What predicts sex partner age differences among African American youth? A longitudinal study from adolescence to young adulthood

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Abstract

Partner age is associated with youth's sex risk behaviors and sexually transmitted infections. At present, however, we do not know whether the co-occurrence of other risk behaviors is associated with having older sex partners during adolescence and young adulthood. Using growth curve modeling, we first described the shape of the age difference between participants and their sex partners across adolescence and young adulthood in a sample of African American youth. Second, we tested whether this model varied systematically by sex, mother's education, and high school dropout. Third, we assessed whether age differences were associated with youth's self-acceptance, alcohol use, and employment trajectories over these two developmental periods. Finally, we tested whether these associations had non-proportional effects over both periods. We modeled sex partners' age differences non-linearly, with females being more likely to date older partners at baseline and over time. High school dropouts also reported older partners at baseline. Self-acceptance and the number of hours worked were associated with sex partners' age differences over time, with the effect decreasing over young adulthood years. Alcohol use frequency was also associated with having older partners over time. We discuss the findings from a health perspective on youth's sexual development.

Keywords

Adolescence; self-esteem; employment; HIV; partner; African American; alcohol

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Introduction

During adolescence, youth explore their sexuality by pursuing romantic interests, exploring their sexual identity, and engaging in sexual relationships. As adolescents transition into young adulthood, the exploration of sexuality becomes less restricted prior to settling into stable relationships such as marriage (Arnett, 2000), yet their healthy sexual development may be limited by risks and vulnerabilities present in their social contexts (Aggleton, 2004; Alan Guttmach Institute, 2005). Youth from disadvantaged backgrounds (i.e., racial/ethnic minorities and lower socioeconomic position) are more likely to be exposed to social, physical, and economic risks that may limit youths' safer sex decision-making and increase their vulnerability to HIV/AIDS, sexually transmitted infections (STI), and unintended pregnancies. In the United States, African Americans have approximately ten times greater risk for HIV infection than their White counterparts (CDC, 2007). These racial differences are even greater when stratified by sex. African American men are eight times more likely to contract HIV than their White male counterparts. Among women, African Americans are 25 times more likely to be infected than their White counterparts. HIV infection is also patterned by socioeconomic status, with adolescents' and young adults' HIV and STI incidence decreasing as parents' socioeconomic status increases and youth complete their high school education (Ford & Lepkowski, 2004). These disparities highlight the importance of developing effective HIV/STI prevention and sex education messages that are informed by empirical research exploring how sexual risk-taking behavior occurs among youth and their sexual partners.

Sex partners' age and sexual risk-taking behaviors

As youth pursue and engage in sexual relationships during adolescence and young adulthood, they may develop sexual relationships with younger and/or older partners. While researchers and policy-makers have suggested that age differences between youth and their sex partners may serve as a marker of sexual power imbalances, the association between partners' age and sexual risk-taking behavior has focused on the detrimental relationship between older partners and youth. Researchers have found older sex partners are associated with increased sex risk behaviors, including earlier sexual debut (Rich & Kim, 2002), lower condom and contraceptive use (DiClemente et al., 2001), STI history (Ford & Lepkowski, 2004), and intimate partner violence (Gielen, McDonnell, & O'Campo, 2002). Nonetheless, these findings are inconsistent across studies. Kissinger and colleagues (2002), for example, found no evidence to suggest that older partners were associated with recurrence of Chlamydia.

The variability across study findings may be attributable to sample characteristics, including the age and gender of participants, the measurement and operationalization of partner age, and the study design. Concerning age, for example, Kaestle, Morisky and Wiley (2002) found that the magnitude of the association between partner's age and sex risk decreased as youth grow older. In addition, most studies have focused solely on females; as result, we do not know how partner age differences vary across sex as well as by other demographic characteristics (i.e., socioeconomic status and education) associated with HIV/STI risk. As we know relatively little regarding what predicts sex partners' age differences across adolescence and young adulthood, we explored whether sex partners' age differences vary by youths' sex, mother's educational attainment, and/or high school dropout.

Most researchers studying sex partners' age have operationalized sex partner age as a categorical variable (i.e., partner is two or more years younger, partner is of same age or less than two years apart, partner is two or more years older). Limiting sex partners' age to these arbitrary categorical values, however, masks the relationship between sex partners' age and

sex risk behaviors and limits our ability to identify a threshold where age differences between youth and their partners may become deleterious. In an attempt to rectify this measurement concern, Kaestle and colleagues (2002) proposed an age gap measure that accounted for the difference in age between female respondents and their romantic sex partners (e.g., positive values in their measure indicated having an older sex partner). Their results suggest that female participants with older partners were more likely to report sexual intercourse than participants with younger or same-aged partners. Unfortunately, the "age gap" measure used in their analyses was truncated in the left tail of the distribution as they chose to group participants with partners of similar age (i.e., age gap is close to zero) and participations with partners of a younger age (i.e., age gap is a negative value). While this operationalization of age differences is noteworthy, it assumes that youth with partners of a similar or younger age are homogeneous and limits our ability to assess any potential risks or benefits that may result when youth have a younger partner. Consequently, we follow Kaestle and colleagues' (2002) approach to study sex partners' age differences as a continuous variable without truncating the distribution so that positive values represent older sex partners and negative values reflect younger sex partners.

Most studies reporting data on sex partner age differences employ cross-sectional designs (Ford & Lepkowski, 2004), limiting our understanding of the cumulative, long-term effects of age differences on youth's sexual development across adolescence and young adulthood. Recently, Bauermeister and colleagues (in press, a) studied the effects of sex partners' age on various sex risk behaviors (i.e., condom use frequency, sexual intercourse frequency, and number of partners) in a prospective sample of African American male and female youth followed from mid-adolescence to young adulthood. In their study, they found that having older sex partners was associated with decreased condom use frequency, increased sexual intercourse frequency, and greater number of sex partners across adolescence and young adulthood. They did not account, however, for competing arguments that could explain their findings. Youth may increase their HIV/STI risks as they explore their sexuality, yet these increases parallel other developmental changes such as decreases in self-esteem(Galambos, Barker, & Krahn, 2006), increases in alcohol use frequency (Stewart & Power, 2003), and greater exposure to adults as they begin to participate in the labor force (Bauermeister, Zimmerman, Barnett, & Caldwell, 2007). In this study, we model sex partners' age differences from middle adolescence to young adulthood and test whether the age difference is associated with predictors of sexual risk-taking behavior (i.e., alcohol use, self-acceptance, and labor force participation) in a prospective sample of African American youth living in an urban city in the Midwest.

Self-Esteem and Sex Risk

Rosenberg (1965) defined self-esteem as the extent to which an individual values and accepts his/her self-worth. The importance of self-esteem in youth's well-being seems to vary as they transition from adolescence into young adulthood. Decreases in self-esteem during adolescence have been associated with greater risk outcomes. Recent evidence, however, suggests that these dips are temporary with most youth regaining their self-esteem as they settle into their social identities during young adulthood (Galambos et al., 2006). In addition, researchers have found that levels of self-esteem vary by race and gender during adolescence and young adulthood. In a nationally representative sample of eighth graders participating in the National Education Longitudinal Study, African American youth had higher self-esteem than White and Latino/Hispanic counterparts across adolescence (Birndorf, Ryan, Auinger, & Aten, 2005). Females also tend to have lower self-esteem than males over adolescence, yet they are more likely to recover their self-esteem at a faster rate than their male counterparts during the young adulthood years (Galambos et al., 2006).

Current public health efforts seeking to mitigate the risk of HIV/STI transmission have focused on decreasing youth's risk by delaying their sexual debut (Sandfort, Orr, Hirsch, & Santelli, 2008) and/or increasing their consistent condom use (Kirby, Laris, & Rolleri, 2007). In an urban sample of junior high school youth, males with higher self-esteem during early adolescence reported earlier sexual debut than their counterparts with lower self-esteem, while females with higher self-esteem during early adolescence reported later sexual onset than their counterparts with lower self-esteem (Spencer, Zimet, Aalsma, & Orr, 2002). Similarly, increased self-esteem among African American middle to late adolescent females was associated with more positive attitudes toward safer sex behaviors such as condom use, communication with their sex partners, and their self-efficacy to use condoms (Salazar et al., 2005). These results raise questions about whether self-esteem provides males with confidence to become sexually active, or if sexual activity enhances their self-esteem. For females, however, it is unclear if self-esteem helps them negotiate their sexual encounters more safely, or if safe sexual activity enhances their self-esteem.

Self-acceptance, a subcomponent of self-esteem, is a vital element for well-being (Ellis, 1995) and reflects how an " individual fully and unconditionally accepts himself whether or not he behaves intelligently, correctly, or competently and whether or not other people approve, respect, or love him" (Ellis, 1977, pg. 101). Greater self-acceptance allows individuals to acknowledge that they are fallible and to reduce the salience of other people's approval when carrying out a behavior (e.g., pressure into not using a condom). Self-acceptance may be a necessary but insufficient condition to improve overall self-esteem (Haney & Durlak, 1998). Nonetheless, youth self-acceptance has been a common component within adolescent HIV/STI prevention efforts as it is posited to be a protective factor against sex risk behaviors (Fergus & Zimmerman, 2005; Salazar et al., 2005; Schulenberg, Maggs, & Hurrelmann, 1997; Zimmerman, Copeland, Shope, & Dielman, 1997). An untested association is whether self-acceptance is associated with sex partner age. For instance, males with lower self-acceptance may seek younger female partners, whereas females with low self-acceptance may pursue older sex partners across adolescence. As male and female youth solidify their adult identity and recover their self-acceptance during the young adulthood years, however, sex partners' age differences may decrease. In this study, we test this hypothesis by exploring the prospective association between self-acceptance and sex partners' age differences over time and assess whether this association varies across gender, age, and educational attainment.

Alcohol Use and Sex Risk

Alcohol use increases youth's vulnerability to HIV/STIs and unintended pregnancies by reducing their ability to negotiate sexual encounters safely. Increased frequency of alcohol use across adolescence and young adulthood has been associated with earlier sexual onset(Stewart & Power, 2003), increased sexual intercourse frequency(Graves & Leigh, 1995), greater inconsistent condom use, multiple sex partners, lower HIV knowledge, and a previously diagnosed STI(Morrison, DiClemente, Wingood, & Collins, 1998). Interestingly, African American youth report lower alcohol use frequency and quantity than their White American and Hispanic American counterparts(Stewart & Power, 2003). One tentative explanation for these findings is that African American youth are less likely to use alcohol than their White and Hispanic American counterparts are because they have a lesser need to drink as a coping mechanism to alleviate the stress associated with the loss in self-acceptance.

Youth with older sex partners, particularly females, may be at greater sex risk because they have greater access to alcohol than their counterparts with younger or same-aged sex partners(Hegna et al., 2004). Unfortunately, there are no prospective studies exploring whether the association between sex partners' age and alcohol use across adolescence and

young adulthood persists after accounting for changes in self-acceptance over time. Thus, we explore whether the association between sex partners' age differences and alcohol use changes as youth's transition into young adulthood, after controlling for changes in self-acceptance over time.

Participating in the Labor Force and Sex Risk

Economic exposures may also contextualize and affect youth well-being by limiting youth's financial independence (e.g., living in poverty, having less than a high school education, and being under or unemployed). While participation in the workforce may increase opportunities for financial independence (often referred to as the *work benefits perspective*), numerous scholars have argued that participation in the labor force may increase youth's risks if they work too much during the transition into young adulthood (*work consequences perspective*) because it may promote too many adult roles and behaviors that youth are unprepared to negotiate(Staff, Mortimer, & Uggen, 2004; Steinberg, Fegley, & Dornbusch, 1993). Although researchers do not agree on how many hours of work per week are acceptable before work becomes deleterious for adolescents during the transition into young adulthood, most research indicates that 10 to 20 hours per week may be a critical threshold(Paschall, Flewelling, & Russell, 2004).

Bauermeister and colleagues (in press, a) found African American adolescents working greater number of hours were more likely to report increased sexual intercourse frequency, number of partners, and older sex partners as they transitioned from adolescents into young adulthood. These effects were greater for African American females. One explanation for these findings is that working youth, especially females, may be exposed to a greater number of adults with whom they may pursue sexual relationships. In a follow-up study, however, Bauermeister and colleagues (in press, b) found that sex partners' age did not mediate the relationship between work and sexual intercourse and number of partners, respectively, even after accounting for differences by sex, education, and marital status. Another explanation for these findings is that youth without adequate coping strategies may suffer additional decreases in their self-acceptance as they try to meet their job demands and may recur to negative coping strategies such as alcohol use to alleviate job stress and any loss in their self-acceptance (Mortimer, Finch, Shanahan, & Ryu, 2000; Valois, Dunham, Jackson, & Waller, 1999). Consequently, Bauermeister's findings may be confounded by the association between the number of hours worked, self-acceptance and alcohol use. We explore whether the effects of hours worked on sex partners' age differences persist after accounting for changes in youth's self-acceptance and alcohol use across adolescence and young adulthood.

Aims & Hypotheses

This study included a sample of African American youth across mid-adolescence (age 14) to young adulthood (age 25) who, when selected for study participation, had been at risk for high school dropout (i.e., a grade point average of 3.0 or lower in eighth grade). This sample is unique as most studies of adolescent sexual behavior rely on predominantly White samples. In addition, although the results may not be generalizable to all African American youth, our study includes a longitudinal design with a large urban sample of at-risk youth who may be at greater risk for negative outcomes (e.g., HIV/STIs and unemployment) because of low school achievement prior to high school.

This study had four objectives. First, we modeled the age difference between participants and their sex partners over time across adolescence and young adulthood. We hypothesized that sex partners' age difference will follow a curvilinear relationship over time. Youth would report older sex partners as they begin to engage in sexual intercourse during middle

to late adolescence, with the difference in sex partners' age decreasing as youth transition into young adulthood and prepare themselves for marriage.

Second, given the persistent unequal distribution of HIV/STIs across the US population by race, sex, and socioeconomic status (AGI, 2005), we explored whether there are differing trajectories in sex partners' age differences by sex, mother's education, and/or youth's high school dropout. Consistent with previous research, we expected to find that females would report older sex partners than males (Hegna, Mossige & Wichstrom, 2004). Furthermore, youth with mothers with fewer years of education and/or who dropout of high school would be more likely to report older sex partners because they would be less likely to be protected from negative social exposures during the transition into adulthood.

Third, we tested whether age differences were associated with participants' self-acceptance, alcohol use frequency, and exposure to work across adolescence and young adulthood using a hierarchical multilevel growth curve model. We hypothesized that youth reporting lower self-acceptance, more frequent alcohol use, and more hours worked would be associated with having older sex partners over time. We expected, however, that these predictors would be associated independently with sex partners' age differences across adolescence and young adulthood. Furthermore, we expected these effects to be stronger for females, youth with mothers with fewer years of education, and high school dropouts.

Finally, we assessed whether the effects of these risk behaviors on sex partners' age differences changed over time. We expected to find that the temporal association between self-acceptance and sex partners' age differences decreased as African American youths recovered their self-acceptance as they left adolescence and transitioned into young adulthood. We further hypothesized that the association between alcohol use and sex partners' age differences would decrease during young adulthood to account for the participants' reaching legal drinking age. Similarly, we expected that the association between the number of hours worked and sex partners' age differences would decrease during young adulthood as a reflection of youth's greater involvement in the labor force and their developmental maturation into adult roles and behaviors.

Methods

This study is based on an eight-year longitudinal study of youth from mid-adolescence (i.e., high school years) to the transition into young adulthood. Data were collected from 850 adolescents at-risk for high school dropout at the beginning the ninth grade (Wave 1: 1994) in four public high schools in a Midwestern city. To be eligible for the study, participants had a grade point of 3.0 or lower at the end of the eighth grade, were not diagnosed by the school as having emotional or developmental impairments, and identified as African American, White, or Bi-racial (African American and White). Waves 1 through 4 correspond to the participants' high school years. Waves 5 through 8 correspond to the second, third, fourth, and fifth years post-high school, regardless of whether they graduated of high school. Previous studies with the same sample have found adolescents had increased their grade point average and the distribution of GPA by Wave 4 (12th grade) of the study was more diverse, providing support for resilience among youth in our sample (Zimmerman, Caldwell, & Bernat, 2002).

Sample

Fifty percent of the original sample was female. Adolescents self-reporting as African American constituted eighty percent of the sample in Wave 1 (n = 681). We focus our analyses on this African American subsample. Eighty-nine African American participants were dropped from our analyses due to missing data on the work measures. Missing

information on hours worked per week during two or more of the first four Waves diminished our ability to test our hypothesis that the effects of number of hours worked during adolescence influence sexual development. In addition, we excluded an additional 30 participants who reported that their sexual debut occurred prior to age 9 or their last sex partner was under the age of 9 because the age indicated for these behaviors may represent coding errors or unusual sexual engagement. Excluded participants were more likely to be male ($\chi^2_{(1)}$ = 26.41, p < .001), older ($t_{(679)}$ = 5.02, p <.001), younger at first sexual intercourse ($t_{(337)}$ = 2.64, p < .01), reporting more sexual partners ($t_{(402)}$ = 3.12, p < .01), and reported greater lifetime sexual intercourse ($t_{(424)}$ = 3.43, p < .001). The mean age at Wave 1 for the remaining 562 African American participants (55% female) in this study was 14.5 years (SD = .60).

Procedure

Structured face-to-face interviews were conducted with students in school or in a community setting if the participants could not be found in school. Waves 5 through 8 interviews were mostly conducted in a community setting. Interviews averaged 60 minutes. After the interview portion of the protocol, participants completed a self-administered paper and pencil questionnaire about alcohol and substance use, sexual behavior and other sensitive information. The study had a 90% response rate over the first four Waves of data collection and a 68% response rate over all eight Waves. The University of Michigan's Institutional Review Board approved the study design and procedures (UM-IRB#H03-0001309).

Measures

Means and standard deviations for each measure across all Waves are presented in Table 1.

Sex Partner Age Differential—This measure was calculated by subtracting the participants' age at the time of interview for each Wave from the reported age of the participants' last sexual partner (i.e., the last person with whom the participant engaged in penetrative sex). The age of participants' last sex partner was asked in an open-ended question across Waves 2 through 8 (The last time you had sex, how old was your partner?). Participants who reported not having sex, not having sex in the previous year, or unable to recall their partner's age were assigned a missing value. The age differential measure had a strong test-retest reliability (α = .76).

Self-acceptance—We measured self-acceptance at each Wave using the Bentler Personality Inventory (Stein, Newcomb, & Bentler, 1986). Participants were given 4 opposing statements and asked to choose how much they agreed with each pair of statements (i.e., "Happy with myself – Unhappy with myself") using a 5-point scale ranging from 1 (the first statement is true for me) to 5 (the second statement is true for me). We computed a composite score by taking the mean across the 4-items. The scale was reverse-coded so higher scores represented greater self-acceptance. We found a strong test-retest reliability (α = .80).

Alcohol Use—Alcohol use over the past 30 days was self-reported by participants for each Wave ("How many times have you had alcoholic beverages to drink during the last 30 days?"). Response categories were 1=0 times, 2=1–2 times, 3=3–5 times, 4=6–9 times, 5=10–19 times, 6=20–39 times, and 7=40+ times. Participants who reported not having had an alcoholic beverage in their lifetime or during the past 12 months were coded as not having had an alcohol beverage in the past 30 days. We found a strong test-retest reliability for alcohol use (α = .83).

Number of hours worked—Participants reported the number of hours worked per week for each Wave ("On the average over the school year, how many hours per week do you work in a job for a pay?" for Wave 2; and, "How many hours per week do you work?" for Waves 3–8). Response categories were 1=None, 2=Less than 10 hours, 3=11–20 hours, 4=21–30 hours, and 5=more than 30 hours. We found a moderately strong test-retest reliability for the work indicator ($\alpha = .64$).

Demographic characteristics—Sociodemographic characteristics were collected from participants at each Wave. In Wave 1, we asked participants to report their date of birth and sex. Participants were asked to report their mother's highest level of schooling using the following nine categories: completed grade school or less, some high school, completed high school, vocational or training school, some college, completed college, graduate or professional school after college, no contact with respective parent, or don't know. These responses were recoded into five categories: 1=completed grade school and/or some high school (10.6%), 2=completed high school (40.8%), 3=had some vocational or training school and/or some college (31.8%), 4=completed college (13.6%), and 5=attended graduate or professional school after college (3.3%). Participants were also asked if they finished high school or received a GED by Wave 5. This high school dropout variable was dummy coded: 0=finished HS (79.4%) and 1=did not complete high school (20.6%). "No contact" and "Don't know" responses were recoded as missing.

Data Analytic Strategy

We conducted preliminary attrition analyses across all study variables comparing participants with complete data (n=562) to those who were excluded from this study (n=119). We used HLM 6.0 (Scientific Software International, 2005) to model sex partners' age differences and test its association with the time-varying covariates (i.e., self-acceptance, alcohol use, and hours worked) across adolescence and young adulthood. While a repeated measures regression performs list-wise deletion for cases with missing values in one or more data points, HLM maximizes all available data because its algorithms do not require information across all Waves in order to compute growth estimates for all participants (Raudenbush & Bryk, 2002). Similar to repeated measures regression, multilevel modeling allows the total variance to be divided into within-individual variation (Level One Model; i.e., change in sex partners' age difference over time) and between-individual variation (Level Two Model; i.e., person-centered characteristics like sex). Because sex partners' age was not collected at Wave 1, we focused our analyses on Waves 2 through 8.

We modeled the change in sex partners' age difference over time using an age-centered approach starting at age 14. This approach models the growth in sex partners' age for every year increase since age 14 across adolescence and young adulthood. After modeling the linear growth of sex partners' age, we included the quadratic and cubic growth terms to account for the curvilinear trend (e.g., "S shape") in sex partners' age difference. The nonlinear growth estimates approximate the acceleration or deceleration of sex partners' age over time. We then calculated the inflection point for each non-linear growth model in order to assess when the slope for sex partners' age differences changed direction (see Appendix A).

To test the association between each predictor (i.e., self-acceptance, alcohol use, and number of hours worked) and sex partners' age difference over time, we entered each time-varying covariate into the growth curve model. Following a hierarchical/stepwise regression approach, we added one time-varying covariate at a time and tested whether time-varying covariates had independent effects on sex partners' age differences, after adjusting for all

covariates present in the model. We then created age-centered time by main effect interactions to acknowledge the possibility that the association between a time-varying covariate and sex partners' age differences could have a non-proportional association (i.e., the slope is not constant over time). Three interactions were computed (e.g., Self-acceptance × Age, Alcohol × Age, and Work × Age) and included in the growth models. Significant interactions indicated that the association between sex partners' age differences and the time-varying covariate changed for every additional year increase across adolescence and young adulthood. Only significant time by main effect interactions were kept in the model. We examined the improvements in model fit by comparing the deviance statistics (i.e., the -2 ln likelihood function value (-2LL)) across each step (Raudenbush & Bryk, 2002).

If the intercept or any growth term varied between individuals, we explored whether person-centered characteristics (i.e., sex, mother's educational attainment, and high-school dropout) explained the variation. If person-centered variables were non-significant, they were dropped from the analyses. In light of the complexity of these models and the potential that we decreased our statistical power to detect meaningful relationships, we also report marginal trends ($p ≤ .10$) in this report.

Results

Attrition Analyses

Adolescent males were more likely to be excluded from our analyses than females ($\chi^2_{(1)} = 26.41$; $p ≤ .001$). Older adolescents at Wave 1 were also more likely to be excluded ($t_{(679)} = 5.02$; $p ≤ .001$). Participants excluded from the analyses reported less alcohol use at Wave 1 ($t_{(73.76)} = 2.23$; $p ≤ .05$) than those included in the analyses. We found no differences by mother's education level at Wave 1 ($t_{(627)} = −.029$; *n.s.*), age of their last sexual partner at Wave 2 ($t_{(433)} = −1.20$; *n.s.*), self-acceptance at Wave 2 ($t_{(589)} = .03$; *n.s.*), or number of hours worked at Wave 1 ($t_{(590)} = −.84$; *n.s.*).

Sex Partners' Age Differences

The difference in age between sex partners and youth was S-shaped and best modeled with a non-linear cubic model (see Figure 1). Overall, females had older sex partners than their male counterparts across adolescence and young adulthood. Youth who did not complete high school were also more likely to report older sex partners than their high school graduated counterparts.

Males reported slightly older sex partners over mid adolescence (ages 14 to 16), having same-aged sex partners over mid and late adolescence (ages 16 and 18), and reported younger sex partners over the young adulthood (ages 19 to 25). Females reported older sex partners over mid adolescence and late adolescence (ages 14 to 18). Across the early young adulthood years (ages 19 to 22), females reported a slight increase in age differences, which was followed by decreasing age differences (ages 23 to 25).

Model 1: Sex Partners' Age Differences—On average, sexually active 14 year olds reported having older sex partners (see Model 1 in Table 2). The age differences, however, varied by person-centered characteristics. Sexually active 14-year-old females (B = 1.77, *SE* = 0.46; $p ≤ .01$) reported sex partners approximately two years older than their male counterparts (B = 0.50, *SE* = 0.45; $p ≤ .10$). Furthermore, youth who did not complete high school reported older sex partners than their counterparts who completed their high school education (B = 0.42, *SE* = 0.21; $p ≤ .05$). Mother's educational attainment did not predict mean age differences at age 14. After including sex and high school dropout as person-

centered characteristics of the mean age difference at age 14, we found no additional random variation on the mean score at age 14 ($\chi^2_{(418)}$=458.57; n.s.).

The growth of sex partners' age differences were best modeled by including a linear, quadratic, and cubic term for the adolescence and young adulthood years; however, we found random variation in its slope ($\chi^2_{(419)}$=549.48; $p \leq .05$). We found no linear growth in sex partners' age differences over time for males (B = −0.49, SE = 0.32; n.s.) or females (B = −0.31, SE = 0.22; n.s.). The quadratic and cubic growth estimates, however, suggested that the age difference between male African American youth and their sex partners accelerated (B = 0.12, SE = 0.06; $p \leq .10$) as they transitioned from adolescence into young adulthood. Females, however, had a greater quadratic acceleration (B = 0.05, SE = 0.02; $p \leq .05$) than their male counterparts. The age differences for males and females then decelerated equally in the cubic growth term (B = −0.01, SE = 0.003; $p \leq .05$). Neither mother's educational attainment nor high school dropout predicted changes in the quadratic growth estimate, even though there was still unexplained variation between individuals' quadratic growth estimate ($\chi^2_{(419)}$=594.77; $p \leq .05$). The cubic growth estimate did not vary at random and was treated as a fixed effect.

The inflection point for males occurred earlier (18.78 years old) than for females (20.75 years old), indicating the point where the slope is equal to zero before changing direction (see Appendix A).

Model 2: Sex Partners' Age & Self-acceptance—Inclusion of the self-acceptance main effect and the time by self-acceptance interaction as time-varying covariates into the model changed the growth curve's estimation. While the linear growth estimate remained non-significant, the quadratic growth estimate became predictive only for females. The age difference between females and their sex partners accelerated as they transitioned from adolescence into young adulthood, but it was not significant for males. The cubic growth estimate, however, became non-significant after adjusting for all other covariates in the model.

We found self-acceptance was associated with sex partners' age differences over time (see Model 2 in Table 2). This association was moderated by high school dropout. Youth who dropped out of high school reported having younger sex partners (B = −0.58, SE = 0.30; $p \leq .10$) than their high school educated counterparts (B = −0.14, SE = 0.13; n.s.) with every unit increase in self-acceptance over time. Nonetheless, this association was not constant over time as suggested by the time by self-acceptance interaction (B = 0.03, SE = 0.01; $p \leq .10$).

As illustrated in Figure 2 and Figure 3, the association between self-acceptance and sex partners' age differences changes as youth transition from adolescence into young adulthood. Among youth who completed high school, higher self-acceptance is associated with older sex partners during adolescence and with younger sex partners during young adulthood. Among high school dropouts, higher self-acceptance is associated with younger sex partners during adolescence and young adulthood. While the association between self-acceptance and sex partners' age differences does not change direction, the magnitude of the association decreases from adolescence into young adulthood. We found no variation by sex or mother's educational attainment on the self-acceptance main effect or time interaction. Upon inspection of the -2LL value, we found Model 2 was a better fit than Model 1 (see Table 2).

Model 3: Sex Partners' Age, Self-acceptance & Alcohol Use—Alcohol use frequency was associated with sex partners' age differences over time (B = −0.04, SE =

0.02; $p \leq .10$), after adjusting for all other covariates in the model (see Model 3 in Table 2). This effect was more notable among youth who dropped out of high school (B = 0.21, $SE = 0.03$; $p \leq .01$).

We found no evidence to suggest that the association between sex partners' age difference and alcohol use varied over time. The time by alcohol interaction was not associated with sex partners' age differences nor did it vary at random by person-centered characteristics. Upon inspection of the -2LL value, we found Model 3 was a better fit than Model 2 (see Table 2).

Model 4: Sex Partners' Age, Self-acceptance, Alcohol Use, & Work—We found the number of hours worked across adolescence and young adulthood was associated with sex partners' age differences (B = 0.15, $SE = 0.05$; $p \leq .01$), after adjusting for all other covariates in the model (see Model 4 in Table 2). The effect of hours worked on sex partners' age differences, however, was not consistent over time (B=−0.02, SE=0.01, $p \leq .10$). Upon inspection of the -2LL value, we found Model 4 was a better fit than Model 3 (see Table 2).

As illustrated in Figure 4, working greater number of hours was associated with older sex partners. This association, however, changes magnitude with age. The effect of working on sex partners' age differences is most notable during adolescence than in the young adulthood. Neither the number of hours worked main effect or time interaction varied by person-centered characteristics. We present the random effects table for the Final Model in Table 3.

Discussion

Sex behaviors such as decreased condom use and increased sexual activity across adolescence and young adulthood may place youth at greater risk for HIV/STI or unintended pregnancies (Newman & Zimmerman, 2000). These risks may be exacerbated further if youth have older sex partners (Ford & Lepkowski, 2004; Rosenthal, Smith, & Visser, 1999). Females reported older sex partners than their male counterparts across both developmental periods. In the presence of large age differences between youth and their partners, uneven sexual power dynamics (e.g., less condom use negotiation) may arise or increase placing women at greater risk for sexually transmitted infections. In their Theory of Gender and Power, Wingood and DiClemente (2002) have argued that HIV/STI and pregnancy risks are greatest for young ethnic minority females because they may be overexposed to social, physical, and economic risks that promote unequal gender power imbalances, limit safer sex decision-making, and increase their vulnerability to HIV/STIs and unintended pregnancy. Nonetheless, our findings also suggest that youth who dropped out of high school, regardless of gender, were more likely to report older sex partners than their high school graduate counterparts. This finding suggests that power imbalances in social standing (i.e., as measured by completion of a high school degree) may be as important as gender in understanding the role of sex partner age differences in youth's overall well-being. In this study, we explored three risk exposures previously found to be associated with sex risk over adolescence and young adulthood: self-acceptance, alcohol use frequency, and number of hours worked.

Consistent with previous research suggesting self-acceptance's protective influence on youth development (Salazar et al., 2005), higher self-acceptance was associated with younger or similar-aged partners. This association, however, seems to weaken as youth grow older. This attenuation is congruent with previous research (Birndorf et al., 2005; Galambos et al., 2006) and may be attributable to overall increases in self-acceptance as youth transition into

young adulthood. Contrary to previous research on sex differences in self-esteem (Galambos et al., 2006) and the Theory of Gender and Power, however, we found no differences by sex in the association between self-acceptance and partner age differences. In fact, our findings suggest that promoting self-acceptance may aid in reducing sex partners' age differences, regardless of youth's gender, particularly during adolescence. One explanation for these findings is that youth may engage in sexual relationships with older partners as a mechanism for feeling better about themselves (i.e., to enhance their self-acceptance). Sexual relationships may promote feelings of closeness and intimacy as well as assure youth of their self-worth and physical appeal. Another explanation may be that older individuals may help their younger sex partners feel good about themselves through other aspects of their relationships such as voicing their opinions in more adult decision-making and participation in adult-like activities. Future research exploring youth's reasons for engaging in sexual relationships with older partners during adolescence and young adulthood is needed to untangle these relationships.

Alcohol use was also associated with sex partners' age differences across adolescence and young adulthood. This effect was particularly notable for youth who did not complete their high school education. Youth without a high school education may have limited access to health promotion resources, which places them at greater vulnerability for HIV/STIs, and unintended pregnancies. Furthermore, high school dropouts may consume more alcohol and have older sex partners than their high school graduated counterparts as a way of coping with a faster-paced transition into adult roles and behaviors. While we expected to find an alcohol use by age interaction as a reflection of the change in their drinking legal status, there was no evidence to suggest that the association between sex partners' age differences and alcohol use changed over time. It is important to note, however, that youth in this sample self-reported limited amounts of alcohol use across adolescence and young adulthood (i.e., average of 1–2 drinks in the past 30 days). The low substance use incidence in this sample may reflect the lower adoption rates of these behaviors among African American youth (Ellickson, Orlando, Tucker, & Klein, 2004). We also found no evidence to suggest a sex difference in alcohol use over time. Taken together, these findings suggest that youth who have older partners and who drink more frequently may be at increased sex risk across adolescence and young adulthood, regardless of youth's sex, even after accounting for changes in self-acceptance over time. One potential interpretation for this finding is that youth with older sex partners have greater access to alcohol while their counterparts with younger or same-aged sex partners do not. Another potential explanation is that youth with older sex partners partake in greater alcohol use in order to feel more mature or cope with decreases in self-acceptance(Guthrie & Low, 2000), or bond with their older partners through participation in more adult-specific activities (i.e., attend a party) where alcohol use is normative. The potential relationships between these risk exposures (i.e., increases in alcohol use due to decreases in self-acceptance or having older sex partners) suggests that one risk compounds the effects of another to increase youth's vulnerability to HIV/STIs and unintended pregnancies. Future research examining these potential explanations would be useful to inform intervention activities.

Working greater number of hours was associated with having older sex partners, particularly during adolescence. While this finding is consistent with previous research, these results suggest that the effects of employment on sex partners' age differences persist even after accounting for other explanations (i.e., changes in self-acceptance and alcohol use over time). Taken together, these findings support the work consequences perspective (Bauermeister et al., in press). Working greater number of hours during adolescence may lead youth to adopt greater adult roles and behaviors, including having sex with older partners. Surprisingly, the association between work and sex partner's age did not vary by sex, mother's education, or high school dropout. One possibility for this finding is that our

measure of employment (e.g., number of hours worked per week) does not fully tease out the effects of economic exposures on sex partners' age differences. Work type, wages, and quality may help identify additional differences is the association between work and healthy development (Mortimer, Harley, & Staff, 2002). Another possibility is that working youth may incorporate greater number of adults into their social networks (i.e., coworkers) and increase their likelihood to have older sex partners. Future research exploring how these factors may mediate or moderate the work and sex partners' age difference relationship would be useful.

Several limitations of the study should be noted. First, the study's findings may not be generalizable because participants in this study were recruited based on their risk for school dropout. Nonetheless, previous studies with the same sample have found adolescents increased their GPA and the distribution of GPA became more diverse by Wave 4 (12th grade) (Zimmerman et al., 2002). This suggests that those who appeared at risk for high school dropout improve in their school performance over time. Attrition analyses also suggest that we may have lost youth who may be at greater risk for HIV/STI and unintended pregnancies. The fact that some of our results are consistent with past research findings, however, suggests that the bias introduced in the sample selection and study attrition may not diminish the overall findings. Second, this study only measured the age of youth's last sexual partner across each Wave. Nonetheless, sample participants reported between one and three sex partners across all 8 Waves, on average, so these data are likely to be mostly representative of their sex partners' age. Future research, however, should test whether age differences across all sex partners in a given year increase sex risk over time. Third, marriage may be a critical factor in considering predictors of age differences. Our sample, however, did not have many married respondents (6%) so we could not examine this effect adequately. Future research that considers marital status would be useful, particularly as youth transition from young adulthood into adulthood. In addition, the absence of differences by mother's educational attainment is puzzling, particularly given that previous research has identified it as a strong predictor of youth's sex risk behaviors (CDC, 2007). The lack of variation in findings may be due to sample selectivity, to socioeconomic challenges faced by the community where youth live, or to the restricted variability in the mother education measure. Future research exploring whether additional individual and community level socioeconomic measures are associated with sex partners' age differences would be useful. Finally, we were unable to examine whether a threshold for age differences and maladaptive outcomes exist. Furthermore, the mean range in age differences in our sample was small (i.e., a 4-year difference). Research examining whether our findings persist when the age difference is larger (e.g., 10-year age differential) would be useful.

These limitations notwithstanding, this study builds on our knowledge of youth's sexual development in several ways. First, the study focused on a large sample of African American urban youth at risk for HIV/STI and pregnancy. Most studies of this kind have focused their analyses exclusively on predominantly White female samples. Our study, on the other hand, includes African American males and females, and finds the association of sex partners' age differences with our variables of interests is consistent across gender (Models 2–4) and underscores the importance of high school completion as a moderator in these associations. Second, the availability of data for participants across 8 Waves allowed for the prospective exploration of sex partners' age differences over time. Specifically, our findings span adolescence and the transition into young adulthood, two developmental periods typically associated with sexual risk-taking behavior and negative sexual health outcomes (CDC, 2005). Third, this study contributes to this body of literature by exploring the relationship between sex partners' age differences, self-acceptance, alcohol use, and work across adolescence and young adulthood. While previous studies have examined these variables separately, our study examines all three variables concurrently in a longitudinal

design. Finally, this study suggests that the inclusion of a life course perspective is essential to understanding the effects of risk exposures across adolescence and young adulthood. While self-acceptance, alcohol use, and employment are associated with sex risk, understanding *when* these exposures have the strongest effect on youth's sexual development may enhance prevention efforts. Specifically, our study acknowledges the prospective changes in the association between sex partners' age difference and youths' self-acceptance and participation in the labor force, respectively.

Implications for Prevention Programs

This study contributes to this body of knowledge by incorporating a life course perspective and highlighting the importance of developmental transitions as youth explore their sexuality. Based on our findings, self-acceptance and exposure to work have the greatest effect during adolescence; thus, interventions focused on improving self-acceptance and/or decreasing negative consequences associated with working youth may have the greatest impact during the adolescent years. Our computation of the inflection point suggests that the age differential for males (i.e., close to age 19) changes direction faster than that of females (i.e., close to age 21). Consequently, the timing of interventions that focus on decreasing age differences for males will need to occur during adolescence to have the greatest impact. For females, however, the timing of the intervention may occur during the adolescent and the transition into young adulthood years.

Sex education programs have found decreases in risky sexual behavior through increases in youth's self-acceptance. African American female adolescents participating in a community intervention, for example, reported a positive association between self-acceptance and condom use, among other sex risk behaviors (Salazar et al., 2005), highlighting the importance of self-acceptance as a construct within sex education programs for African American adolescents. Similarly, in a randomized control trial to test the efficacy of an empowerment intervention vis-à-vis a skill-based intervention for low-income African American women, participants in the empowerment intervention reported greater intention to change their behavior than participants in the skill-based intervention (St. Lawrence, Wilson, Eldridge, Brasfield, & O'Bannon, 1997). Our findings are consistent with previous findings on self-acceptance for adolescent females; however, our results suggest that increases in self-acceptance are also relevant for males. Consequently, male and female youth may benefit from intervention programs that develop their safer sex negotiation skills as well as increase their self-efficacy and self-acceptance through increased awareness of gender disparities in sexual relationship power dynamics. Future intervention programs should include activities focusing on safer sex skills as well as opportunities for youth, both male and female, to discuss the role of gender on their sexual decision-making.

While working during adolescence and emerging adulthood has been found to increase youth's self-acceptance and decrease alcohol use (Staff et al., 2004), most intervention programs aiming to decrease sex risk through increased self-acceptance and decreased substance use have focused on school or community contexts (Kirby, 2002). Sex education programs based on the workplace have been effective in reducing working youth's sex risk behaviors by promoting greater awareness of the risks associated with HIV transmission and other STIs. Based on our findings, working African American youth may benefit from sex education programs at work. Because working youth are exposed to greater number of adult roles and behaviors, it is possible that working youth encounter sexual advances within the workplace that are less likely to occur in other contexts such as school. Consequently, sex education programs that assess whether current prevention efforts adequately target the needs of working youth would be useful. Finally, our results underscore the importance of education for youth development. We found youth who did not complete their high school education were more likely to report larger decreases in self-acceptance and increases in

alcohol use. Given that education is a structural factor associated with disparities in HIV/STI incidence among youth (AGI, 2005) and a correlate of sexual risk, sex education should be incorporated into school dropout prevention programs. Formative research for developing or adapting health promotion activities focused on youth development may be necessary to inform relevant prevention programs. Sex education programs specifically targeting youth who may be at risk for high school dropout may reduce the likelihood of HIV, STIs, and unintended pregnancies.

Conclusions

Overall, self-acceptance, alcohol use, and the number of hours worked may pose additional risks for STI, HIV, and unwanted pregnancies through their association with a youth's sex partner's age. Future intervention research focusing on strategies for sexual negotiation, especially for youth who have sexual relationships with younger or older partners, should be explored further. In addition, sex education programs and preventive efforts aiming to reduce sex partners' age differences for adolescents and young adults through positive development may benefit by incorporating intervention activities that enhance self-acceptance during adolescence, facilitate youth's academic achievement (e.g., graduating high school), decrease youth's alcohol use frequency, and adapt health promotion materials for working youth.

Acknowledgments

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Appendix A. Computing Inflection Points in Non-Linear Growth Curves

Every non-linear growth curve has one more inflection points (i.e., the point where the slope is equal to zero before changing direction), with the number of inflection points equaling the number of non-linear growth terms minus 2 (e.g., one inflection term for a cubic model). To compute an inflection point, we are only interested in those terms that change as a function of time.

$$y=\pi_0+ \underline{\pi_1(Time)+\pi_2(Time)^2\pi_3(Time)^3}$$

(EQ A.1)

Equation A4.1 illustrates the three time estimates included in the growth curve model without time varying covariates (see Model 1 in Table 4.2): the linear growth over time for sex partners' age differences across adolescence and emerging adulthood and its associated squared and cubed growth terms. Consequently, the sex partners' age growth curve has one inflection point. The inflection point for males and females will differ, however, because their growth curve slopes varied by sex.

$$0=\pi_1(Time)+\pi_2(Time)^2+\pi_3(Time)^3 \qquad \text{(EQ A.2)}$$

To compute the inflection point for the quadratic term for males, we must find the point in time when the curve equals zero by including the growth slope estimates and taking the second order of Equation A4.2, solving for *Time*.

$$-.488620\,(Time)+.119748(Time)^2-.008350\,(Time)^3=0$$
$$0+1(-.488620)(Time)^0=2(.119748)(Time)^1-3(.008350)(Time)^2$$
$$0+0(-.488620)=1(.239496)-2(0.02505)(Time)$$
$$0=.239496-0.0501(Time)$$
$$Time={}^{.239496}\!\big/{}_{.0501}=4.78\ years \qquad \text{(EQ A.3)}$$

The inflection point for males occurs at 4.78 years. Note, however, that because the growth model was centered on age 14, the inflection point for males occurs when they are 18.78 years old. Repeating this same procedure with the estimates for females in the sample, we find that the inflection point for females occurs when they are 20.75 years old.

$$-.79563\,(Time)+.169108\,(Time)^2-.008350\,(Time)^3=0$$
$$0+1(-.79563)(Time)^0=2(.169108)(Time)^1-3(.008350)(Time)^2$$
$$0+0(-.79563)=1(0.338216)(Time)^1-2(.02505)(Time)$$
$$0=.338216-.0501(Time)$$
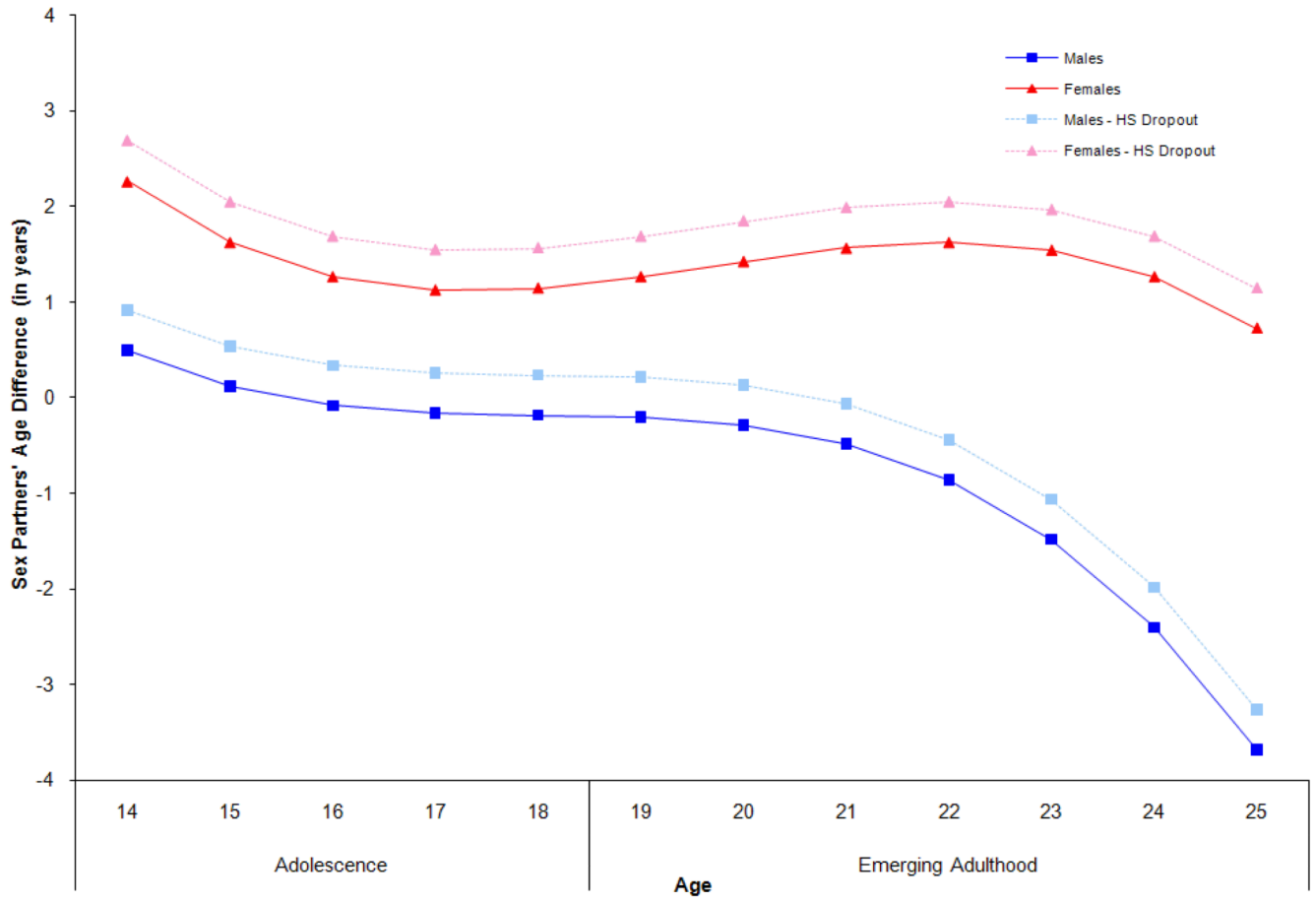$$Time={}^{.338216}\!\big/{}_{.0501}=6.75\ years \qquad \text{(EQ A.4)}$$

Figure 1.
Growth Model of Sex Partners' Age Differences by Sex and High School Dropout across Adolescence and Young adulthood (no covariates).

Figure 2.
Growth Model of Self-Acceptance on Sex Partners' Age Differences for Males across
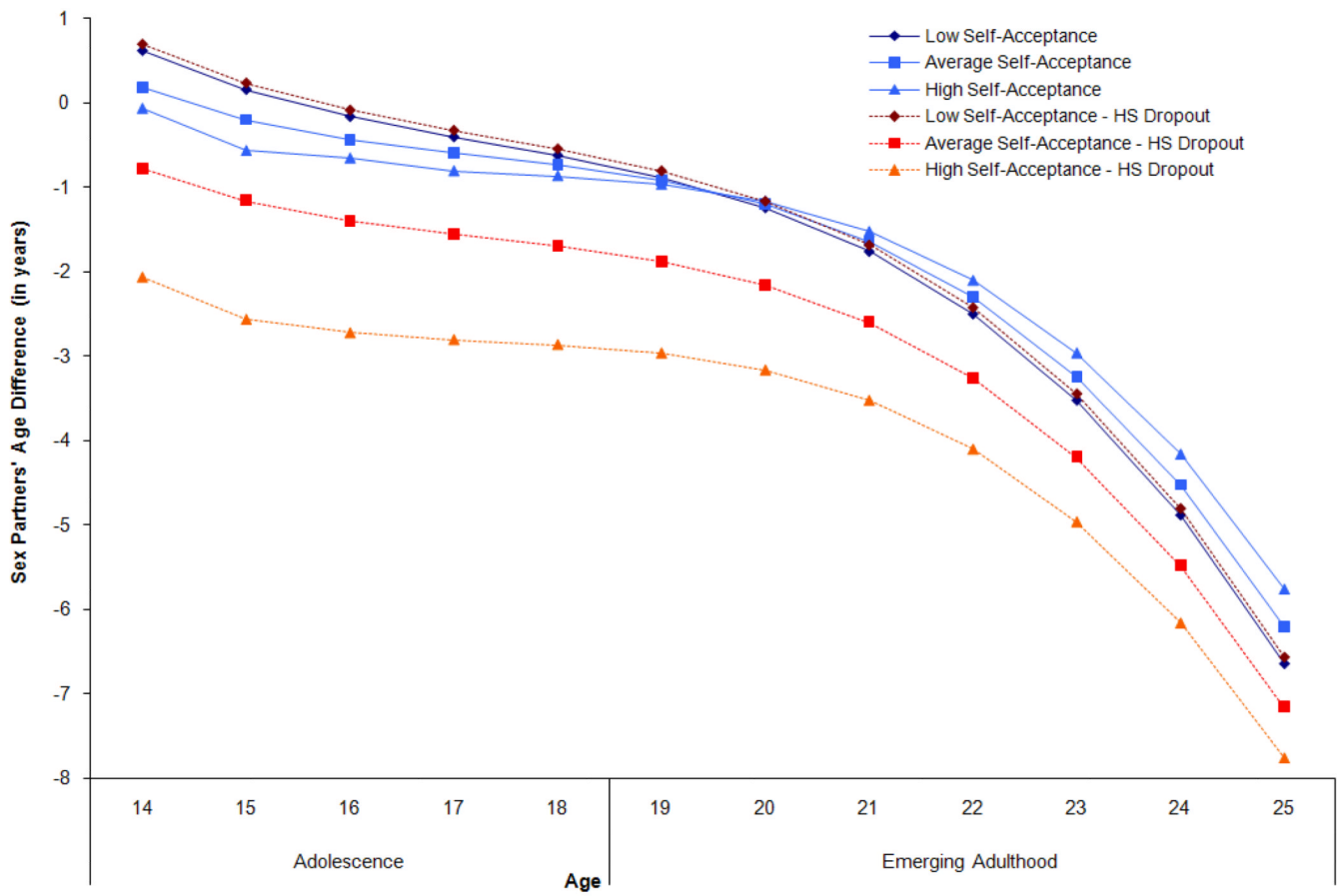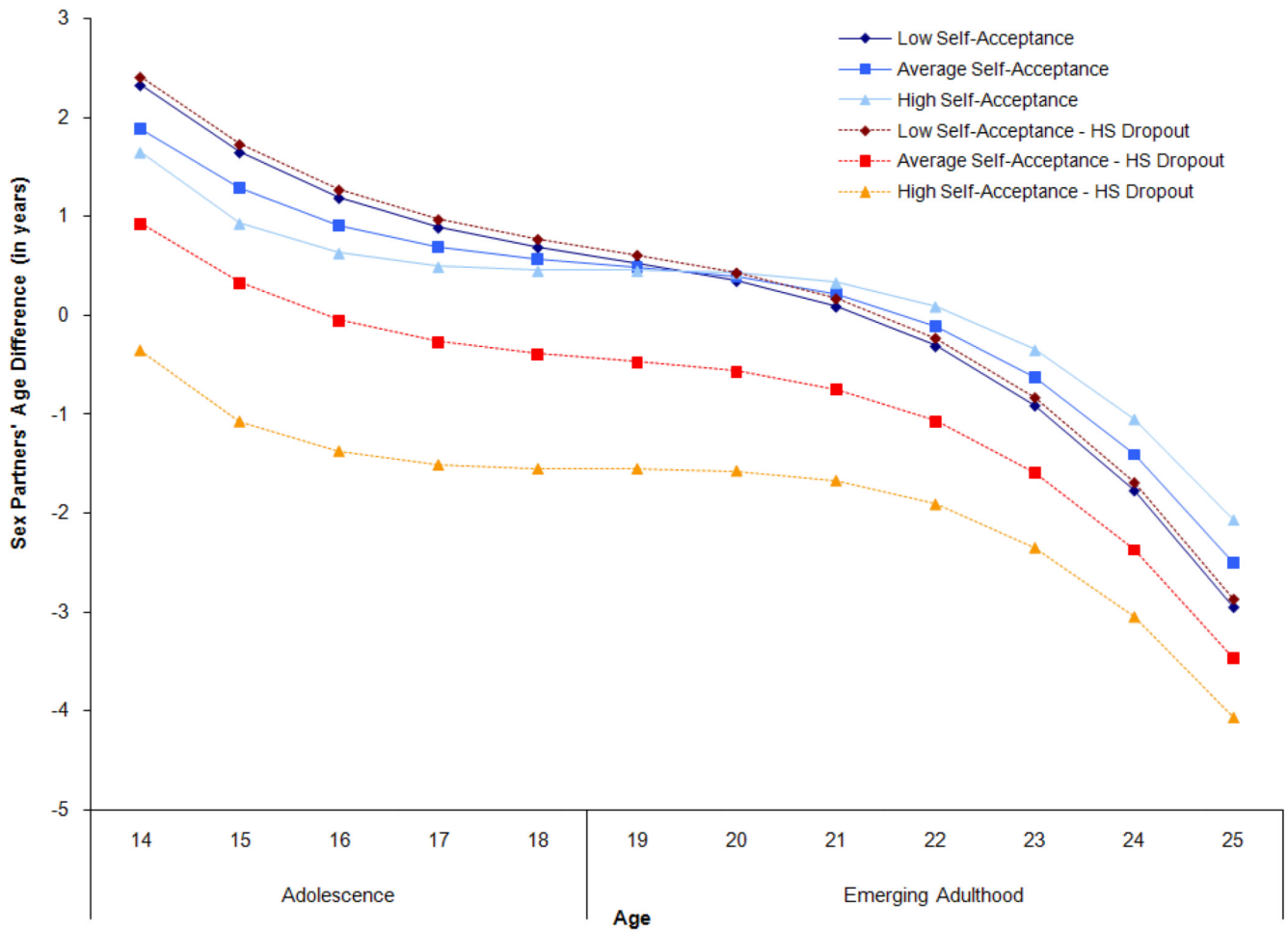Adolescence and Young adulthood (all other covariates held constant at zero).

Figure 3.
Growth Model of Self-Acceptance on Sex Partners' Age Differences for Females across Adolescence and Young adulthood (all other covariates held constant at zero).
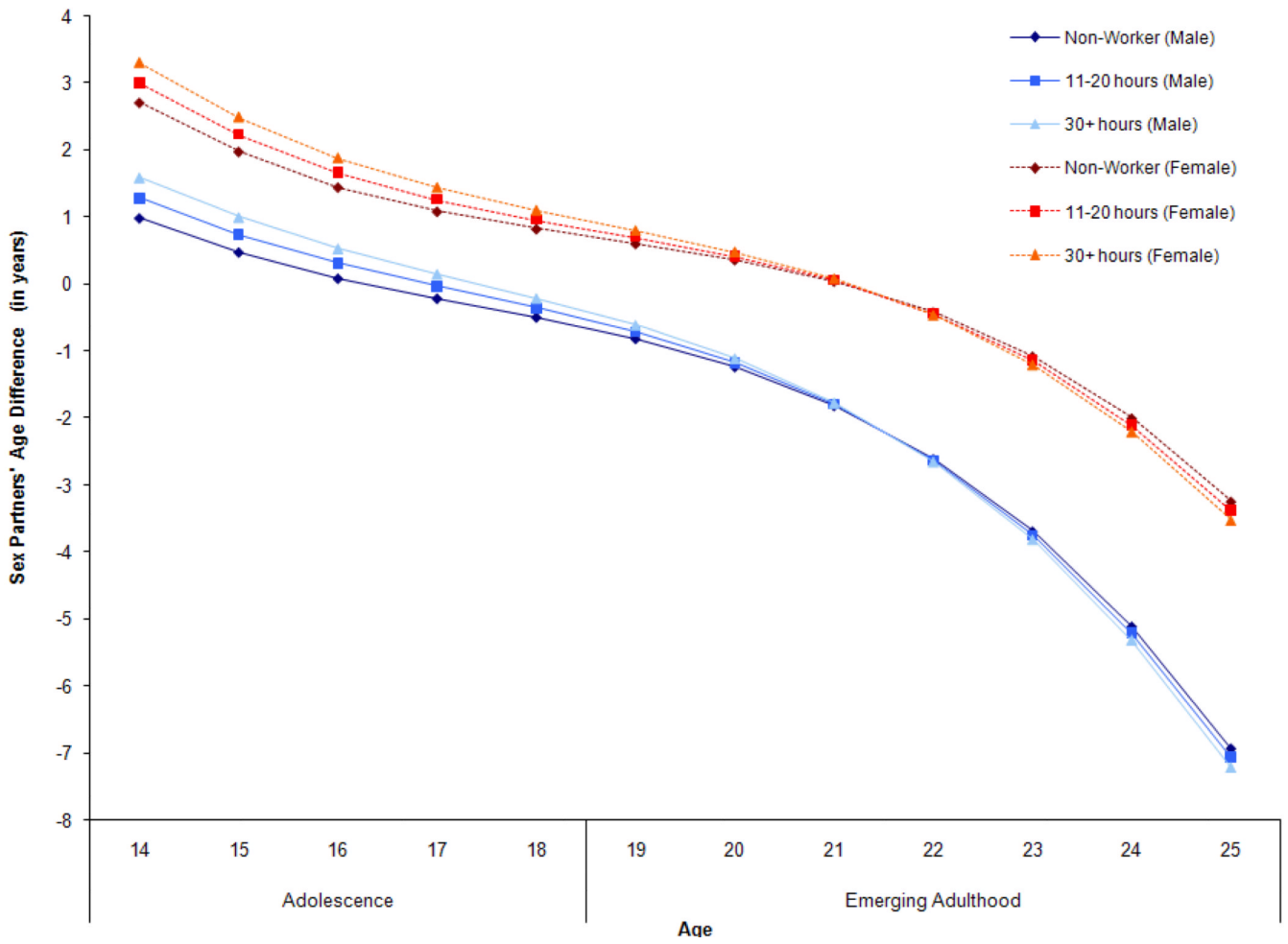
Figure 4.
Growth Model of Number of Hours Worked on Sex Partner's Age Differences by Sex
across Adolescence and Young adulthood (all other covariates held constant at zero).

Table 1

Descriptive Statistics for Study Variables across Waves by Sex

Wave	Age Difference M(SD)	N	Self-Acceptance M(SD)	N	Alcohol Use M(SD)	N	Hours Worked M(SD)	N
MALES								
2	−.14 (1.66)	171	4.46 (.72)	250	1.50 (1.02)	240	1.25 (.68)	251
3	.04 (2.25)	166	4.64 (.60)	249	1.65 (1.23)	234	1.88 (1.28)	249
4	−.06 (2.23)	179	4.61 (.61)	249	1.72 (1.26)	236	2.04 (1.42)	249
5	.44 (3.11)	138	4.53 (.61)	166	2.09 (1.44)	165	3.41 (1.81)	168
6	.08 (2.99)	154	4.44 (.71)	189	2.31 (1.70)	188	3.40 (1.84)	189
7	−.24 (2.85)	135	4.42 (.70)	160	2.50 (1.78)	160	3.33 (1.82)	162
8	−.30 (3.51)	144	4.22 (.83)	166	2.52 (1.77)	165	3.46 (1.80)	169
FEMALES								
2	1.30 (2.31)	193	4.51 (.70)	311	1.53 (.98)	301	1.32 (.82)	311
3	1.36 (2.45)	221	4.52 (.69)	310	1.55 (1.14)	300	1.77 (1.22)	310
4	1.33 (2.55)	238	4.43 (.75)	306	1.49 (1.06)	294	2.06 (1.36)	304
5	2.04 (3.40)	218	4.46 (.75)	247	1.70 (1.12)	249	3.16 (1.80)	250
6	2.06 (3.56)	216	4.45 (.70)	259	1.76 (1.14)	251	3.48 (1.76)	257
7	2.69 (4.31)	198	4.41 (.71)	243	1.92 (1.21)	240	3.30 (1.77)	244
8	2.78 (4.69)	206	4.36 (.74)	242	1.93 (1.37)	238	3.18 (1.82)	242

Table 2

Multilevel Hierarchical Model of Sex Partners' Age Differences across Adolescence and Young adulthood.

	Step 1 $B(SE)$		Step 2 $B(SE)$		Step 3 $B(SE)$		Step 4 $B(SE)$	
Age Difference at Age 14, π_0								
Base, B_{00}	0.50(.45)		0.82(.50)	*	0.81(.50)	*	0.84(.50)	*
Sex, B_{01}	1.77(.46)	***	1.78(.47)	***	1.79(.47)	***	1.71(.47)	***
HS Dropout, B_{02}	0.42(.21)	**	0.50(.22)	**	0.55(.22)	**	0.60(.22)	***
Mean linear growth per year, π_1								
Base, B_{10}	−0.49(.32)		−0.44(.33)		−0.43(.33)		−0.59(.34)	*
Sex, B_{11}	−0.31(.22)		−0.30(.22)		−0.29(.22)		−0.26(.22)	
Mean squared growth per year, π_2								
Base, B_{20}	0.12(.06)	*	0.09(.07)		0.09(.07)		0.10(.07)	
Sex, B_{21}	0.05(.02)	**	0.05(.02)	**	0.05(.02)	**	0.04(.02)	**
Mean cubed growth per year, π_3	−0.01(.003)	**	−0.01(.004)	*	−0.01 (.004)		−0.01(.004)	***
Self-Acceptance, π_4								
Base, B_{40}			−0.14(.13)		−0.14(.13)		−0.22(.13)	
HS Dropout, B_{41}			−0.58(.30)	*	−0.52(.30)	*	−0.52(.30)	*
Self-Acceptance × Age, π_5			0.03(.01)	*	0.03(.01)	**	0.04(.02)	**
Alcohol Use Frequency, π_6								
Base, B_{60}					−0.04(.02)	*	−0.04(.02)	*
HS Dropout, B_{61}					0.21(.03)	***	0.21(.03)	***
Number of Hours Worked, π_7							0.15(.05)	***
Number of Hours Worked × Age, π_8							−0.02(.01)	*
Model Fit (-2 LL)	12616.22		12558.21		12474.54		12442.33	
Model Fit Difference (Δ df)			58.01 (2)***		83.67 (1)***		32.21 (2)***	

Table 3

Random Effects for Multilevel Hierarchical Growth Curve Model of Self-Acceptance, Alcohol Use, and Hours Worked on Partners' Age Difference across Adolescence and Young Adulthood.

Random Effects Table	Variance	df	χ^2	
Age Difference at Age 14, r_{oi}	3.10	413	458.62	*
Mean linear growth per year, r_{1i}	1.41	414	546.24	***
Mean squared growth per year, r_{2i}	0.01	414	591.48	***
Level-1 error, e_{ti}	5.21			
Average Reliability (λ)				
Age Difference at Age 14, π_o			.09	
Mean linear growth per year, π_1			.17	
Mean squared growth per year, π_2			.19	

*
$p < .10$

**
$p < .05$

***
$p < .01$