

SEXUAL HEALTH KNOWLEDGE OF ADOLESCENTS
FROM DIFFERENT NEIGHBORHOODS

by

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ABSTRACT OF THE THESIS

Sexual Health Knowledge of Adolescent Boys and Girls from Different Neighborhoods

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The present study used data from the National Longitudinal Study of Adolescent Health (Add Health) to estimate the associations of gender to neighborhood sexual health knowledge of 2,808 adolescents. Using multiple regression analyses, we controlled for characteristics such as race, family income, parental education, and neighborhood poverty. We found these factors had modest negative effects on sexual health knowledge. The interaction of gender and average neighborhood sexual health knowledge score showed that girls had higher levels of sexual health knowledge than boys and that their sexual knowledge scores were more affected by neighborhood averages.

INTRODUCTION

Neighborhood Influence on Adolescents

Understanding adolescent sexual knowledge is an important topic, as an understanding of sexual knowledge has a number of implications for health behavior. A dearth of sexual health knowledge may place adolescents at greater risk for negative health outcomes, lower condom use, less academic achievement in school, and even less of an ability to regulate their emotions (Ackerman, Kogos, Youngstrom, Schoff, & Izard, 1999; Duncan, Yeung, Brooks-Gunn, & Smith, 1998). Adolescents who grow up in a lower income neighborhood may be at a greater risk for developing certain negative outcomes and behaviors. An increase in risk of teen pregnancy, sexually transmitted infections (STI), and engagement in risky sexual encounters may be more likely for adolescents from low income neighborhoods (Mayer & Jencks, 1989; Berkman et al, 2011). Similarly, neighborhood-effects may be present in how adolescents learn about sexual health. Adolescent sexual health knowledge is difficult to study and has remained relatively absent in scientific discussions, but sexual health knowledge may indeed be a neighborhood-effect that shows how communities value the health and well-being of their population within a particular neighborhood (Sampson et al., 2002).

Neighborhood perspective is often used to explain what is normal in a community, especially when a phenomenon is prevalent. A social phenomenon in a specific community, like high-risk behavior, can impact those who reside in certain neighborhoods (Sampson et al., 2002). Adolescents from lower socio-

economic neighborhoods often have lower levels of sexual health knowledge. A recent study found that adolescents from low socio-economic neighborhoods are more likely to have less sexual health knowledge than adolescents from well-off neighborhoods (Atkins et al, 2012). Prior literature has mostly examined neighborhood-effects for delinquency, violence, and depression in adolescents (Sampson, Morenoff, & Gannon- Rowley, 2002; Chung & Steinberg, 2006), yet one thing all these prior studies have neglected to address is how the role of gender and sexual health knowledge differs by neighborhood.

Peer Effects in Adolescents

Adolescents, like any group of peers, have the ability to influence motivation, behavior, and thoughts in each other individually or as a group (Eisenkorp 2010). The literature indicates that peer effects for neighborhood adolescents are correlated with certain kinds of factors, such as age of first sexual experience, teen pregnancy, college admissions rates, income, and normative behaviors (Meyer, 1970; Hogan & Kitagawa, 1985; Mayer & Jencks, 1989; Hart, Atkins, & Fegley, 2003). One study on peer effects showed that peers of the same gender had a greater influence in a classroom setting because high-achieving girls were more likely to affect each other in the classroom, but it was unclear whether girls actually had a greater ability to influence one another in different standardized measurements (Lavy, Silva, & Weinhardt, 2012).

Sexual Health Knowledge & Risks

Neighborhoods with lower socio-economic status (SES) tend to correlate with lower grades often because there is a lack of proper educational resources.

These communities tend to have lower levels of knowledge about sexual health due to a lack of proper educational resources (Flay, 2002 and Davis & Niebes-Davis, 2010). On average, adolescents with low grade point averages and residences in high poverty neighborhoods showed a diminished understanding of sexual health knowledge (Atkins et al., 2012 & Lavy et al., 2012). Formal sexual health education can help adolescents delay the age of first intercourse, especially if given early in adolescence (Mueller, Gavin, & Kulkarni, 2008). Neighborhoods with high poverty also have an earlier average age of first sexual intercourse, and adolescents who have their first sexual intercourse at 15-years-old or younger have a much greater risk for teenage pregnancy (Mueller et al., 2008),

Research also suggests that younger adolescents are usually less informed than older adolescents about sexual health and less likely to use a form of contraception (Mueller et al., 2008 & Flay, 2002). Delaying the age of first intercourse significantly increases the frequency of contraception use in future intercourse (Masten, Hubbard, Gest, Tellegen, Garmezy, & Ramirez, 1999). The absence of contraception during first intercourse decreases the use of protection significantly during each additional sexual encounter (Masten et al, 1999 & Muller et al, 2008), and neighborhood adolescents may play an important role in the timing of initial sexual activity. Adolescent peers with higher levels of sexual health knowledge could mean a neighborhood delay in the average age of first intercourse, or even an increase in contraceptive measures during adolescents' initial sexual experience.

Current Study

We developed three hypotheses that we aimed to test from our secondary analysis data. Hypothesis 1 posits that adolescents from neighborhoods with higher average sexual health knowledge would also have higher sexual health knowledge. Next, we explored whether there were sexual health knowledge score differences between adolescents in Time 1 and Time 2. Hypothesis 2 posits that adolescents would have higher levels of sexual health knowledge in Time 2. Lastly, we explored the extent that gender moderated the neighborhood influence on sexual health knowledge levels. Hypothesis 3 posits that adolescent girls on average have higher levels of sexual health knowledge than adolescent boys.

The present study focuses on the role of gender in sexual health knowledge of adolescents with different neighborhoods. More specifically, this study examines how an adolescent's gender mediates the average amount of accurate sexual health knowledge that he or she receives within a certain neighborhood. During secondary analysis, data from the National Longitudinal Study of Adolescent Health (Add Health) was used to explore neighborhood associations of gender and sexual health knowledge of 2,808 adolescents in the United States (Harris, 2009).

METHOD

Participants

The use of Add Health data was approved by Rutgers University's Institutional Review Board for the Department of Psychology. The National Longitudinal Study of Adolescent Health began in 1994. The data used was taken from Wave I and II of the Restricted Use Add Health Data, which is a large school based study of American adolescents in grades 7 through 12 (Harris, 2009). Participants were taken from a subsample of Add Health for whom neighborhood Census tract data was available. All high schools in the United States were eligible to participate in the study, as long as they had an 11th grade with a minimum of 30 adolescents. Ultimately, there were 80 high schools selected for the study. The total sample of high school was stratified by region, urbanicity, school type, race, and size. Urbanicity referred to a school's atmosphere, in terms of rural, suburban, or urban. School type was defined as private, public, or religiously affiliated. High schools were chosen with probability proportional to size (Harris, 2009).

All adolescents in the sample received an in-home questionnaire and in-school questionnaire given by an administrator (Harris, 2009). Our analyses used data from the in-home and in-school questionnaires gathered between September 1994 (Time 1) and December 1995 (Time 2), duration of about 15 months. The Add Health study used a two-stage sampling procedure, which was then stratified. Schools were initially selected for inclusion in the study, and adolescents from

each school were sampled from them. Issues of multicollinearity were not present because no correlations were higher than 0.65.

The full eligible sample includes all Add Health respondents ($n = 20,745$) who were adolescents within grades 7 through 12 during the 1994 school year. Respondents were between the ages of 13 and 18. Individuals with missing data were deleted and removed from the study ($n = 20,424$). Only one child per family was used, so assumptions of independence of observations were not violated by possible confounding variables from including multiple children from the same family ($n = 17,898$) (Kruskal, 1988). Since the sexual health knowledge questionnaire deliberately excluded participants younger than 15-years-old in 1994, any adolescents who did not meet the age requirement were not asked questions regarding sexual health knowledge. Therefore only the oldest child in each family was counted, and the sample size was reduced ($n = 13,454$) by their exclusion.

Our final analytic sample was further restricted by neighborhood clusters and included only individuals who were between 15 and 17-years-old at Time 1 and had lived in the same neighborhood for the entire duration between the two time points ($n = 2,809$). Time 1 was from Wave I in 1994 and Time 2 was from Wave II in 1995. One participant was deleted due to missing data ($n = 2,808$). There were 1,437 boys (51.18%) and 1,371 girls (48.82%) for the final exploratory analysis. The final sample was approximately 59.52% White, 14.99% Black/African-American, 15.74% Hispanic, 0.85% Native American, 4.56% Asian/Pacific Islander, and 4.34% Other.

Measures

Demographic Characteristics

Participants were asked to report their date of birth, gender (dummy variable: *boy* = 0, *girl* = 1), race (dummy variables: *White* = 0; *Black*, *Asian*, *Native American and other* = 1), and ethnicity (dummy variable: 0 = *Non-Hispanic*). Percentages for these categorical variables are presented in Table 1. The yearly family income reported by a parent served to evaluate a family's economic status. Parental education was based off of the mother's highest level of schooling. Education level was measured on a range from 1 (*eighth grade or less*) to 9 (*graduated from 4-year college or university in addition to professional training*). Martial status was based on whether an adolescent's parents were currently and legally married. Means, standard deviations, and ranges for these variables can be seen in Table 2.

Neighborhood Characteristics

In this study, the concept of neighborhood was represented by Census tract. Individuals were living in specific neighborhoods based on their Census tract information. Neighborhood poverty was defined as the percentage of individuals in the Census tract residing in homes with incomes below the federal poverty line. Neighborhood urbanicity was the percentage of the Census tract that was urbanized as opposed to rural or suburbanized (Hart & Marmorstein, 2009). Means, standard deviations, and ranges for these variables can be seen in Table 2.

Sexual Health Knowledge

A variable was created for sexual health knowledge by compiling answers and scores from individual respondents based on the questions provided in the Add Health, *Section 19: Knowledge Quiz* (Atkins et al, 2012). Sexual health knowledge served as the dependent variable. The average of the correct versus incorrect answers was used to calculate individual scores. Answers were coded 1 and 0 and the score for each subject was calculated by summing correct response as a final score. Individual final scores were totaled for each neighborhood and used to create the average neighborhood scores. For instance, Add Health participants responded to questions such as, “Even if the man pulls out before he ejaculates (even if ejaculation occurs outside of the woman’s body), it is still possible for the woman to become pregnant” (see Figure 2).

Adolescents’ responses to knowledge-based and perception questions about sexual health were averaged by neighborhood. This questionnaire was used in Waves I and II and consisted of ten true and false questions about sexual habits, beliefs, and behaviors (Figure 2). Each question was broken down into two parts. The first part represented the actual question, and the second part asked how confident the adolescent was in the answer. If a respondent refused to answer, the question was labeled as missing, but a response of “don’t know” equated to an incorrect answer. Questions gauged the sexual health knowledge from a sexual health knowledge quiz for an adolescent’s understanding of sexual activity, knowledge of reproductive biology, and risk of possible consequences of sexual interactions (Add Health, 2008).

Analytic Plan

In this study, we first controlled for certain variables. While not directly related to sexual health knowledge factors of poverty, urbanicity, race, ethnicity, siblings, parental education, family income, and marital status of parents might contribute. We expected that limiting the influence of these factors was important to test whether or not adolescent sexual health knowledge was associated with neighborhood sexual health knowledge and gender over a 15 month period during adolescence. We then focused on adolescents, who were at least 15, and had taken the sexual health knowledge quiz. Census tract neighborhoods were categorized as clusters of the population. Clusters were small and formed from a much larger structure. Prior to our analysis, an average score was calculated for each neighborhood. An average neighborhood score was constructed if there were at least five adolescents with counted scores on the sexual health knowledge quiz. We expected that adolescents who lived in a neighborhood with higher-than-average sexual health knowledge would be more likely to have higher levels of sexual health knowledge.

Finally, half the final population was randomly selected in order to standardize the average sexual health knowledge scores of each neighborhood by each adolescent age. This process served to directly compare the average scores of adolescents of a specific age to one another in each neighborhood. Adolescent sexual health knowledge scores were only tallied for individuals who remained in the same neighborhood for the duration of 15 months between Time 1 and Time 2. Adolescents were organized into two groups according to gender, and their

scores were plotted. The averages were split into two groups (boys and girls) for gender comparisons. Data was then submitted to the multiple regression analysis.

RESULTS

Descriptive Statistics

Table 2 portrays the mean, standard deviations, and ranges of the nine variables by gender: siblings, parental education, married parents, percent of neighborhood poverty, percent of neighborhood urbanicity, percent of adolescents under 15, adolescent sexual health knowledge score at time 1 tract, adolescent sexual health knowledge score at time 2, and adolescent sexual health knowledge score at time 1. Alpha ($r = \sim 0.36$) was the Cronbach Coefficient reported adolescent sexual health knowledge at time 2.

Regression Analysis

A multiple regression analysis was conducted on sexual health knowledge scores, in which a change score was calculated by subtracting score at Time 2 from score at Time 1. The scores were then submitted to the regression equation with the interaction of gender and neighborhood sexual health knowledge as factors that yielded a main effect for adolescent sexual health knowledge (Table 3). We expected that adolescents would have higher levels of sexual health knowledge at Time 2. Hypothesis 1 turned out to be false. Adolescents did not automatically have higher levels of sexual health knowledge if they grew up in a neighborhood that had higher levels of sexual health knowledge. This idea was true for girls, but false for boys. We predicted in Hypothesis 2, adolescents had higher levels of sexual health knowledge at Time 2 then at Time 1. Both boys and girls exhibited increases in average sexual health knowledge independently of their neighborhood's respective knowledge score at Time 2.

As shown in Figure 1, the Y-value for adolescent sexual health knowledge (Time 2 - Time 1) was positive, meaning that both boys and girls improved their average sexual health knowledge scores. Surprisingly, we found that while girls' improvement was higher when living in a neighborhood with higher levels of sexual health knowledge (Time 2 - Time 1 = ~ 0.07 in low knowledge neighborhood; Time 2 - Time 1 = ~ 0.21 in high knowledge neighborhood). The opposite effect was true for boys, who improved less when living in a high sexual knowledge neighborhood than in a low knowledge neighborhood. However, boys still improved their sexual health knowledge scores overall regardless neighborhood they live in (Time 2 - Time 1 = ~ 0.18 in low knowledge neighborhood; Time 2 - Time 1 = ~ 0.10 in high knowledge neighborhood). We expected that girls would have higher levels of sexual health knowledge than boys. As predicted in Hypothesis 3, on average girls had higher levels of sexual health knowledge than boys from the same neighborhood.

The present study discovered a previously unknown interaction between time, gender, and neighborhood knowledge. Over time, boys do not improve their levels of sexual health knowledge as much as girls do. This is important because it shows growing up in a neighborhood with high levels of sexual health knowledge provides a beneficial increase for girls' sexual health knowledge, but boys need to be afforded better resources for their understanding of sexual health. Table 3 presents that there were other potentially detrimental factors that were not considering in the original hypotheses that may contribute to lower levels of

sexual health knowledge such as being a Hispanic adolescent who comes from a lower income family with less educated parents.

DISCUSSION

The sexual health knowledge scores of adolescent girls are more influenced by the average sexual health knowledge scores of adolescents in a neighborhood than are the scores of boys. Gender seems to moderate the association between average neighborhood sexual health knowledge scores and an adolescent's sexual health knowledge score. There are several factors to be considered in this type of neighborhood-effect. Perhaps the most important factor to consider in this neighborhood-based gender knowledge gap is the location of potential information. Where do adolescents get their information about sexual health, and how can we improve the quality of that information?

School Environment on Adolescent

Access to appropriate sexual health information in schools and encouraging affordable preventive safety measures, such as condoms, provides opportunities to make better informed decisions about sexual behavior (Davis & Niebes-Davis, 2010). School districts with fewer resources are less likely to inform adolescents about sexual health knowledge and may increase their sexual health risk. Less affluent neighborhoods tend to have more crowded schools and are often expected to do more with fewer resources (Shumow, Vandell, & Posner, 1999). Successful learning is less likely to occur or be sought if classrooms are cluttered, noisy, and disorderly (Ibbotson, 2011) because quality information is more difficult to distribute and accurate information harder to absorb (Eisenkorp 2010). The same type of classroom environment can cause wrong information to be absorbed by adolescents in a sexual education class, where adolescents gather

information from their peers instead of their teacher. Similarly, peer expectations could help uncover why factually incorrect “common sense knowledge” exists. Untrue adolescent sexual health knowledge may persist in this kind of learning environment.

Sexual Health Influences of Peers

The type of sexual conversations and information that gets absorbed through peer interactions within neighborhoods may vary by gender (Wight, 1994; Walker, 2001; Sandoval-Lewis, 1998; & Bogle, 2008). Conversations about sexual health often occur among with adolescents of the same gender, and girls talk about sex-related topics among themselves significantly more than boys (Kapungu, 2010). A lack of quality sexual health information can lead to serious public health implications for adolescents, such as misperceptions about sexual health risk, contraception use, and higher teen pregnancy rates.

An understanding of sexual health knowledge equips developing adolescents with better information to make safer decisions (Walker, 2001). Boys may speak publicly about sex to each other through the lens of conquest, objectification, and exploits regardless of their private beliefs on the topic (Wight, 1994). Girls may talk more deeply amongst themselves about the complexity and significance of intimate topics due to the extra value that they place on both friendship and clear communication over their boy counterparts (Claes & Poirier, 1993). The dynamic that exists in girls’ communications with one another could play a major role in curbing risky sexual behaviors, even when boys are also inadequately informed (Frost & Darroch, 2008). Girls’ communication intimacy

is often mirrored by the interactions and conversations had with their mothers (Kapungu, 2010).

Parental Influence on Health Knowledge

As presented in Table 3, lower levels of parental education may decrease an adolescent's sexual health knowledge. Research suggests gender does, in fact, matter for parent and child conversations about sexual health (Sandoval-Lewis, 1998). In other words, a parent's gender triggers different conversations with sons versus daughters. Mothers speak with their sons about sex less than they do with their daughters, and fathers rarely speak to their daughters about sex (Kapungu, 2010). Mothers are also typically the parent who talks about sexual health to their children (Walker, 2001). Fathers who do speak to their sons about sex often ignore emotional implications and focus solely on physical issues like protection against pregnancy (Wight, 1994). It may be the case that boys who do not have an active father or father figure do not have the opportunity for these types of conversations about sex.

Risk of Teen Pregnancy & Sexually Transmitted Infections

A lack of sexual health knowledge was correlated with greater risk for teenage pregnancy (Ryan, Franzetta, & Manlove, 2007). Teenage girls of color disproportionately live in low SES neighborhoods, which may be why they represent a large portion of teen pregnancies (Hogan & Kitagawa, 1985). The lack of sexual health knowledge was largely due to underfunded schools, lack of education sexual health education resources, and negative peer influence to corrode the social acceptance of sex without protection. Hogan et al also found

that 67% of black 15 and 16-year-olds whose classrooms had a majority of black adolescents stated that they had already lost their virginity (Furstenberg, Morgan, Moore, & Peterson, 1987).

Sometimes peers are more influential in early condom use than parents, families, or schools (Gilmore et al., 2011). Despite sexual health education in school, information about sex is largely gathered from peers (Flay, 2002). Gilmore and Flay suggest sexual health education in schools is significant. School districts need available information resources to educate adolescents; however adolescents still seek sexual health knowledge elsewhere from less qualified peers. Since the average adolescent has a lower level of understanding sexual health knowledge than an adult, the adolescent peer often serves as an inaccurate information resource (Frost & Darroch, 2008). Repeating incorrect sexual health knowledge in conversation as if it were true can increase adolescent sexual health risks of pregnancy or sexually transmitted infections (Ryan, Franzetta, & Manlove, 2007).

Limitations

Our study focused on how adolescents are affected by the information in their neighborhood community. Effect size is small in magnitude. Adolescents most likely did not influence the information available in the neighborhood themselves. Similarly, we were unable to discern if stereotyped gender roles in mating played a part in adolescent sexual health knowledge. It may be the case that boys are expected to “just know about sex,” and therefore are less likely to seek out information from credible sources. Personality could also be a

component of how sexually active boys and girls wish to be, so perhaps extraverts have better sexual health information because they have more sexual experiences. We think our findings suggest that enhanced meanings for conveying sexual health information will increase overall knowledge scores for both boys and girls.

We do not know what factors are responsible for the knowledge gap between boys and girls, especially adolescents from the same neighborhood, who may have access to the exact same resources. It is also unclear whether these gains are real gains in sexual health knowledge or reflective of other factors. Knowledge-based tests measure content but can be unintentionally influenced by other variables. Additionally, we cannot predict whether the gains in sexual health knowledge for girls will remain stable or change in the future. Further investigation is needed as sexual health knowledge could stagnate around a certain age or life experiences. A deep understanding of sexual health is a complex and constantly changing variable because of the nature of how the information is collected over time.

Conclusion

Ultimately, this study improves upon what we know about adolescent sexual health knowledge, and shows adolescent boys' sexual health knowledge has room for improvement. Adolescents need to have access to factually correct and high quality information about sexual health, whether it is from formal sexual health education in school, government health services, non-profits, non-governmental organizations, or their parents. Adolescents should not have to rely on their peers who may be just as clueless and curious as they are. Inaccurate

information can have serious consequences for developing youth already burdened with difficult decisions about their future.

Open and honest conversation to adolescents about sexual health may also help the emotionally tumultuous transitions of puberty and hormones. Emotional intimacy is already a difficult and confusing topic, so it is important to prepare adolescents for the role of emotions in physical intimacy. It is unrealistic to believe that adolescents will not engage in sexual activity, so providing them with the tools to make smarter decisions will allow more of them to protect themselves against unwanted pregnancies and sexually transmitted infections.

APPENDICES

Table 1
Breakdown of Gender, Race, and Ethnicity

Gender	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Boys	1437	51.18	1437	51.18
Girls	1371	48.82	2808	100

Race	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not White/Caucasian	1137	40.48	1671	40.48
White/Caucasian	1671	59.52	2808	100

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Black/African American	2387	85.01	2387	85.01
Black/African American	421	14.99	2808	100

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Hispanic	2366	84.26	2366	84.26
Hispanic	442	15.74	2808	100

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Native American	2784	99.15	2784	99.15
Native American	24	0.85	2808	100

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Asian/Pacific Islander	2680	95.44	2680	95.44
Asian/Pacific Islander	128	4.56	2808	100

	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not Multiracial	2686	95.66	2686	95.66
Other	122	4.34	2808	100

*Rounded to nearest hundredth

Table 2
Descriptive Statistics for Adolescents and Neighborhoods

Gender	N Obs	Variable	N	Mean	Std Dev	Minimum	Maximum
Boys	1437	Family Income	1437	3.64	0.87	0	6.91
		Siblings	1437	1.31	1.12	0	7
		Parental Education	1437	5.05	1.93	1	8
		Married Parents	1437	0.71	0.46	0	1
		Percent of Neighborhood Poverty	1437	11.18	9.59	0	55
		Percent of Neighborhood Urbanicity	1437	0.55	0.5	0	1
		Percent of Adolescents Under 15	1437	22.52	3.64	10.9	33.84
		Adolescent Sexual Health Knowledge Score at Time 1 Tract	1437	-0.01	0.43	-1.36	1.23
		Adolescent Sexual Health Knowledge Score at Time 2	1437	0.11	0.91	-3.5	2.13
		Adolescent Sexual Health Knowledge Score at Time 1	1437	-0.01	0.97	-3.18	2.19
		Family Income	1371	3.57	0.81	0	6.69
		Siblings	1371	1.33	1.04	0	10
		Parental Education	1371	4.96	1.89	1	8
		Married Parents	1371	0.7	0.46	0	1
Girls	1371	Percent of Neighborhood Poverty	1371	12.38	10.45	0	57
		Percent of Neighborhood Urbanicity	1371	0.57	0.5	0	1
		Percent of Adolescents Under 15	1371	22.7	4.04	12.06	37.69
		Adolescent Sexual Health Knowledge Score at Time 1 Tract	1371	-0.03	0.44	-1.64	1.23
		Adolescent Sexual Health Knowledge Score at Time 2	1371	0.13	0.99	-3.49	2.13
		Adolescent Sexual Health Knowledge Score at Time 1	1371	0.06	1.02	-3.35	2.19

*Rounded to nearest hundredth

Table 3
Multiple Regression Analysis of Adolescent Sexual Health Knowledge Score at Time 2, Controlling for Knowledge at Time 1

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	17	555.54	32.68	46.4	<.0001
Error	2790	1964.94	0.7		
Corrected Total	2808	2520.48			

R-Square	Coefficient Variable	Root MSE	Sexual Health Knowledge Score at Time 2 Mean
0.22	711.89	0.84	0.12

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age at Time 1	1	1.59	1.59	2.26	0.13
Female	1	0.03	0.03	0.04	0.85
Black/African American	1	1.68	1.68	2.39	0.12
Hispanic	1	4.03	4.03	*5.72	0.02
Native American	1	0.78	0.78	1.1	0.29
Asian/Pacific Islander	1	1.08	1.08	1.54	0.21
Other	1	0.59	0.59	0.84	0.36
Family Income	1	4.13	4.13	*5.87	0.02
Siblings	1	0.05	0.05	0.07	0.79
Parental Education	1	4.65	4.65	**6.6	0.01
Married Parents	1	0.4	0.4	0.57	0.45
Percent of Neighborhood Poverty	1	2.29	2.29	3.26	0.07
Percent of Neighborhood Urbanicity	1	0.23	0.23	0.32	0.57
Percent of Adolescents Under 15	1	0.0001	0.0001	0	0.99
Adolescent Sexual Health Knowledge Score at Time 1 Tract	1	1.59	1.59	2.26	0.13
Female*Sexual Health Knowledge Score Interaction	1	6.15	6.15	***8.73	0.003
Adolescent Sexual Health Knowledge Score at Time 1	1	437.95	437.95	***621.84	<.0001

~Rounded to nearest hundredth

*p < .05.

**p < .01.

***p < .001.

Table 4
Multiple Regression Analysis Estimates and Standard Error

Parameter	Estimate	Standard Error
Intercept	0.15	0.04
Age at Time 1	0.03	0.02
Female	0.006	0.03
Black/African American	-0.08	0.05
Hispanic	-0.12	0.05
Native American	0.18	0.18
Asian/Pacific Islander	0.1	0.08
Other	0.07	0.08
Family Income	0.06	0.02
Siblings	0.004	0.02
Parental Education	0.03	0.01
Married Parents	-0.03	0.04
Percent of Neighborhood Poverty	-0.003	0.002
Percent of Neighborhood Urbanicity	-0.02	0.04
Percent of Adolescents Under 15	4.9E-05	0.004
Adolescent Sexual Health Knowledge Score at Time 1		
Tract	-0.08	0.05
Female*Sexual Health Knowledge Score Interaction	0.21	0.07
Adolescent Sexual Health Knowledge Score at Time 1	0.41	0.02

*Rounded to nearest hundredth

Table 5
Descriptive Statistics for Adolescents and Neighborhoods at Time 1

Variables at Time 1	N	Mean	Std Dev	Minimum	Maximum
Age	2808	15.9	0.78	15	17
Siblings	2808	1.32	1.08	0	10
Family Income	2808	3.61	0.84	0	6.91
Parental Education	2808	5	1.91	1	8
Percent of Adolescents Under 15	2808	22.61	3.84	10.9	37.69
Percent of Neighborhood Poverty	2808	11.77	10.03	0	57
Percent of Neighborhood Urbanicity	2808	54.24	47.52	0	100
Percent of College Educated	2808	22.84	12.07	3	73
Adolescent Sexual Health Knowledge Score	2808	0.02	1	-3.35	2.19

*Rounded to nearest hundredth

Table 6
Simple Statistics for Variables Used

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
Siblings	2808	1.32	1.08	3710	0	10
Parental Education	2808	5	1.91	14053	1	8
Married Parents	2808	0.7	0.46	1971	0	1
Percent of Neighborhood Poverty	2808	11.77	10.03	33038	0	57
Percent of Neighborhood Urbanicity	2808	0.56	0.5	1575	0	1
Percent of Adolescents Under 15	2808	22.61	3.84	63489	10.9	37.69
Adolescent Sexual Health Knowledge Score at Time 1 Tract	2808	-0.02	0.44	-61.62	-1.64	1.23
Adolescent Sexual Health Knowledge Score at Time 2	2808	0.12	0.95	331.02	-3.49	2.13
Adolescent Sexual Health Knowledge Score at Time 1	2808	0.02	1	63.43	-3.35	2.19

*Rounded to nearest hundredth

Table 7
Correlations Among of the Nine Variables of the Regression Equation

Pearson Correlation Coefficients, N = 2808
Probability > |r| under H0: Rho=0

	Siblings	Parental Education	Married Parents	Percent of Neighborhood Poverty	Percent of Neighborhood Urbanicity	Percent of Adolescents Under 15	Adolescent Sexual Health Knowledge Score at Time 1 Tract	Adolescent Sexual Health Knowledge Score at Time 2	Adolescent Sexual Health Knowledge Score at Time 1
Siblings	1	-0.07	0.14	-0.01	***0.08	0.057	0.0006	-0.02	-0.04
		0.0002	<.0001	0.61	<.0001	0.003	0.97	0.23	0.03
Parental Education	-0.07	1	0.1	***-0.19	-0.002	-0.04	***0.09	***0.14	***0.11
	0.0002		<.0001	<.0001	0.9	0.04	<.0001	<.0001	<.0001
Married Parents	0.14	***0.1	1	***-0.17	-0.05	0.06	0.04	0.02	-0.01
	<.0001	<.0001		<.0001	0.01	0.002	0.05	0.32	0.51
Percent of Neighborhood Poverty	-0.01	***-0.2	-0.17	1	***-0.24	0.06	***-0.24	***-0.13	***-0.12
	0.61	<.0001	<.0001		<.0001	0.003	<.0001	<.0001	<.0001
Percent of Neighborhood Urbanicity	0.08	-0.002	-0.05	***-0.24	1	***-0.21	-0.03	-0.006	0.01
	<.0001	0.9	0.01	<.0001		<.0001	0.09	0.74	0.54
Percent of Adolescents Under 15	0.06	-0.04	0.06	0.06	***-0.21	1	***0.12	0.02	0.03
	0.003	0.04	0.002	0.003	<.0001		<.0001	0.38	0.15
Adolescent Sexual Health Knowledge Score at Time 1 Tract	0.0006	***0.09	0.04	***-0.24	-0.03	***0.12	1	***0.1	***0.15
	0.97	<.0001	0.05	<.0001	0.09	<.0001		<.0001	<.0001
Adolescent Sexual Health Knowledge Score at Time 2	-0.02	***0.14	0.02	***-0.13	-0.006	0.02	***0.1	1	***0.45
	0.23	<.0001	0.32	<.0001	0.74	0.38	<.0001		<.0001
Adolescent Sexual Health Knowledge Score at Time 1	-0.04	***0.11	-0.01	***-0.12	0.02	0.03	***0.15	***0.45	1
	0.03	<.0001	0.51	<.0001	0.54	0.15	<.0001	<.0001	

*Rounded to nearest hundredth

***p < .001.

Figure 1. The interaction of gender and sexual health knowledge.

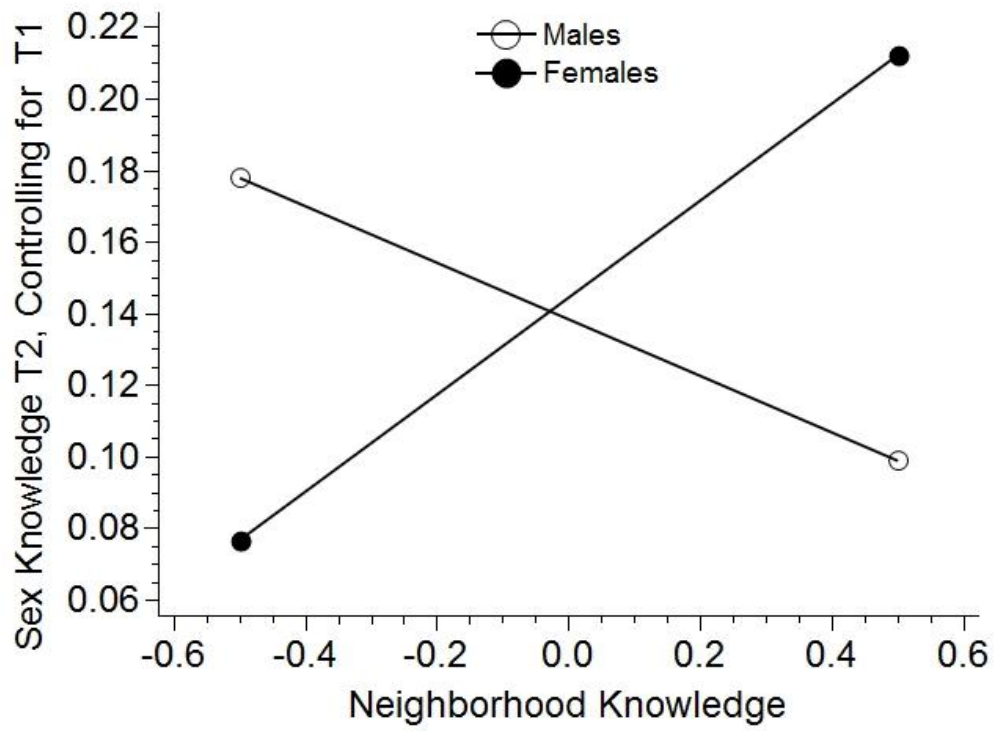


Figure 2. In home questionnaire code book, S.19 section 19: knowledge quiz.

“Section 19—which is a factual quiz about contraception—is administered only to respondents who are at least 15 years old.

The following questions examine your knowledge on pregnancy and birth control. This is not a test. Please answer each question to the best of your ability. For each of the following statements, please tell me if you think it is true or false.

This section is administered if AGE \geq 15”.

1a. When a woman has sexual intercourse, almost all sperm die inside her body after about six hours. **H1KQ1A**

- 1 true
- 2 false <the correct answer>
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

1b. How confident are you that your answer is correct? **H1KQ1B**

- 1 very
- 2 moderately
- 3 slightly
- 4 not at all
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

2a. When using a condom, the man should pull out of the woman right after he has ejaculated (come). **H1KQ2A**

- 1 true <the correct answer>
- 2 false
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

2b. How confident are you that your answer is correct? **H1KQ2B**

- 1 very
- 2 moderately
- 3 slightly
- 4 not at all
- 6 refused

- 7 legitimate skip
- 8 don't know
- 9 not applicable

3a. Most women's periods are regular, that is, they ovulate (are fertile) fourteen days after their periods begin. **H1KQ3A**

- 1 true
- 2 false <the correct answer>
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

3b. How confident are you that your answer is correct? **H1KQ3B**

- 1 very
- 2 moderately
- 3 slightly
- 4 not at all
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

4a. Natural skin (lamb skin) condoms provide better protection against the AIDS virus than latex condoms. **H1KQ4A**

- 1 true
- 2 false <the correct answer>
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

4b. How confident are you that your answer is correct? **H1KQ4B**

- 1 very
- 2 moderately
- 3 slightly
- 4 not at all
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

5a. When putting on a condom, it is important to have it fit tightly, leaving no space at the tip. **H1KQ5A**

- 1 true
- 2 false <the correct answer>

- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

5b. How confident are you that your answer is correct? **H1KQ5B**

- 1 very
- 2 moderately
- 3 slightly
- 4 not at all
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

6a. Vaseline can be used with condoms, and they will work just as well.

H1KQ6A

- 1 true
- 2 false <the correct answer>
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

6b. How confident are you that your answer is correct? **H1KQ6B**

- 1 very
- 2 moderately
- 3 slightly
- 4 not at all
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

7a. The most likely time for a woman to get pregnant is right before her period starts. **H1KQ7A**

- 1 true
- 2 false <the correct answer>
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

7b. How confident are you that your answer is correct? **H1KQ7B**

- 1 very
- 2 moderately

- 3 slightly
- 4 not at all
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

8a. Even if the man pulls out before he ejaculates (even if ejaculation occurs outside of the woman's body), it is still possible for the woman to become pregnant. **H1KQ8A**

- 1 true <the correct answer>
- 2 false
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

8b. How confident are you that your answer is correct? **H1KQ8B**

- 1 very
- 2 moderately
- 3 slightly
- 4 not at all
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

9a. As long as the condom fits over the tip of the penis, it doesn't matter how far down it is unrolled. **H1KQ9A**

- 1 true
- 2 false <the correct answer>
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

9b. How confident are you that your answer is correct? **H1KQ9B**

- 1 very
- 2 moderately
- 3 slightly
- 4 not at all
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

10a. In general, a woman is most likely to get pregnant if she has sex during her period, as compared with other times of the month. **H1KQ10A**

- 1 true
- 2 false <the correct answer>
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

10b. How confident are you that your answer is correct? **H1KQ10B**

- 1 very
- 2 moderately
- 3 slightly
- 4 not at all
- 6 refused
- 7 legitimate skip
- 8 don't know
- 9 not applicable

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