deletion of a few cases. This involves a very small percentage of the cases, and is unlikely to greatly affect the results.

Table 1

Missing Data and Attrition for the Sample

Data Element	Valid *N* (Missing *n*)
Wave I In-Home Participants[a]	20,745
Cases in probability sample (analysis sample)	18,924
School identification	18,921 (3)
Sexual initiation response	18,713 (208)
Racial/ethnic response[b]	18,488 (225)

[a] Includes 1,821 cases not in the probability sample (cases without sampling weights).
[b] "Other" or inconsistent responses treated as missing.

With the exception of these few deleted cases, missing data from the other covariates (e.g. religiosity) and outcome variables were imputed using multiple imputation (MI). Were data missing at random (MAR), this imputation would produce unbiased estimates. But, because responses may be missing not at random (MNAR), MI was used to *reduce* bias. MI reduces bias for missing data imputation

more so than other procedures such as pairwise deletion, mean substitution or other such methods prior to creating scales (Schafer & Graham, 2002), and even when data are MNAR it will reduce bias (Enders, 2010). MI was conducted using NORM software for items prior to creating scales (Schafer, 1997; Enders, 2010).

Measures

This research examines both individual and school predictors of sexual behavior. This section first describes the measures of individuals to be used, and then describes measures of the school environment. The Add Health dataset was examined for items or scales relating to the constructs found to be correlated with adolescent sexual behavior, according to the literature review. Internal consistency item analyses were conducted for potential items to be included in the scales to determine the most appropriate items to include and to establish the internal consistency of the scales. The items included in each scale and item level analyses are included in the Appendix.

Individual variables. Predictors at the individual level include ethnic self-identification and other predictors linked to sexual behavior through the literature review. Ethnic self-identifications were coded as dummy variables in the regression models, with students who self-identified as White considered the reference group. Characteristics of the sample are described in Table 2.

Table 2

Overall Sample Characteristics

Characteristic	Frequency[a]	%
Gender		
Male	9070	49.1
Female	9418	50.9
Racial Groups		
Latino	3034	16.4
Mexican[b]	1508	8.2
Chicano	145	.8
Cuban	510	2.8
Puerto Rican	589	3.2
Central/South American	350	1.9
Other	280	1.5
White	9947	53.8
Black or African American	4007	21.7
American Indian/Native American	181	1.0
Asian or Pacific Islander	1329	7.2
Sexual Initiation[c]	7431	40.2

[a] Frequencies and percentages are unweighted.
[b] Participants were allowed to mark more than one Latino subgroup. Information regarding subgroup affiliation is provided to describe the sample, but was not included in the analyses.
[c] Indicates the number and percentage of respondents who responded "yes."

Ethnicity. Ethnic self-identification was included in the statistical models in order to answer the substantive research questions regarding the influence of school context as an explanatory mechanism for ethnic group differences in adolescent

sexual behavior. Respondents were asked if they were "of Hispanic or Latino origin." Individuals who answered affirmatively were considered Latino and not any other race or ethnicity. Afterwards, respondents were asked, "What is your race?" and given the following response options: White, Black or African American, American Indian or Native American, Asian or Pacific Islander, or Other, with the possibility of choosing more than one response option. The Latino question was applied regardless of responses to the race question, resulting in five categories excluding "Other" or ambiguous. Individuals who indicated that they identified with more than one race were then asked, "Which one category best describes your racial background?" Individuals who chose Other were excluded from the analyses because of the ambiguity of this racial self-designation. If individuals chose more than one racial category and then failed to choose one race that best described them, or if individuals chose a race that best described them that was not endorsed on the previous question, they were also excluded from the analyses. Refer to Table 2 for the number of participants who identified as each ethnic classification.

Age. Within the current age range of study participants (11.39 to 21.39 years old, $M = 16.19$, $SD = 1.71$), age is highly related to whether the individual has ever had sex for adolescents in general. Age is related to sexual maturation and the onset of puberty and, therefore, was included as a covariate. The transitional period of adolescence, specifically from approximately 13 to 16 years old, is also a high period of delinquent behaviors (Williams et al., 1999). Participants up to age 21 were included in the analyses, because adolescents up to age 21 may attend school.

Age was calculated for all participants by converting the year and month that the participant was born and the year and month the participant completed the survey into seconds since the beginning of the Gregorian calendar via SPSS. Then, the seconds at birth were subtracted from the seconds at survey completion, and reconverted back into years and fractions of years. The day that the participant was born was not included in the data.

Gender. Although gender is not related to sexual initiation, with approximately equal rates for males and females between ages 15 and 17 (approximately 31.6% vs. 30.0%, respectively), gender *is* related to *risky* sexual behavior, such as early sexual initiation and number of lifetime partners (CDC, 2011), and was therefore included in the model. Gender was identified by the participant (0 = male; 1 = female).

Socioeconomic status. A composite measure of SES was included because previous literature has documented a relationship between poverty, parental education, and sexual behavior (see Table A1). SES was measured through a composite of total household income, parental education, and public assistance (α = .67). Because income was not normally distributed, income underwent log transformation before being recoded to quintiles. Incomes 1.5 standard deviations below the mean were scored 1, between 1.5 and .5 standard deviations below the mean scored 2, within .5 standard deviations of the mean scored 3, between .5 and 1.5 standard deviations above the mean scored 4, and greater than 1.5 standard deviations above the mean scored 5. Maternal and paternal education were scored as follows: below high school/never attended school = 1, high school graduate/GED/vocational

school = 2, some college/vocational training after high school = 3, graduated from a 4-year college = 4, and graduate or professional degree = 5. Public assistance was assessed through two dichotomous items: (a) having received food stamps or (b) housing subsidy/public housing (0 = yes, 1 = no). Composite scores were calculated by summing all five items, with higher scores indicating higher SES (M = 10.15, SD = 2.93). Public assistance items were included in the scale, but not heavily weighted, in order to differentiate between levels of poverty at the lower end of the SES spectrum. Because these two items were given little weight relative to the income and education items, the scale should be interpreted as primarily representing the latter.

Problem behavior. A scale of problem behaviors was included as previous literature has found a relationship between adolescent sexual behavior and other problem behaviors, presumably as the result of an underlying disposition related to delinquency (see Table A2). Such personality traits or disposition may be a lack of self-control or impulsivity. The scale included 15 items asking the individual about the occurrence of engaging in problem behaviors (e.g. lying to parents or guardians about friends, stealing, or damaging property) over the past 12 months (α = .84). Participants responded on an ordered scale (0 = never, 1 = 1 or 2 times, 2 = 3 or 4 times, and 3 = 5 or more times), although their responses were collapsed into two categories: 0 = no, 1 = yes and missing data were imputed. This reduced the error variance and skewed distribution resulting from individuals who engage in high levels of problem behavior. Composite scores were the proportion of positive responses with higher scores indicating more problem behaviors (M = .19, SD = .19).

Commitment to education. A measure of commitment to education was included to account for individual school-related factors, such as achievement, affective attachment to school, and educational inspirations (see Table A3). The scale was a composite score of 8 items (α = .70), including "How much do you want to go to college?" (1 = low, 5 = high), "How likely is it that you will go to college?" (1 = low, 5 = high), "What was your [most recent] grade in English or language arts?", "And what was your grade in mathematics?" (A = 4, B = 3, C = 2, D or lower = 1), [Most recently], how often did you have trouble (a) getting along with your teachers, (b) paying attention in school, (c) getting your homework done, or (d) getting along with other students?" (0 = every day, 1 = almost every day, 2 = about once a week, 3 = just a few times, 4 = never). Composite scores were calculated as the average of the *z*-scores for all responses, with higher scores indicating greater commitment to education (*Range* = -2.73 to .99, *SD* = .57).

Attachment to parents and teachers. Attachment to parents and teachers was included as a second measure of social bonding (see Table A4). The scale was measured through 6 items (α = .79), including "How much do you feel that (a) adults care about you, (b) teachers care about you, (c) your parents care about you, (d) people in your family understand you, (e) you and your family have fun together, and (f) your family pays attention to you?" Participants responded on a five-point scale, where 1 = not at all and 5 = very much. Composite scores were calculated as the average of all responses, with higher scores indicating greater attachment to others (*M* = 3.98, *SD* = .63).

Authoritative discipline. Authoritative discipline was included as a protective factor because the literature suggests that supervision is a significant restraint against problem behavior (see Table A5). Parental control was measured through 6 items (α = .63), including "Do your parents let you make your own decisions about (a) the people you hang around with, (b) what you wear, (c) how much television you watch, (d) which television programs you watch, (e) what time you go to bed on week nights, or (f) what you eat?" All items were scored dichotomously (0 = yes, 1 = no). Composite scores were the proportion of positive responses with higher scores indicating more parental control (*M* = .81, *SD* = .23).

Religiosity. Religiosity was also included in the model because of its documented influence on sexual behavior (see Table A6). Religiosity was measured through 4 items (α = .74): "In the past 12 months, how often did you attend religious services?", "How important is religion to you?", "How often do you pray?", and "Many churches, synagogues, and other places of worship have special activities for teenagers—such as youth groups, Bible classes, or choir. In the past 12 months, how often did you attend such youth activities?" All of the items were scored on a four-point scale, with higher scores indicating greater religiosity. Composite scores were calculated as an average of all items (*M* = 2.16, *SD* = .82).

Motivations to engage in sex. Motivations to engage in sex was the outcome for the third research question; motivations to engage in sex was included as a predictor for the research question concerning sexual initiation (see Table A7). These motivations were assessed through 8 items (α = .73): "If you had sexual intercourse, (a) your friends would respect you more, (b) your partner would lose respect for you

(reverse coded), (c) you would feel guilty (reverse coded), (d) it would upset your mother (reverse coded), (e) it would give you a great deal of physical pleasure, (f) it would relax you, (g) it would make you more attractive to women/men, and (h) you would feel less lonely." All of the items were scored on a Likert-type scale (1 = strongly disagree, 5 = strongly agree). Composite scores were calculated as the average of all responses such that higher scores will indicate greater motivation to engage in sexual behavior (M = 3.28, SD = .63).

Sexual initiation. Sexual initiation was assessed by asking the respondent, "Have you ever had sexual intercourse? When we say sexual intercourse, we mean when a male inserts his penis into a female's vagina." Reponses were dichotomous (0 = No; 1 = Yes). Frequencies for the sexual initiation response variables can be found in Table 2.

The means and standard deviations for each of the individual differences predictors for Anglo, Latino, and Black participants are shown in Table 3. Table 3 illustrates that, in this dataset with this coding strategy, problem behavior is consistent across ethnic groups, despite research suggesting that Black students have higher rates of problem behavior. This may be because the problem behaviors were collapsed into dichotomous categories, reducing the influence of very high rates for specific behaviors on the composite index. Furthermore, six of the categories were endorsed by at least 20% of the sample. Table 4 illustrates the bivariate correlations between the individual characteristics.

Table 3

Descriptive Statistics for Individual Predictors for Anglo, Latino, and Black Respondents

Characteristic	Anglo *M* (*SD*) *r*	Latino *M* (*SD*) *r*	Black *M* (*SD*) *r*
SES	10.82 (2.72) .29	8.17 (2.61) -.11	9.38 (2.88) -.31
Problem Behavior	.19 (.19) -.03	.21 (.20) -.01	.19 (.18) -.04
Commitment to Education	.00 (.58) .04	-.10 (.59) -.02	-.05 (.55) -.07
Attach. to Parents and Teachers	3.94 (.62) -.04	3.99 (.66) .03	4.01 (.66) .02
Authoritative Discipline	.84 (.21) .13	.76 (.26) -.03	.79 (.24) -.10
Religiosity	2.29 (.84) .13	2.25 (.77) -.17	1.90 (.71) .02
Motivations to Engage in Sex	2.71 (.61) -.02	2.72 (.64) .07	2.82 (.64) -.02
Sexual Initiation	.38 -.06	.38 .14	.56 -.02

Note: All correlations were significant at the .01 level. The sexual initiation outcome is the proportion of respondents within each racial group who have had sex.

Table 4

Bivariate Correlations Among Variables

	Prob. Behavior	Commit. To Educ.	Attachment	Discipline	Religiosity	Mot. for Sex
SES	-.03	.23	.04	.11	.05	-.06
Problem Behavior	-	-.40	-.33	-.03	-.13	.29
Commit. To Educ.	-.40	-	.36	.01	.17	.27
Attachment	-.33	.36	-	.06	.20	.22
Discipline	-.03	.01	.06	-	.14	-.15
Religiosity	-.13	.17	.20	.14	-	.31
Motivations for Sex	.29	.27	.22	-.15	.31	-
Sexual Initiation	.22	-.23	-.22	-.15	-.31	.38

Note. All correlations were significant at the .05 level.

Contextual variables. Research has suggested that several contextual variables that are linked to adolescent sexual behavior; these are included in the statistical models to answer the research questions. These were aggregated from individual responses using individual-level sampling weights. Administrator reports of sexual norms in the school were investigated as potential measures, however preliminary analyses indicated that these had little correlation with student self-reports. Therefore, administrator reports were likely invalid and excluded from the study. Table 5 shows the descriptive statistics for the sample of schools.

Table 5

*Descriptive Statistics for School Characteristics (*N = *132 Schools)*

School Characteristic	Mean	25th %ile	75th %ile	Min/Max
Proportion White	.64	.37	.94	.00/1.00
Proportion Black	.19	.0038	.28	.00/.99
Proportion Latino	.13	.0067	.17	.00/.90
Proportion Asian American	.04	.0000	.03	.00/.72
Proportion American Indian	.01	.0000	.0086	.00/.40
Proportion Had Sex	.40	.29	.51	.00/.85
Participants per School	156.27	86.50	178.00	43/1721
School-Level Weights	116.82	62.88	150.28	35.89/4170.13

Ethnic group proportions. Responses to the race and ethnicity items were aggregated in order to calculate the proportion of each ethnic group in the school.

This school-level characteristic was used as the predictor for the first research question, in order to determine the extent to which Latino students are concentrated in areas where sexual permissiveness is the norm. Ethnic group proportions can be found in Table 5.

School socioeconomic status. School socioeconomic status was included because research has found that neighborhood or school SES is related to adolescent sexual behavior and other problem behavior. Accordingly, it was included as a control variable at level-2 for the HLM and HGLM equations.

School commitment to education. School-level commitment to education was included in the models because the literature has suggested that the overall level of school achievement and affective bonding to the school is related to adolescent sexual behavior and other problem behaviors. This variable was calculated by aggregating the individual responses from each scale.

School-level motivations to engage in sex. In order to determine the extent to which sexual permissiveness in the school affects the relationship between ethnicity and adolescent sexual behavior, the individual responses regarding motivations to engage in sex were aggregated. This variable was entered at level-2 into the statistical models where sexual initiation is the outcome.

Data Analysis

Analyses were conducted using SPSS 17.0 and HLM 6.02. HLM and HGLM equations for the second through fourth research questions were built from the bottom up, where individual-level predictors were added first and school-level predictors were added after the individual-level equations had been developed. Group mean

centering at level-1 was appropriate for the racial categories to investigate the cross-level interaction of school-level predictors on level-1 regression coefficients. Grand mean centering was appropriate for the demographic and sociopsychological variables at level-1 in order to adjust for the covariates (Enders & Tofighi, 2007). Grand mean centering was also appropriate at level-2 to reduce nonessential multicollinearity (Marquardt, 1980). Restricted Maximum Likelihood (REML) estimation procedures were used for the HLM equations. LaPlace estimation procedures were used for the HGLM equations to correct for the downward bias of the random variance components associated with penalized quasi-likelihood (PQL). LaPlace estimation procedures also provide model fit statistics through the HLM 6.02 software (Raudenbush & Bryk, 2002).

Statistical models. For the first research question, or whether or not Latino adolescents are more likely to attend schools where a higher proportion of the students have had sex or there are more permissive beliefs about sex, scatterplots were created. Here, the abscissa is the proportion of race *g* in the school and the ordinate is (a) the aggregated score for motivations to engage in sex or (b) the proportion of students in the school who have had sex. Equation 1 illustrates the linear regression model needed for significance testing for the first research question.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e \quad (1)$$

where Y is the aggregate motivations to engage in sex or proportion of students who have had sex in the school, β_0 is the intercept or the proportion of students who self-identified as White who have had sex evaluated at the average school mean age, β_1 is the raw regression coefficient of the outcome variable on the mean age in the school,

X_1 is the mean age for the school, β_h is the raw regression coefficient of the outcome variables for the proportion of each race in the school (where g = 2 for Black, g = 3 for Latino, g = 4 for Asian/Pacific Islander, g = 5 for Native American) compared to the age-adjusted reference group proportion, X_h is the proportion of students of race g in the school, and e is the error term. Age is important to include as a predictor because schools span different ranges of grades. School-level weights were used when conducting the regression analysis.

Unconditional models for questions 2 through 4. The unconditional models were estimated for both response variables in order to calculate the proportion of the variance between-schools. Equation 2 illustrates the unconditional mixed model for the second research question and Equation 3 illustrates the unconditional mixed model for the third research question.

$$Y_{ij} = \gamma_{00} + u_j + r_{ij} \tag{2}$$

$$\ln\left(\frac{p_{ij}}{1 - p_{ij}}\right) = \gamma_{00} + u_j \tag{3}$$

The intraclass correlation (ICC) or percentage of variance accounted for between schools can be calculated using Equation 4.

$$ICC = \frac{\sigma^2{}_{between}}{\sigma^2{}_{between} + \sigma^2{}_{within}} \tag{4}$$

where $\sigma^2{}_{between} = \tau_{00(unconditional)}$. Because the response variable for the third research question is dichotomous, it may be conceived as a latent variable with the student-level error assumed to have a standard logistic distribution with a mean of 0 and standard deviation of $\pi^2/3$ (Snijders & Bosker, 1999). Therefore, in Equation 4, $\sigma^2{}_{within} = \pi^2/3$.

HLM equations. The second research question can be answered with Equations 5 through 10. Equation 5 is the individual-level equation; Equations 6 through 10 are the school-level equations.

$$Y_{ij} = \beta_{0j} + \sum_{h=1}^{H} \alpha_{hj}\left(Z_{hij} - \bar{Z}_{h\cdot\cdot}\right) + \sum_{g=1}^{G} \beta_{gj}\left(X_{gij} - \bar{X}_{g\cdot j}\right) + r_{ij} \quad (5)$$

$$\beta_{0j} = \gamma_{00} + \sum_{k=1}^{K} \gamma_{0k}\left(W_j - \bar{W}_{\cdot}\right) + u_{0j} \quad (6)$$

$$\beta_{1j} = \gamma_{10} + \sum_{k=1}^{K} \gamma_{1k}\left(W_j - \bar{W}_{\cdot}\right) + u_{1j} \quad (7)$$

$$\beta_{2j} = \gamma_{20} + \sum_{k=1}^{K} \gamma_{2k}\left(W_j - \bar{W}_{\cdot}\right) + u_{2j} \quad (8)$$

$$\beta_{3j} = \gamma_{30} + \sum_{k=1}^{K} \gamma_{3k}\left(W_j - \bar{W}_{\cdot}\right) + u_{3j} \quad (9)$$

$$\beta_{4j} = \gamma_{40} + \sum_{k=1}^{K} \gamma_{4k}\left(W_j - \bar{W}_{\cdot}\right) + u_{4j} \quad (10)$$

In Equation 5, Y_{ij} is the self-reported motivation to engage in sex for student *i* in school *j*, β_{0j} is the intercept or the school mean for the reference group (i.e. students who self-identified as White) adjusted for covariates (Z_1 through Z_h), and the α_{hj} are the slopes of the regressions of the outcome variable on the predictors, where

Z_1 = age

Z_2 = gender

Z_3 = SES

Z_4 = problem behavior

Z_5 = commitment to education

Z_6 = attachment to parents and teachers

Z_7 = authoritative discipline

Z_8 = religiosity

β_{gj} are the slopes of the regressions of the outcome variables on each race in the j^{th} school, where

X_1 = Black

X_2 = Latino

X_3 = Asian/Pacific Islander

X_4 = for Native American

and r_{ij} is the residual for the student i in school j. All ethnicities were included in the analysis, even though the focus of the study is on Latino adolescents in order to (a) provide statistical control and (b) to provide descriptive information about rates of sexual behavior in comparison to other ethnic groups.

Equations 6 through 10 investigate contextual effects of the school on the intercept (β_{0j}) and the regression coefficients for ethnic self-identifications in the j^{th} school (β_{gj}). Here, γ_{00} is the grand mean of motivations to engage in sex for schools adjusted for the contextual covariates and γ_{gk} are the regression coefficients that represent a cross-level interaction of contextual variables on level-1 predictors. γ_{gk} are the regression coefficients for each contextual covariate in the j^{th} school, where

W_1 = school-level SES,

W_2 = school-level commitment to education,

W_3 = proportion Latino, and

u_{gj} is the residual error for the j^{th} school.

Here, it is important to differentiate between compositional and contextual effects. Compositional effects are those that result from similarities between students

within schools, particularly similarities in characteristics related to the outcomes. For example, if the difference in the school-level motivations to engage in sex between middle schools and high schools occurs *only* because students in middle schools are closer in age to their peers in the middle school rather than students in the high school, this would be a compositional effect. However, if the difference in school-level motivations to engage in sex occurs because of some school-level characteristics (such as culture) that affects the students within that school and not others, then this is a contextual effect. Using multilevel models and controlling for level-1 variables (e.g. including predictors at level-1 and their aggregates at level-2) helps to distinguish contextual effects above and beyond compositional effects.

HGLM equation. The HGLM equation needed to answer the third research question uses a logit link function, illustrated in Equation 11. The school-level equations are the same as those given above in Equations 6 through 10, although the school-level motivation to engage in sex, reflecting the school-level sexual permissiveness, is included as a contextual covariate.

$$\ln\left(\frac{p_{ij}}{1-p_{ij}}\right) = \beta_{0j} + \sum_{h=1}^{H} \alpha_{hj}\left(Z_{hij} - \bar{Z}_{h\cdot\cdot}\right) + \sum_{g=1}^{G} \beta_{gj}\left(X_{gij} - \bar{X}_{g\cdot j}\right) \tag{11}$$

Equation 11 is similar to Equation 5 but p_{ij} is the probability that student *i* in school *j* self-reports having had sex, motivations to engage in sex is included as an additional predictor (i.e. the outcome from the second research question) at level-1 and level-2, and there is no individual-level residual. Specifically, in Equation 11,

Z_1 = age

Z_2 = gender

Z_3 = SES

Z_4 = problem behavior

Z_5 = commitment to education

Z_6 = attachment to parents and teachers

Z_7 = authoritative discipline

Z_8 = religiosity

Z_9 = motivations to engage in sex

and β_{gj} are the slopes of the regressions of the outcome variables on each race in the j^{th} school, where

X_1 = Black

X_2 = Latino

X_3 = Asian/Pacific Islander

X_4 = for Native American

Model fit. Model fit was used to determine the appropriateness of adding predictors at level-1 and level-2 to the equations. Model fit was calculated through the deviance statistic in HLM 6.02, which equals the -2 log likelihood; models were compared to each other using the χ^2 statistic.

Chapter 4: Results

Research question #1. The first research question investigates the extent to which Latino adolescents are concentrated in areas where sexual permissiveness is the norm. Figures 2 through 4 are the scatterplots to illustrate the relationship between the proportions of Whites, Latinos, and Blacks per school and the school-level motivations to engage in sex. Table 6 shows the results of the linear regression model needed for significance testing for the school-level motivations to engage in sex outcome variable.

It is important to note that the scatterplots represent bivariate correlations between the proportion of each ethnicity in the school and the school-level outcomes, while the regression results yield partial correlations where covariates are included. Accordingly, particularly in the scatterplot in Figure 7 and the Latino regression coefficient in Table 7, there is a discrepancy between the correlations. When controlling for other variables, the relationship between the proportion Latinos and sexual initiation at the school-level is increased from the bivariate correlation in the scatterplot.

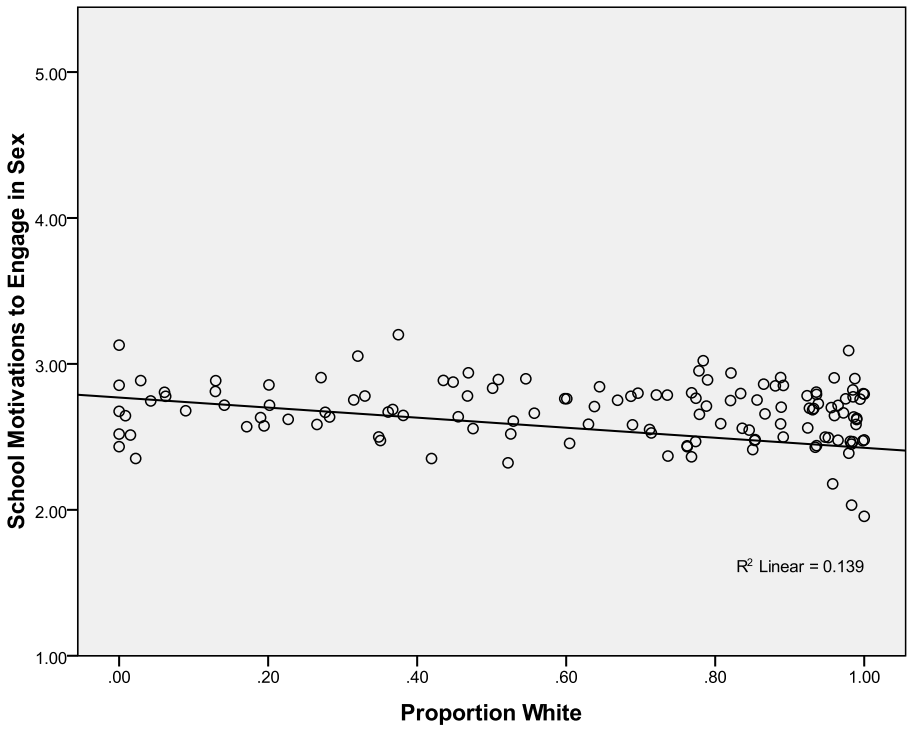

Figure 2. Scatterplot illustrating the relationship between the proportion of White students in the school and the average school mean motivations to engage in sex. One dot = one school.

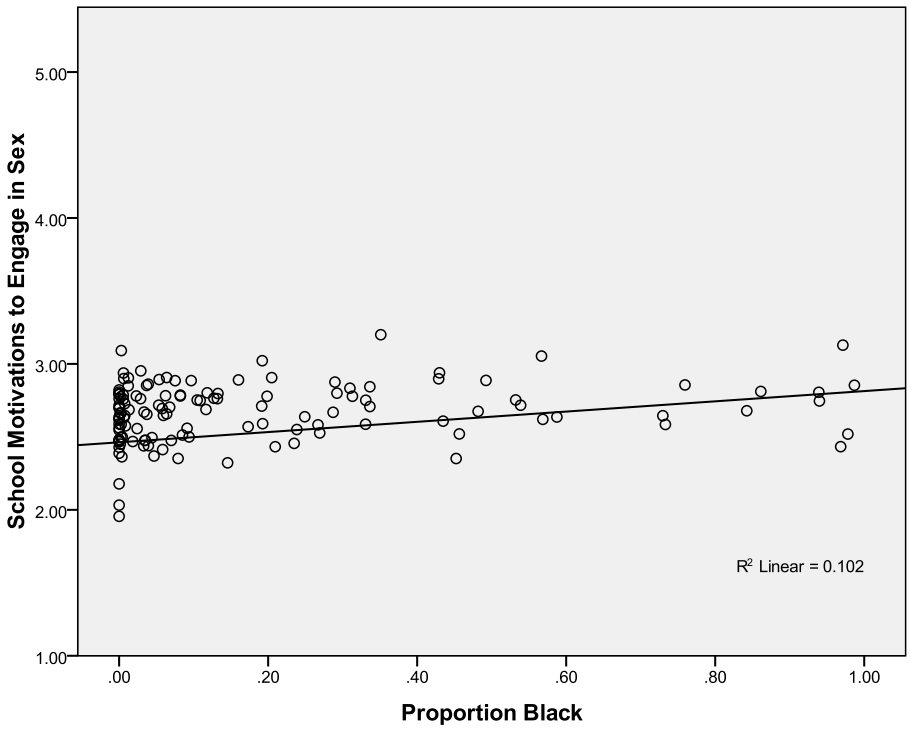

Figure 3. Scatterplot illustrating the relationship between the proportion of Black students in the school and the average school mean motivations to engage in sex. One dot = one school.

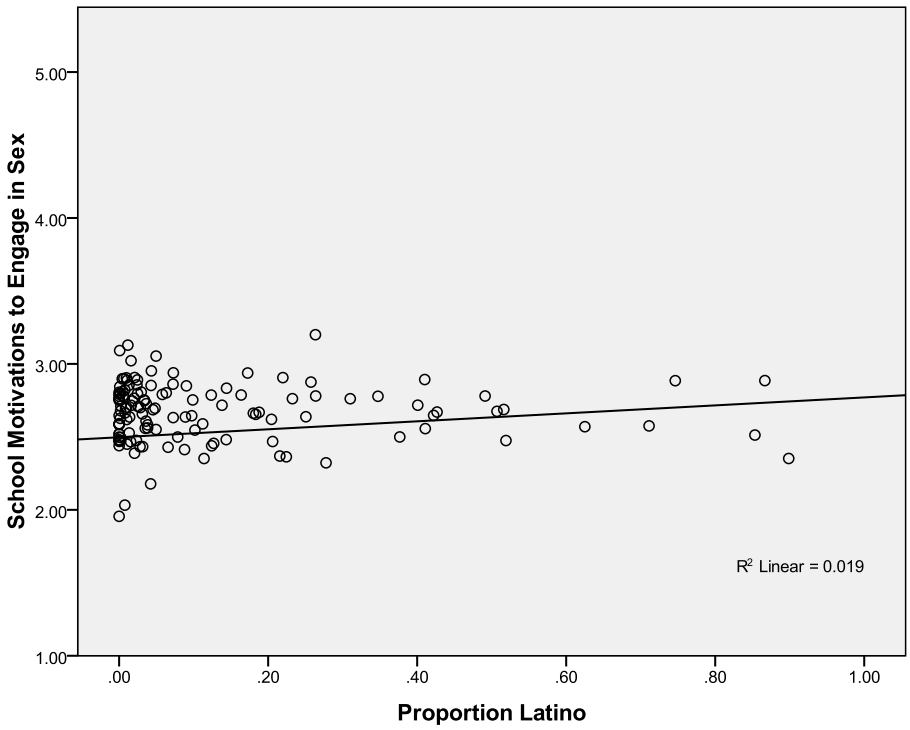

Figure 4. Scatterplot illustrating the relationship between the proportion of Latino students in the school and the average school mean motivations to engage in sex. One dot = one school.

Table 6

Regression of School Motivations to Engage in Sex on School Mean Age and Ethnic Composition (N = 132 Schools)

Predictor	*β*	S.E.	*p*	*ρ*
Intercept	2.44	.002	<.01	-.37
Age	.18	.001	<.01	.62
Black	.31	.004	<.01	.32
Latino	.08	.008	<.01	-.37
Asian/Pacific Islander	.71	.023	<.01	.16
Native American	.87	.031	<.01	.12

Note: Coefficients are unstandardized. All correlations are significant at the .01 level.

In Table 6, the intercept can be interpreted as the mean school motivations to engage in sex in a school of average age (15.20 years old) and no non-White students. The raw regression coefficient for the proportion of each ethnicity in the school can be interpreted as the increase in the school motivations to engage in sex when moving from a school with no students of that ethnicity to a school with only students of that ethnicity. Specifically, moving from a school with only White students to a school with only Latino students would result in an increase of .08 in the school mean score for motivations to engage in sex.

Figures 5 through 7 are the scatterplots to illustrate the relationship between the proportions of Whites, Latinos, and Blacks per school and the proportion of students having had sex. Table 7 shows the results of the linear regression model needed for significance testing for the proportion of students having had sex outcome variable.

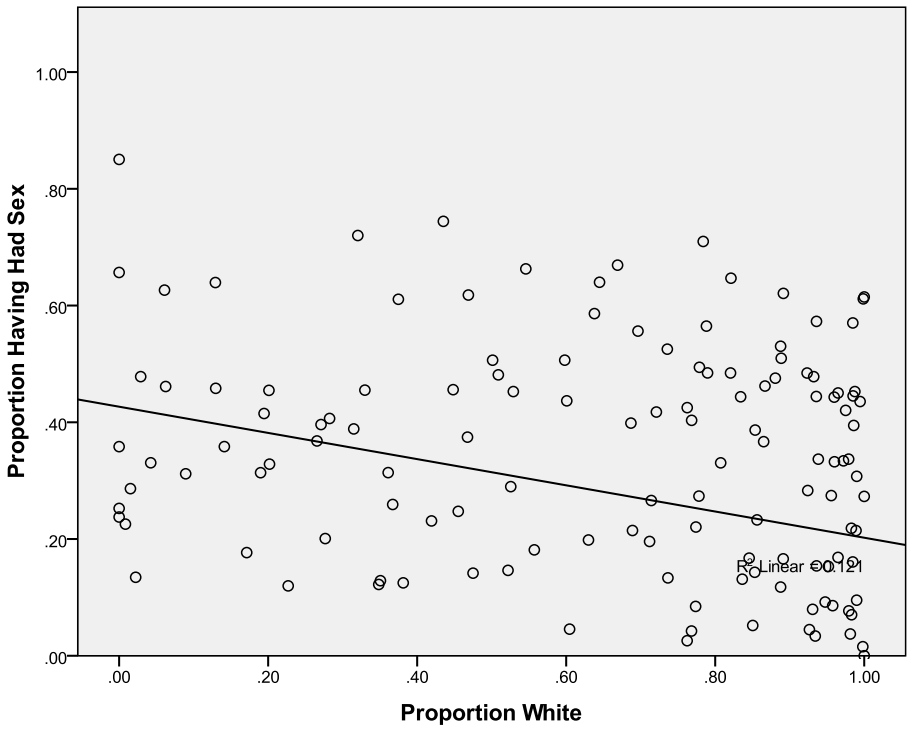

Figure 5. Scatterplot illustrating the relationship between the proportion of White students in the school and the proportion of students having had sex. One dot = one school.

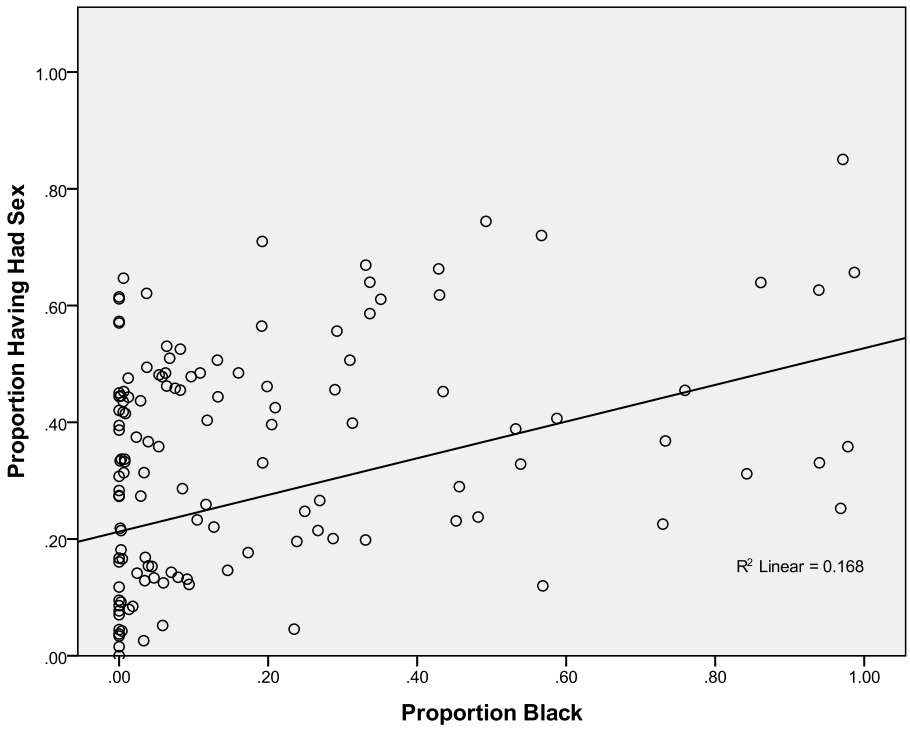

Figure 6. Scatterplot illustrating the relationship between the proportion of Black students in the school and the proportion of students having had sex. One dot = one school.

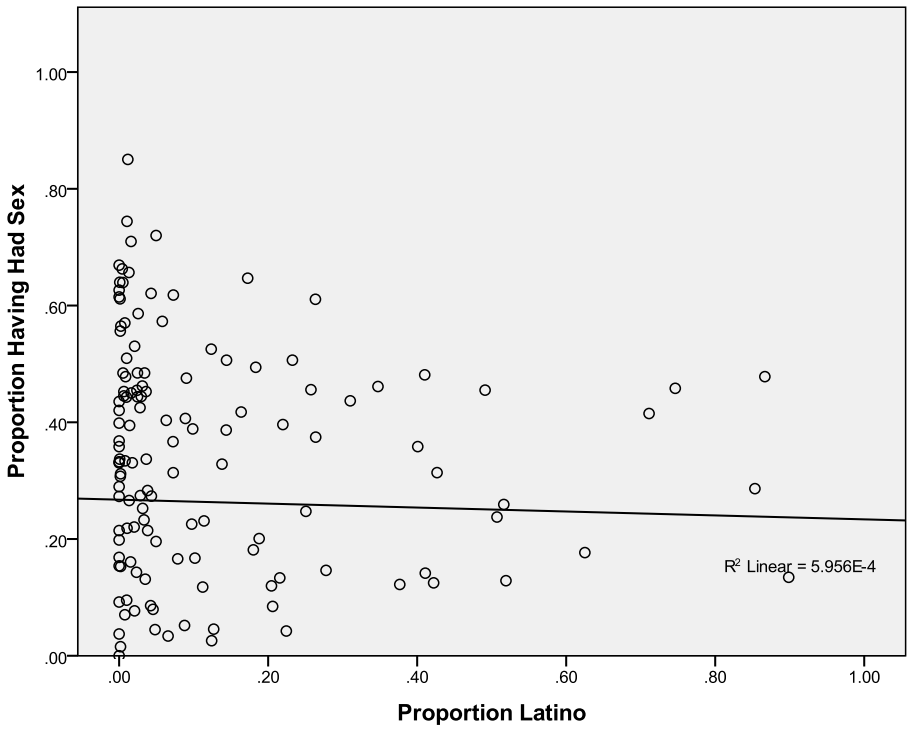

Figure 7. Scatterplot illustrating the relationship between the proportion of Latino students in the school and the proportion of students having had sex. One dot = one school.

Table 7

Regression of School Sexual Initiation on School Mean Age and Ethnic Composition (N = 132 Schools)

Predictor	*β*	S.E.	*p*	*ρ*
Intercept	.22	.001	<.01	-.35
Age	.12	.001	<.01	.74
Black	.28	.002	<.01	.41
Latino	-.15	.005	<.01	-.02
Asian/Pacific Islander	.16	.013	<.01	.04
Native American	.51	.017	<.01	.08

Note. Coefficients are unstandardized. All correlations are significant at the .01 level.

In Table 7, the intercept can be interpreted as the proportion of students having had sex in a school of average age (15.20 years old) with only White students. Results suggest that moving from a school with only White students to a school with only Latino students would result in a .15 *decrease* in the proportion of students who have had sex.

Both analyses in Tables 6 and 7 are based on aggregate data and, therefore, inferences about the individual should not be made. Making inferences about individuals based on aggregate data is known as the ecological fallacy (Robinson, 1950). It may be that Latinos are more likely to attend schools where other students have extremely low motivations to engage in sex or are extremely unlikely to have had sex. Therefore, Latino ethnicity, at the individual-level, may actually be positively correlated with motivations to engage in sex and sexual initiation, even though the aggregate data may suggest that the higher proportion of Latinos is related to lower motivations to engage in sex and rates of sexual initiation.

Unconditional models for HLM and HGLM equations. The results for the unconditional models can be found in Table 8 and indicate that 16% and 26% of the variance lies between schools for motivations to engage in sex and sexual initiation, respectively. The between-school variance for the HGLM model is dependent upon the assumption that $\sigma^2_{within} = \pi^2/3$. If this assumption is inaccurate, then the between-school variance estimate may be biased. Because this estimate is much higher than other studies have claimed (between 1% and 6%, Trejos-Castillo & Vazsonyi, 2009), the estimate should be interpreted with caution.

Table 8

Unconditional Models

Statistic	Motivations for Sex	Ever Had Sex
γ_{00}	2.71	-.91
S.E. of γ_{00}	.005	.10
σ^2_{within}	.39	3.29
Odds Ratio	-	.40
Var(u_{ij}) or τ_{00}	.019	1.15
Intraclass Correlation (ICC)	.046	.26
Deviance Statistic	33442.23	55432.37

Note. Var(u_{ij}) = between-school variance. $\sigma^2_{within} = \pi^2/3$ for sexual initiation outcome.

HLM equations. The results for the third research question indicate that there is no relationship between Latino self-identification and motivations to engage in sex above and beyond individual characteristics. The results shown in Table 9 are for variables centered as in Equation 5. Because the school-mean centering for the ethnicity indicators in this equation does not adjust for between-school differences in ethnic composition, additional analyses were conducted with uncentered ethnic predictors (i.e. indicator variables) to ensure that there was no relationship between Latino ethnicity and motivations to engage in sex. These subsequent analyses did not have a significant partial regression coefficient when the variables were uncentered.

However, final estimation of the variance components (level-1 variables centered as in Equation 5) implied that there were nearly significant differences in regression slopes between schools (p = .073). Therefore, even though the average slope of the Latino regression coefficients was not significantly different from zero,

the possible moderation of the relation between Latino ethnicity and motivations to engage in sex by school-level characteristics was worth investigation (see Table 9). School-level characteristics (i.e. school SES, school commitment to education, and proportion Latino) were added to the equations where the outcomes were the intercept and the ethnicity regression coefficients (illustrated in Equations 5 through 9).

A model comparison test indicated that there was a significant increase in model fit of the model with only level-1 predictors over the unconditional model (χ^2 = 1949.74; df = 102; $p < .001$). The model with the level-2 predictors, investigating the moderation of the Latino regression coefficient by school characteristics, significantly improved model fit over the model with only the level-1 predictors (χ^2 = 13.54; df = 6; p = .035). The proportion of the between-school variance explained was computed using the following formula: ($\tau_{\text{unconditional}} - \tau_{final}$) / $\tau_{\text{unconditional}}$. τ_{final} = .043; therefore, the proportion of the between-school variance explained by the level-1 predictors was 6.5%.

Table 9

Results for Motivations to Engage in Sex

	Model with Level-1 Predictors					Model with Level-2 Predictors					
Predictors	Coeff. (S.E.)	*p*	Effect Size	Variance (S.D.)	Var. *p*	Coeff. (S.E.)	*p*	Effect Size	Variance (S.D.)	Var. *p*	Reliability
Intercept (β_{0j})	2.61 (.06)	<.01	.87	.043 (.21)	<.01	2.62 (.06)	<.01	.87	.043 (.21)	<.01	.87
School-level SES (γ_{01})	--	--	--	--	--	.028 (.009)	<.01		--	--	--
School Commit. to Educ. (γ_{02})	--	--	--	--	--	-.25 (.12)	.04		--	--	--
Proportion Latino (γ_{03})	--	--	--	--	--	-.07 (.09)	.45		--	--	--
Age (α_{1j})	.06 (.007)	<.01	.99	.002 (.041)	.11	.06 (.007)	<.01	.99	.002 (.04)	.11	.61
Gender (α_{2j})	-.39 (.03)	<.01	.96	.014 (.12)	<.01	-.39 (.03)	<.01	.96	.014 (.12)	<.01	.72
SES (α_{3j})	-.008 (.003)	.01	.99	.0002 (.013)	.13	-.009 (.003)	<.01	.99	.0002 (.013)	.11	.46
Problem Behavior (α_{4j})	.49 (.06)	<.01	.84	.055 (.24)	.08	.49 (.06)	<.01	.83	.059 (.24)	.08	.58
Commitment to Education (α_{5j})	-.10 (.01)	<.01	.98	.004 (.062)	>.50	-.10 (.01)	<.01	.98	.004 (.05)	>.50	.41
Attach. To Parents/Teachers (α_{6j})	-.06 (.01)	<.01	.99	.003 (.053)	>.50	-.06 (.01)	<.01	.99	.003 (.06)	>.50	.43
Authoritative Discipline (α_{7j})	-.11 (.05)	.03	.82	.063 (.25)	<.01	-.11 (.05)	.03	.82	.062 (.25)	<.01	.66
Religiosity (α_{8j})	-.11 (.009)	<.01	.99	.002 (.043)	>.50	-.12 (.009)	<.01	.99	.002 (.042)	>.50	.45
Black (β_{1j})	.09 (.03)	<.01	.96	.013 (.11)	>.50	.10 (.03)	<.01	.96	.012 (.11)	>.50	.36
School-level SES (γ_{11})	--	--	--	--	--	.009 (.014)	.50	--	--	--	--
School Commit. to Educ. (γ_{12})	--	--	--	--	--	-.09 (.17)	.56	--	--	--	--
Proportion Latino (γ_{13})	--	--	--	--	--	-.16 (.11)	.13	--	--	--	--

Latino (β_{2j})	-.002	.94	.95	.017	.073	.02	.46	.97	.012	.06	.40
	(.03)			(.13)		(.03)			(.11)		
School-level SES (γ_{21})	--	--	--	--	--	.01	.53	--	--	--	--
						(.02)					
School Commit. to Educ. (γ_{22})	--	--	--	--	--	-.20	.20	--	--	--	--
						(.15)					
Proportion Latino (γ_{23})	--	--	--	--	--	-.33	.01	--	--	--	--
						(.13)					
Asian American (β_{3j})	-.05	.10	.98	.0064	>.50	-.06	.09	.98	.006	>.50	.15
	(.03)			(.08)		(.04)			(.075)		
School-level SES (γ_{31})	--	--	--	--	--	-.017	.53	--	--	--	--
						(.03)					
School Commit. to Educ. (γ_{32})	--	--	--	--	--	.21	.48	--	--	--	--
						(.30)					
Proportion Latino (γ_{33})	--	--	--	--	--	-.03	.91	--	--	--	--
						(.26)					
American Indian (β_{4j})	-.07	.28	.89	.04	>.50	-.05	.35	.89	.04	>.50	.21
	(.06)			(.19)		(.06)			(.19)		
School-level SES (γ_{41})	--	--	--	--	--	-.05	.36	--	--	--	--
						(.05)					
School Commit. to Educ. (γ_{42})	--	--	--	--	--	.71	.09	--	--	--	--
						(.42)					
Proportion Latino (γ_{43})	--	--	--	--	--	-.25	.36	--	--	--	--
						(.27)					
Deviance Statistic			26878.49						26859.86		

Note. α indicates grand-mean centering for the corresponding covariate; β indicates group-mean centering of the covariate. School proportion Latino does not have a main effect (γ_{03} is not significantly different from 0), but in schools with many Latinos, individual Latinos report less motivation to engage in sex (γ_{23} = -.33, p = .01). Effect sizes were calculated using the following formula: $var_{\text{NoPredictor}} - var_{\text{Predictor}})/var_{\text{NoPredictor}}$ (Peugh, 2010).

HGLM equations. The results of the HGLM equations, which investigate the second and fourth research questions concerning the effects of the school environment on sexual initiation, are shown in Table 10. At level-1, preliminary analyses indicated that the high number of covariates prevented the model from converging and, therefore, some non-significant covariates were excluded from the model. These covariates were gender and the dummy code for American Indian ethnicity. At level-2, school-level commitment to education also had a non-significant effect and was excluded from the model.

The proportion of the between-school variance explained by the level-1 predictors was 69% (τ_{final} = .47). Adding the level-2 predictors explained an additional 15% of the between-school variance (84% of the variance of the unconditional model; τ_{final} = .24).

Table 10

Results for Sexual Initiation

	Model with Level-1 Predictors					Model with Level-2 Predictors					
Predictors	Coeff. (S.E.)	*P*	Exp. (coeff.)	Variance (S.D.)	Var. *p*	Coeff. (S.E.)	*p*	Exp. (coeff.)	Variance (S.D.)	Var. *p*	Reliability
Intercept (β_{0j})	-.74	<.01	.48	.47	<.01	-.65	<.01	.52	.23	<.01	.61
	(.12)			(.69		(.07)			(.48)		
School-level SES (γ_{01})	--	--	--	--	--	-.20	<.01	.82	--	--	--
						(.05)					
School Motivations (γ_{02})	--	--	--	--	--	1.97	<.01	7.18	--	--	--
						(.41)					
Age (α_{1j})	.56	<.01	1.74	.04	.16	.51	<.01	1.67	.04	.10	.53
	(.04)			(.21)		(.04)			(.21)		
SES (α_{3j})	-.08	<.01	.93	.003	>.50	-.07	<.01	.94	.00	>.50	.28
	(.01)			(.05)		(.01)			(.05)		
Problem Behavior (α_{4j})	2.55	<.01	12.87	1.31	<.01	2.54	<.01	12.62	1.25	<.01	.45
	(.23)			(1.15)		(.23)			(1.12)		
Commitment to Education (α_{5j})	-.33	<.01	.72	.02	.31	-.33	<.01	.72	.02	.26	.12
	(.05)			(.14)		(.05)			(.14)		
Attach. To Parents/Teachers (α_{6j})	-.22	<.01	.80	.06	.11	-.20	<.01	.82	.07	.09	.35
	(.06)			(.25)		(.06)			(.26)		
Authoritative Discipline (α_{7j})	.87	<.01	2.39	.59	<.01	.84	<.01	2.31	.65	<.01	.38
	(.15)			(.77)		(.16)			(.81)		
Religiosity (α_{8j})	.17	<.01	1.18	.04	<.01	.14	<.01	1.15	.04	>.50	.36
	(.05)			(.19)		(.05)			(.21)		
Motivations to Engage (α_{9j})	1.17	<.01	3.21	.25	.06	1.15	<.01	3.14	.26	.07	.59
	(.09)			(.50)		(.10)			(.51)		
Black (β_{1j})	.91	<.01	2.49	.58	.07	.88	<.01	2.40	.55	.44	.42
	(.16)			(.76)		(.17)			(.74)		
School-level SES (γ_{01})	--	--	--	--	--	-.11	.14	.89	--	--	--
						(.07)					
School Motivations (γ_{02})	--	--	--	--	--	-1.60	.01	.20	--	--	--
						(.62)					
Latino (β_{2j})	.35	.16	1.42	.73	>.50	.24	.20	1.27	.56	.32	.41
	(.21)			(.86)		(.19)			(.75)		
School-level SES (γ_{01})	--	--	--	--	--	-.05	.65	.96	--	--	--
						(.09)					

School Motivations (γ_{02})	--	--	--	--	--	-2.60 (.66)	<.01	.07	--	--	--
Asian American (β_{3j})	-.89 (.18)	<.01	.41	.33 (.58)	>.50	-.88 (.23)	<.01	.42	.36 (.60)	>.50	.19
School-level SES (γ_{01})	--	--	--	--	--	.04 (.11)	.70	1.04	--	--	--
School Motivations (γ_{02})	--	--	--	--	--	-.45 (1.13)	.70	.65	--	--	--

Note. α indicates grand-mean centering for the corresponding covariate; β indicates group-mean centering of the covariate.

Chapter 5: Discussion

This study explicitly tests the relationship between the school environment and adolescent sexual behavior. Most studies fail to account for school contextual effects; instead, studies have generally investigated individual-level characteristics of the school (e.g. school attachment) on Latino adolescent sexual behavior, rather than the effects of the school as an environmental influence. Furthermore, this research examines the extent to which the Add Health dataset supports a theory of differential socialization for Latinos, contributing to ethnic group differences in sexual behavior.

Referring back to the two-fold classification of potential study outcomes in Figure 1, in the present research Latinos are not found to be concentrated in areas where sexual permissiveness is the norm. While having a higher proportion of Latinos in the school is correlated with slightly higher motivations to engage in sex at the school-level, this does not translate into higher rates of sexual initiation. Results suggest that the higher the proportion of Latino students in the school, the lower the proportion of students who have had sex. Although it is unclear whether or not these students are foreign-born, these results may support the findings of Brewster and colleagues (1993) who found that neighborhoods with a higher proportion of Latino immigrants restrained against sexual activity for Latino adolescents.

When looking at the relationship between the proportion of other ethnic groups at the school-level and sexual outcomes, the results differ for different groups. Specifically, as the proportion of White students in the school increases, both the mean motivations to engage in sex at the school-level and the proportion of students who have had sex decreases. On the other hand, as the proportion of Black students

increases, the motivations to engage in sex and rates of sexual initiation increase as well. This is consistent with previous findings (CDC, 2009).

The results for the second research question suggest that sexually permissive school cultures (i.e. schools with higher mean levels of motivations to engage in sex) are significantly related to sexual initiation controlling for school-level SES (γ_{02} = 1.97, p <.01, Exp (coeff.) = 7.18). Therefore, more permissive school sexual cultures do have a positive contextual effect on sexual initiation above and beyond the characteristics of the individual. One interpretation of this finding is that it provides support for social learning theory, as the sexually permissive school culture may be a medium through which students are learning about sexual behavior or obtaining sexual scripts. There may be: (a) an increase in opportunity for the individual to engage in sexual acts or (b) modeling of problem behavior or normative beliefs favoring adolescent sexual behavior. These findings align with previous studies that illustrate that schools with a high proportion of students engaging in problem behavior is associated with more problem behavior of other kinds, net of individual beliefs and behaviors (e.g. Boardman et al., 2008; Hoffman & Ireland, 2004; Kumar et al., 2002 as cited in Cook et al., 2010).

This study found that individual problem behavior and motivations to engage in sex were the strongest predictors of sexual initiation among the variables examined. This lends support to an interpretation that impulsivity, tendency not to delay gratification, or other traits that would increase the likelihood of all problem behaviors (e.g. truancy or stealing) may also be responsible for adolescent sexual initiation. Additionally, the strength of the individual beliefs or motivations to

engage in sex in predicting sexual initiation is consistent with Kirby's (2007) claim that personal beliefs about sex are one of the strongest predictors of sexual behavior.

Latino self-identification did not have a statistically significant effect on motivations to engage in sex (p = .94), when controlling for other individual predictors, both in models where ethnicity was group-mean centered and left uncentered. Black, Asian, and White self-identifications did have an effect on motivations to engage in sex (β_{1j} = .09, p <.01; β_{3j} = -.05; p = .10; and β_{0j} = 2.61; p <.01, respectively, raw regression coefficients). Even though the coefficient for Latino ethnicity was non-significant, there were significant differences in the regression slope between schools, which warranted the investigation of the moderation of Latino ethnicity by contextual effects. Results imply that Latinos report less motivation to engage in sex in schools with a high percentage of Latinos. This also consistent with the findings of Brewster and colleagues (1993), suggesting that having a higher proportion of Latinos is associated with more conservative sexual beliefs or behavioral norms.

When investigating the relationship between ethnicity and sexual initiation, there is a positive relationship between Latino and Black self-identifications and sexual initiation (β_{2j} = .35, p = .16, odds ratio = 1.42 and β_{1j} = .91, p < .01, odds ratio = 2.49), above and beyond other individual predictors. In order to investigate how these relationships changed across schools with a more sexually permissive culture, school-level motivations to engage in sex were added to the model. For both ethnicities, the positive relationship between ethnicity and sexual initiation was

attenuated when students were attending schools where sexual permissiveness was the norm (γ_{22} = -2.60, $p < .01$; γ_{12} = -1.60; $p < .01$).

Because this relationship was attenuated, this cannot be a contributing factor to the divergent rates of sexual behavior among students of different ethnicities. In fact, these results suggest that students of any ethnicity would be more likely engage in sexual behavior if attending a school where sexual permissiveness is the norm and that the relationship between Latino ethnicity and sexual initiation is weakened in such schools. Latino students do seem to be differentially affected by sexual norms than White students, but in the opposite direction that expected given the current rates of sexual behavior. Therefore, future studies may wish to investigate additional explanatory mechanisms for the different rates of sexual behavior among adolescents.

The present study provides a conservative estimate of environmental effects because the school or other environmental factors have likely influenced individual characteristics prior to entering school. For example, school characteristics related to neighborhood composition or parental education may influence the child's development before the *direct* individual experience with schooling. This study only measures the direct relationship between school characteristics and adolescent sexual behavior, and fails to assess the indirect influence of the environment on individual characteristics, which in turn have been documented to predict adolescent sexual behavior.

Shneyderman and Schwartz (2012) investigated the mediation of intrapersonal and contextual predictors of adolescent sexual behavior using the Add Health data, although contextual effects were defined differently in that study than in the present

one. Shneyderman and Schwartz defined contextual effects as parent-adolescent relationship quality (similar to the individual-level attachment to parent and teachers construct in the present study), school connectedness (similar to the individual-level commitment to education construct in the present study), and exposure to sex education. They found that higher quality parent-adolescent relationships indirectly delayed sexual initiation by altering the adolescent's attitudes about sex and increasing knowledge about sex and increased the likelihood of condom use by increasing self-efficacy. School connectedness also delayed sexual initiation by increasing knowledge about sex. In the present study, the effects of commitment to education and attachment to parents and teachers may also have been mediated by knowledge about sex, which was not included in the analyses. Future studies may wish to investigate mediation, include such covariates, and reanalyze the data.

Chen, Thompson, and Morrison-Beedy (2010) also used the Add Health dataset to investigate contextual effects. Like Shneyderman and Schwartz, Chen and colleagues defined contextual effects to be the effects of the attachment to or perception of the family, school, or neighborhood rather than unique environmental contributions above and beyond individual characteristics. Like the present study, Chen, Thompson, and Morrison-Beedy found that engaging in other problem behaviors was the strongest predictor of risky sexual behavior (measured through a composite index of high-risk sexual behavior, such as having unprotected sex). The study did find not peer or school factors to be significant, but did support neighborhood effects. Interestingly, higher parental perceptions of neighborhood safety *increased* the risky sexual behavior composite.

Implications

Because this study found that the school environment is related to student sexual behavior, school-based interventions that aim to change school-level characteristics that instigate adolescent sexual behavior may be useful. For example, because school-level beliefs about engaging in sex were found to be correlated with sexual behavior, then interventions aimed to alter beliefs about sexual norms or sexual norms, themselves, may be helpful. Future research may wish to determine if actual sexual norms or perceived sexual norms are more important.

Specifically, some of the items in the scale measuring motivations to engage in sex may lend insight into the reasons why school-level beliefs are related to sexual behavior and how to mitigate these contextual effects. For example, in schools where the majority of students tend to believe that "if you had sexual intercourse, your friends would respect you more" or "if you had sexual intercourse, it would make you more attractive to women/men," it is easy to see why one might be more likely to engage in intercourse. *Pluralistic ignorance* is a term that has been used to describe the social psychological phenomenon where individuals incorrectly assume that the majority of group holds certain opinions or engages in specific behaviors (Miller & McFarland, 1987). The present study did not investigate the distinction between beliefs actually held (which were investigated here) and perceptions of others' beliefs (which were not investigated). Misperception of sexual norms which exaggerate the sexual behavior of peers in a school environment may be one mechanism through which contextual effects may increase sexual behavior. Therefore it is reasonable to

speculate that research examining pluralistic ignorance and evaluations of educational programming where *actual* beliefs or practices are discussed may be useful.

Limitations

Despite the virtues of this study, there are also several limitations. First, some researchers discourage the use of racial/ethnic categories or dummy codes as they lack conceptual meaning (Helms, Jernigan, & Mascher, 2005). Rather, they suggest using constructs based on group membership (e.g. experienced racism) as independent variables in order to more accurately explain the phenomena being investigated. Future studies may wish to replace the ethnic self-identifications in this study with variables that could conceptually explain the relationship between ethnicity and adolescent sexual behavior. Likewise, future studies may also wish to explore mediation.

Similarly, the extent to which individuals are attached to or invested in their ethnic identification is unexamined in the present research. Different individuals who identify as Latino may elect to do so for varying reasons. Ethnic identity or attachment, in addition to contextual effects, may moderate the relationship between ethnicity and adolescent sexual behavior. Future studies may wish to explore this possibility.

Furthermore, the Latino ethnic group is heterogeneous, such that adolescents whose family of origin is from Argentina may differ greatly from adolescents whose family of origin is from Mexico, even though they may have both chosen the Latino ethnic group to identify themselves. Latino subgroups vary in the social, political, and economic context in which they have immigrated or been received by the host

culture. Future studies may wish to disaggregate the Latino population by their nationality and investigate how the variation in the Latino population affects sexual behavior.

The data used are over 15 years old. Given the age of the dataset, it is necessary to assume that the relationship between contextual factors and individual sexual behavior is likely to be relatively constant. Because support for an environmental influence on sexual initiation was found, future studies may wish to replicate this study using more recent data.

This study also excluded covariates that may be important in explaining the relationship between ethnicity and adolescent sexual behavior, as they were outside the scope of the study. Such variables include, but are not limited to, measures of acculturation, generational status, language use, onset of puberty, and physical attractiveness. Excluding related covariates from the model may result in model misspecification. As a consequence, regression estimates may be biased. Future studies may wish to include one or more of these measures.

Data must be assumed to be potentially missing not at random (MNAR) and, therefore, data imputation procedures may reduce but not eliminate bias. However, using MI procedures is likely to be the least biased of available methods of dealing with missing data that almost always exists in such large datasets (Enders, 2010).

Additionally, these results may to some degree incorporate a statistical artifact. As the mean motivations to engage in sex at the school level approaches the maximum possible score, and the proportion of students who have had sex approach the maximum possible proportion, the regression coefficients will naturally be

attenuated. More importantly in the present data, as the representation of a particular ethnic group in a school approaches 0% or 100%, the within-school slope in the regression of any outcome variable on ethnicity for this group must approach zero. This type of attenuation may be regarded as similar to a ceiling effect and not representative of an actual moderation of the relationship between ethnicity and sexual behavior in schools with an extreme sexual culture.

Finally, sexual norms may exist within the proximal peer group as well as at the school-level. Specifically, adolescents may self-segregate and choose to associate with others who have similar values and beliefs about sexual behavior, regardless of the school norms. This study only investigated the influence of school norms; future studies may wish to examine smaller circles of influence.

Appendix

Table A1

Socioeconomic Status Measure (α = .66)

Item	M	S.D.	Alpha if Item Deleted
Total Household Income	2.99	.33	.56
Maternal Education	2.60	1.19	.53
Paternal Education	2.67	1.24	.51
Food Stamps	.12	-	.67
Housing Subsidy/Public Housing	.03	-	.70

Note: Household income and parental education were scored on a scale of 1 to 5. Food Stamps and Housing Subsidy/Public Housing assessed lifetime prevalence of having received either form of public assistance, and was assessed dichotomously.

Table A2

Problem Behavior Measure ($\alpha = .84$)

Item	M	Alpha if Item Deleted
Paint with graffiti or signs on someone else's property or in a public place	.10	.79
Deliberately damage property that didn't belong to you	.18	.79
Lie to your parents or guardians about where you had been or whom you were with	.54	.80
Take something from a store without paying for it	.25	.78
Get into a serious physical fight	.32	.79
Hurt someone badly enough to need bandages or care from a doctor or nurse	.19	.80
Run away from home	.10	.79
Drive a car without its owner's permission	.11	.79
Steal something worth more than $50	.06	.79
Go into a house or building to steal something	.05	.80
Use or threaten to use a weapon to get something from someone	.04	.80
Sell marijuana or other drugs	.09	.79
Steal something worth less than $50	.21	.78
Take part in a fight where a group of your friends was against another group	.20	.79
Act loud, rowdy, or unruly in a public place	.48	.80

Note: Item responses were collapsed into a dichotomy as the distribution of the raw data was significantly positively skewed. The mean can be interpreted as the proportion of students who responded affirmatively.

Table A3

Commitment to Education Measure (α = .70)

Item	Min	Max	Alpha if Item Deleted
Desire to go to college	-3.34	.56	.67
Likelihood of going to college	-2.73	.74	.66
Recent grade in English	-2.67	1.25	.69
Recent grade in mathematics	-2.28	1.28	.70
Difficulty getting along with teachers	-3.27	.89	.68
Difficulty paying attention in school	-2.68	1.20	.67
Difficulty finishing homework	-2.58	1.11	.66
Difficulty getting along with peers	-3.20	.88	.69

Note: Items assessing difficulties in schools were reverse coded. All items were converted into z-scores ($M = 0$; $SD = 1$), as the range of the responses differed for each item.

Table A4

Attachment to Parents and Teachers Measure (α = .79)

Item	M	S.D.	Alpha if Item Deleted
Adults care about you	4.34	.84	.77
Teachers care about you	3.48	1.00	.79
Your parents care about you	4.78	.58	.78
Your family understands you	3.56	1.03	.75
Your family has fun together	3.70	1.01	.74
Your family pays attention to you	3.9	.93	.73

Note: Items were scored on a five-point scale, with higher scores indicating greater attachment.

Table A5

Authoritative Discipline Measure (α = .63)

Item	M	Alpha if Item Deleted
The people you hang around with	.15	.62
What you wear	.10	.60
How much television you watch	.17	.57
Which television programs you watch	.20	.57
What time you go to bed on week nights	.33	.61
What you eat	.18	.60

Note: Items asked if the participant's parents let him/her make decisions about each behavior, were scored dichotomously, and then reverse coded. The mean can be interpreted as the proportion of respondents indicating that his/her parents do *not* allow them to make such decisions (e.g. exerting *more* parental control).

Table A6

Religiosity Measure (α = .74)

Item	M	S.D.	Alpha if Item Deleted
How often did you attend religious services	2.11	1.08	.62
How important is religion to you	1.73	.78	.68
How often do you pray	2.13	1.28	.70
How often did you attend youth activities in a place of worship	2.86	1.21	.70

Note: Items were scored on a four-point scale, with higher scores indicating greater religiosity.

Table A7

Motivations to Engage in Sex Measure ($\alpha = .73$)

Item	M	S.D.	Alpha if Item Deleted
Your friends would respect you more	3.61	1.01	.72
Your partner would lose respect for you*	2.63	1.10	.73
You would feel guilty*	3.14	1.22	.70
It would upset your mother*	3.99	1.09	.72
It would give you a great deal of physical pleasure	2.72	1.05	.69
It would relax you	3.00	.99	.67
It would make you more attractive to women/men	3.59	.99	.71
You would feel less lonely	3.48	1.03	.71

Note: Items marked with * are reverse coded.

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