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Abstract

“Hookups” are sexual encounters between partners who are not in a traditional committed romantic relationship. The majority of college students engage in hookup behavior, but little is known about the health consequences of hookups. This longitudinal study examined the effects of sexual hookups on mental health and risk for sexual victimization (SV) and sexually transmitted diseases (STDs) among first-year college women. It was hypothesized that sexual hookup behavior would negatively affect women’s mental health and increase their likelihood of experiencing SV and STDs. Participants ($N = 483$) completed 13 monthly online surveys that assessed sexual behavior (performing oral sex, receiving oral sex, and vaginal sex) with casual and romantic partners, mental health outcomes, SV, and self-reported STD diagnoses. Participants were also tested for three STDs at the end of the academic year. Hookup behavior involving either oral or vaginal sex was reported by 34% prior to college and 40% during the year-long study. Multivariate latent growth curve modeling showed that increases in the probability of oral sex (performed) and vaginal sex hookup behavior during the academic year were associated with increases in perceived stress and decreases in positive affect. Compared to women who did not hook up during the study, women who hooked up were more likely to experience SV, even after controlling for several risk factors for SV and sex in the context of romantic relationships. Engaging in any sexual hookup behavior during the study was not predictive of acquiring a new STD, but power for this logistic regression analysis was limited due to the low base rate of STDs. Lifetime history of sexual hookup behavior was significantly associated with lifetime STD diagnosis. Overall, the results suggest that sexual hookup behavior leads to increased psychological distress for some women and increases risk of experiencing SV and STDs.

HEALTH CONSEQUENCES OF SEXUAL HOOKUPS FOR FIRST-YEAR
COLLEGE WOMEN: A ONE-YEAR PROSPECTIVE INVESTIGATION

by

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Dissertation

Submitted in partial fulfillment of the requirements for the degree of
Doctor of Philosophy in Clinical Psychology

Syracuse University
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Health Consequences of Sexual Hookups for First-Year College Women:
A One-Year Prospective Investigation

The term *hookup* lacks a universal definition, but most young people agree that hookups are sexual encounters between partners who are not in a traditional committed romantic relationship and do not expect a relationship to result as a condition of the encounter. Qualitative research confirms that hookups involve a wide range of sexual behaviors (e.g., kissing to vaginal sex), occur between partners who are not in a romantic relationship, and do not signify an impending romantic commitment (Paul & Hayes, 2002; Stinson, 2010). College students' descriptions of typical hookups are highly consistent, even between those who have and have not hooked up; thus, despite lack of complete agreement on the definition of hookups, the term seems to have a "shared cultural meaning" among young people (Paul & Hayes, 2002, p. 656). Hooking up has become common among college students (England, Shafer, & Fogarty, 2008) and has started to replace traditional dating as the main way to explore romantic relationships on college campuses (Armstrong, England, & Fogarty, 2010; Bradshaw, Kahn, & Saville, 2010). More relationships start with a hookup than with a date (44% vs. 33%; England & Thomas, 2006), and dates usually happen after two people have already hooked up (England et al., 2008). Thus, hooking up appears to have replaced traditional courtship rituals (cf. Rose & Frieze, 1993) and provides a new system whereby youth socialize and meet romantic or sexual partners (Bogle, 2008b).

Several biomedical (e.g., earlier age at menarche, availability of hormonal birth control) sociocultural (e.g., increasing age at first marriage, more permissive sexual attitudes), and college environment (e.g., coed dormitories, higher female-to-male ratios)

changes occurring over the past 50 years have contributed to the “rise of hookup culture” (Armstrong et al., 2010, p. 363; Bogle, 2008a; England & Thomas, 2006; Heldman & Wade, 2010). Consequently, hookup behavior is now common among college students. Lifetime prevalence rates range from 53-78% (Garcia & Reiber, 2008; McClintock, 2010; Paul, McManus, & Hayes, 2000; Penhollow, Young, & Bailey, 2007). Surveys of over 19,000 undergraduates revealed that 74% had at least one hookup by their senior year; further, of those with hookup experience, 40% reported 4-9 hookups, and 20% reported 10 or more (Armstrong et al., 2010).

Recently, hooking up has received a lot of attention in the popular press (e.g., Chen, 2010; Dillon, 2007; Stepp, 2007), where it is usually portrayed as harmful to young people, especially to women. However, most depictions in the popular press draw upon anecdotal evidence. Over the past 10 years, and especially from 2009 to 2010, hooking up has also received a great deal of scholarly attention (Heldman & Wade, 2010; Stinson, 2010). The high prevalence of hookups suggests that hookup behavior may have positive consequences, such as excitement and sexual pleasure, for those who engage in it. At the same time, sexual hookups may have negative consequences, especially for women, who appear to be more vulnerable than men to emotional distress, sexual victimization (SV), and sexually transmitted diseases (STDs). The purpose of this study was to examine, using a prospective design, the effect of sexual hookups on mental health, risk for SV, and STD incidence among first-year college women.

Defining Sexual Hookups

Qualitative Findings

Although there is no single definition of hookups, today’s young people have a

“relatively uniform set of expectations or an internalized script” for hookups (Paul, Wenzel, & Harvey, 2008, p. 379). Qualitative research suggests consistent understandings of the term *hookup*. College students describe three main features of hookups: (a) a variety of sexual behaviors may occur, (b) the partners are not in a committed relationship, and (c) the interaction is short-term and does not signify that a romantic relationship will begin (Epstein, Calzo, Smiler, & Ward, 2009). Young people also frequently define hookups in terms of what they lack (i.e., emotional attachment and commitment; Banker, Kaestle, & Allen, 2010). Despite the possibility of slight discrepancies in how the term hookup is interpreted, most college students, including those who have never engaged in hookups, describe hookups in a consistent manner (Paul & Hayes, 2002).

Definitions from Early Studies

The first study to focus specially on hookups, which was published in 2000 (Paul et al.), has been very influential in shaping how researchers operationally define hookups. In that study, the authors defined a hookup as “a sexual encounter, usually lasting only one night, between two people who are strangers or brief acquaintances. Some physical sexual interaction is typical, but it may or may not include intercourse” (Paul et al., 2000, p. 76). In subsequent years, researchers continued to define hookups as one-time-only sexual encounters between strangers or brief acquaintances (e.g., Paul & Hayes, 2002; Penhollow et al., 2007). However, recent research on hookup experiences has suggested that these restrictions may be misleading. For example, an event-level study of first-semester female college students describing their most recent hookups found that 47% hooked up with a friend, 23% with an acquaintance, 14% with a stranger, 12% with an

ex-boyfriend, and 4% other (Fielder & Carey, 2010b). In addition, hookups often occur repeatedly between the same partners. Three event-level studies have all found that approximately 50% of college students' most recent hookups were with partners they had hooked up with at least once before (Armstrong et al., 2010; England & Thomas, 2006; Fielder & Carey, 2010b). Thus, it appears that partner type is more varied than originally thought, and both "one-night stands" and a pattern of ongoing hookups are common experiences.

Definitions from Recent Studies

As researchers' understanding of hookups has improved, their operational definitions have been adjusted accordingly. Increasingly, authors have been using a broader definition of hookup with respect to hookup partners' relationship (e.g., strangers, friends); moreover, most researchers have removed the qualification that the interaction occurs only once between a given set of partners. A representative operational definition of a hookup is "an event in which two people are physically intimate outside of a committed relationship without the expectation of future encounters" (Owen, Rhoades, Stanley, & Fincham, 2010, p. 656). Findings from ongoing research on hookups continue to refine our understanding of the phenomenological experience of hookups, but disagreement persists regarding some details. For example, some researchers suggest that hookups are unplanned (e.g., McClintock, 2010), but other findings have indicated that either the particular partner or the occurrence of a hookup (with any partner) are sometimes planned in advance (Fielder, 2008; Paul & Hayes, 2002). Also, some researchers consider hookups to be distinct from "friends with benefits" (Lehmiller, VanderDrift, & Kelly, 2010), whereas the finding that the most common hookup partner

is a friend (Fielder & Carey, 2010b) suggests that friends with benefits may be a subtype of hookups in which the partner is a friend and the hookups occur repeatedly. Further research will help to resolve these inconsistencies.

Related Terminology

Other words in the lexicon of today's youth share many features in common with hookups. "Friends with benefits," meaning friends who engage in sexual behavior without a romantic commitment (Owen & Fincham, 2011a), is the most researched term, but further research is needed to determine whether it is a subtype of hookup or a distinct phenomenon. College students' scripts for friends with benefits are similar to hookup scripts, except the partners have an ongoing friendship and may engage in sexual interaction over a long period of time (Epstein et al., 2009). Another popular term is "booty call," which has been defined as "a communication initiated towards a non-long-term relationship partner with the urgent intent either stated or implied, of having sexual activity and/or intercourse" (Jonason, Li, & Cason, 2009, p. 462). This definition suggests that the booty call is simply one way for an individual interested in a hookup to initiate the hookup, rather than a distinct phenomenon. Because all of these terms are used by college students to describe sexual but not romantic relationships (Banker et al., 2010), they seem to be similar experiences, with the latter two falling under the larger category of hookups.

The rise in scholarly attention on hookups over the past ten years (Stinson, 2010) suggests that many researchers consider hooking up and casual sex to be different phenomena. Several features of hookups suggest that hooking up differs from casual sex. First, hooking up and casual sex are defined differently. Casual sex is usually defined as

meeting a partner and having sexual intercourse that same day, having sexual intercourse with a partner once and only once, or having sexual intercourse without emotional commitment (Herold & Mewhinney, 1993; Regan & Dreyer, 1999; Weaver & Herold, 2000). A typical operational definition of casual sex is “sexual intercourse with someone they just met that same day or evening” (Herold, Maticka-Tyndale, & Mewhinney, 1998, p. 504). In contrast, hookups may include a variety of sexual behaviors besides vaginal sex, and hookup partners often know each other well (e.g., friends, ex-boyfriends/ex-girlfriends) and hook up on multiple occasions (Fielder & Carey, 2010b). Thus, the main definitional feature hooking up and casual sex have in common is the lack of emotional commitment.

Second, the extremely high prevalence of hookup behavior among college students distinguishes hooking up from casual sex. Hookups are a normative experience for young people attending college today (Garcia & Reiber, 2008), whereas casual sex was never as accepted or mainstream. Third, hooking up is also done more openly than casual sex was, especially among women (Downing-Matibag & Geisinger, 2009; Garcia & Reiber, 2008). Fourth, another unique feature of hookups is the accompanying desire to delay romantic relationships among this age group (Heldman & Wade, 2010). Qualitative research indicates that relationships are now viewed as less important than self-development during the college years (Hamilton & Armstrong, 2009). Relationships are also regarded somewhat negatively by emerging adults because they require too much time and energy, limit one’s ability to meet new people, and interfere with schoolwork and other life goals (e.g., travel). However, hookups allow youth to obtain sexual intimacy without the commitment required by a relationship (Downing-Matibag &

Geisinger, 2009), which is more convenient during the college years. Thus, while the debate continues, hooking up and casual sex appear to be different phenomena.

Importance of Behavioral Specificity

A review of the hookup literature suggests the importance of using specific behavioral terms in definitions of hookups. Most hookup definitions include vague terms, such as “sexual encounter,” to describe the physical interaction that occurs between hookup partners (Fortunato, Young, Boyd, & Fons, 2010, p. 268). Accordingly, researchers do not obtain any information on which sexual behaviors occur during hookups. Research has illustrated the importance of providing specific behaviors in operational definitions; Weaver and Herold (2000) found that the prevalence of casual sex ranged from 13% to 73% depending on which type of sexual behavior (sexual intercourse vs. non-coital sexual behavior) and which type of relationship (met that same day vs. not in a committed relationship) they asked about. Also, young people’s judgments of what constitutes “sex” are influenced by factors such as the length of time a couple has been dating or sexually involved, and casual partners may not be considered sexual partners (Cecil, Bogart, Wagstaff, Pinkerton, & Abramson, 2002). As a result, asking about sexual encounters in general may not elicit complete reporting of hookups.

Behavioral specificity is important because different sexual behaviors carry different levels of risk. Kissing and sexual touching usually carry little to no risk for STD transmission, oral sex carries a moderate risk (Edwards & Carne, 1998a, 1998b), and vaginal and anal sex carry the highest risk (Institute of Medicine, 1997). Therefore, it is important to understand the prevalence of oral, vaginal, and anal sex during hookups compared to less intimate behaviors. Event-level studies have assessed the sexual

behaviors that occurred during college students' most recent hookups; classified according to the most intimate behavior that occurred, 31-34% reported kissing, 16-19% reported genital touching, 15-30% reported oral sex, and 23-54% reported vaginal sex (Downing-Matibag & Geisinger, 2009; England et al., 2008; England & Thomas, 2006). Another study assessed the overall prevalence of seven sexual behaviors during first-year female college students' most recent hookups; 98% reported kissing, 67% reported having their breasts touched, 56% reported genital touching outside of clothing, 46% reported sexual touching underneath clothing, 27% reported oral sex, 27% reported vaginal sex, and 0% reported anal sex (Fielder & Carey, 2010b).

Proposed Hookup Definition

The hookup definition used in this study reflects the extant research. Research indicates that a variety of partner types (e.g., friend, stranger) and sexual behaviors (e.g., kissing, vaginal sex) are involved in hookups (Armstrong et al., 2010; Fielder & Carey, 2010b), which illustrates the variety of ways the term may be interpreted. At the same time, numerous studies have converged on the same defining characteristic of a hookup: the lack of current or expected future commitment between partners (Epstein et al., 2009; Paul & Hayes, 2002; Stinson, 2010). A unique approach to hookup assessment was used to capture the non-committal aspect of hookups while minimizing the potential for proactive interference (Anderson & Neely 1996). Participants were asked about interactions with casual partners, rather than about hookups (Fielder & Carey, 2010a; 2010b). Minimizing use of the word hookup limited the likelihood of participants responding with their idiosyncratic understandings of the term in mind.

A casual partner was defined as “someone whom you were not dating or in a

romantic relationship with at the time of the physical intimacy, and there was no mutual expectation of a romantic commitment. Some people call these hookups.” Use of this definition of casual partner captured the non-committal aspect of hookups (as identified by students in formative research; cf. Bogle, 2008a; Epstein et al., 2009; Paul & Hayes, 2002) while limiting attention on the word hookup. In the definition of casual partner, neither partner type (e.g., friend, stranger) nor duration of association (e.g., one time only, multiple interactions) was restricted. In addition, any level of commitment or romantic involvement was specified as disqualifying the interaction as a hookup; both “dating,” which may be interpreted as a more casual or non-exclusive relationship but is also frequently used by college students to refer to individuals already in a relationship (Banker et al., 2010; Bogle, 2008a), and “in a romantic relationship,” which has a straightforward interpretation as a serious or committed relationship, were mentioned in the definition as exclusion criteria. The specification of “no mutual expectation of a romantic commitment” was included to disqualify sexual events that occur between two people who engage in sexual behavior in a context suggesting to both partners that a romantic relationship is imminent (e.g., two people who have been dating but have not yet explicitly discussed being “in a relationship”). At the same time, an interaction in which one or both partners desires, rather than expects, a romantic commitment remains eligible to be considered a hookup; some individuals hook up in the hopes that a romantic relationship will eventually develop (Bogle, 2007; Grello et al., 2006; Lehmiller et al., 2010).

Because the term hookup is ambiguous (Bogle, 2008a) and used to refer to different sexual behaviors (Paul & Hayes, 2002), the hookup definition used in this study

was behaviorally specific. Oral and vaginal sex hookups,¹ henceforth referred to as sexual hookups, were the focus of this study because they confer greater potential for health consequences compared to non-penetrative sexual behavior, such as kissing or sexual touching. Thus, a sexual hookup was operationally defined as oral or vaginal sex with a casual partner. Participants were asked about oral and vaginal sex with casual partners. Although this assessment strategy is not without disadvantages (e.g., not emphasizing the word hookup), it was designed to reduce ambiguity in individuals' interpretations of questions about hookup behavior while still capturing the essence of hookup behavior.

Health Consequences of Hookups

Rationale for Focus on First-Year College Women

Gender differences in vulnerability to consequences. Research suggests that women are more vulnerable than men to the potential consequences of hookups, such as negative effects on mental health, SV, and STDs. First, women are more likely than men to have negative emotional reactions to sex outside of committed relationships due to gender differences in sexual motives (Meston & Buss, 2007) and acceptance of casual sex (Petersen & Hyde, 2010) as well as the sexual double standard that leads to damaged reputations for women, but not men, who have numerous sexual partners (Crawford & Popp, 2003). Also, women are more likely than men to be diagnosed with depression (American College Health Association [ACHA], 2010). Second, women are more vulnerable to SV: women tend to be physically smaller than men, most victims of SV are female, and most perpetrators are male (Spitzberg, 1999). Third, women are more biologically vulnerable to STDs than men due to their anatomy (e.g., greater mucosal

¹ Anal sex rarely occurs during hookups (Fielder & Carey, 2010b), so it was not assessed in this study in order to minimize the burden on participants and improve data quality.

surface area for pathogens to enter) and increased likelihood of asymptomatic infections (Institute of Medicine, 1997). Because women are more vulnerable than men to the possible consequences of sexual hookups, the current study focused on women.

Emerging adulthood. Emerging adulthood has been defined as the period from ages 18 through 25 (Arnett, 2000). Emerging adulthood is hypothesized to be distinct from adolescence and young adulthood. In developed nations, particularly the United States, emerging adults have more freedom than adolescents and are not yet subjected to social role demands or expectations (e.g., maintaining a household, working full-time; Arnett, 2000). In addition, emerging adults have decided little about, but have numerous options for, their futures. Arnett argued that “the scope of independent exploration of life’s possibilities is greater for most people than it will be at any other period in the life course” (2000, p. 469). The major developmental goal of emerging adulthood is identity formation, which helps explain why risky behaviors (e.g., unprotected sex) occur most frequently during this developmental stage.

College attendance has become more common than in the past, and 69% of American high school graduates now enter college the fall after their high school graduation (National Center for Education Statistics, 2007). Most American college students enter college when they are 18 years old, and the vast majority of students living on college campuses are emerging adults. Because the developmental context of emerging adulthood calls for experimentation, college students are likely to engage in hookup behavior as part of their exploration of relationships and sex. Indeed, the majority of college students report hookup experience (Armstrong et al., 2010). Accordingly, the current study focused on college students.

Transition from high school to college. Within the college experience, the transition from high school to college is an important developmental context. The first year of college is a period in which risky behaviors, such as alcohol use, drug use, and sexual behavior, tend to increase (Bailey, Haggerty, White, & Catalano, 2010; Fromme, Corbin, & Kruse, 2008). For instance, a recent study found that 11% of participants lost their virginity during the first two quarters of college (Patrick & Lee, 2010). Numerous factors contribute to the increase in risk behaviors among residential students during the transition to college. First, students no longer live with their parents or guardians, which may increase their opportunities to try new behaviors. Second, students are subject to minimal supervision from college officials; having their own rooms provides privacy and opportunities to engage in risky behaviors. Third, experimentation is an important developmental task of emerging adulthood (Arnett, 2000). Fourth, students have expectations for college as the time and place to party and try new things (Bogle, 2008a). Fifth, perceived norms and media portrayals about college may increase students' desire to engage in risk behaviors to fit in with their peers. In sum, the first year of college is an important period because of the potential for risk behavior; hence, the current study focused on first-year college students.

Summary of rationale for sampling plan. This study focused on incoming first-year college women. As the following review will illustrate, preliminary evidence suggests that women are the most vulnerable to the potential health consequences of hooking up. Given their developmental context of emerging adulthood and the high prevalence of hookup behavior among them, college students are an important population to study. Specifically, this study focused on first-year students due to the increase in risk

behaviors during the transition from high school to college.

Mental Health

Positive changes in mental health. Although sexuality among youth has traditionally been viewed as problematic or dangerous, sexual identity development is a normal, healthy aspect of emerging adulthood (Halpern, 2010). Accordingly, sexual hookup behavior may lead to positive changes in mental health for college women. Qualitative studies have revealed a variety of benefits that women receive from hookups (Glenn & Marquardt, 2001; Plante, 2006; Paul, 2006; Paul & Hayes, 2002; Regan & Dryer, 1999), which may lead to positive mental health consequences, such as increased self-esteem, positive affect, or life satisfaction. First, potential personal benefits include feeling attractive, feeling desirable, feeling empowered, experiencing excitement and fun, and being distracted from stress or other life concerns. Second, potential sexual benefits include experiencing sexual pleasure, engaging in sexual experimentation, obtaining sexual experience, and experiencing the novelty of new partners. Third, potential social benefits include meeting new people, fitting in with peers, feeling close to someone, and improving social status.

As a result of one or more of these benefits, hookups could have a positive impact on women's mental health. Research has found that 26% of college women report only positive emotional reactions (e.g., desirable, pleased) to their hookups over the past year, and another 25% reported some positive and some negative emotional reactions to their hookups (Owen et al., 2010). Moreover, on average, college women reported more positive emotional reactions to their hookup and friends with benefits encounters than negative reactions (Owen & Fincham, 2011a; 2011b). Similarly, on average, women

report high enjoyment of their most recent hookups (Armstrong et al., 2010; Fielder & Carey, 2010b), and 28% of women viewed their most recent one-night stand positively (Campbell, 2008). Overall, findings are inconclusive, with the average college woman reporting enjoying hookups at the event-level, but only one-fourth of women reporting positive global emotional reactions to hookups.

Negative changes in mental health. Other evidence suggests that sexual hookup behavior may lead to negative changes in mental health for college women. On average, women are less likely than men to desire or engage in sex outside of committed relationships (Okami & Shackelford, 2001; Surbey & Conohan, 2000). The majority of women report feeling guilty after casual sex (Herold & Mewhinney, 1993) and regretting their most recent one-night stands (Campbell, 2008). Traditional sexual scripts for women dictate that their sexual behavior and experience should be more restricted than men's (i.e., should occur only in the context of committed relationships), so women who violate the script by hooking up may experience guilt and regret (McCormick, 1987). In addition, hookups lack emotional intimacy, and women are more likely than men to report intimacy motives as their reason for engaging in sexual behavior (Cooper, Shapiro, & Powers, 1998; Meston & Buss, 2007). When asked about their reasons for engaging in their most recent hookups, college women rated emotional motives higher than men, whereas men rated physical motives higher than women (Daubman & Schatten, 2009). Moreover, most women report wanting an emotional attachment to exist with a partner before having sex (Carroll, Volk, & Hyde, 1985; Lottes, 1993). Thus, women's negative attitudes toward casual sex and focus on intimacy motives for having sex may lead to negative mental health reactions for those who engage in sexual hookups.

The social consequences of hooking up also suggest the possibility for negative reactions in women. American society subscribes to a sexual double standard requiring women to be sexually conservative but encouraging sexual behavior among men (Crawford & Popp, 2003). Women whose behavior does not follow these guidelines may be stigmatized. Indeed, qualitative research indicates that college students believe that women, but not men, who hook up too often are “sluts” (England et al., 2008; Paul, 2006); it is difficult for women to know how often is too often. A second social reason that women may react negatively to hookups is a lack of the desired outcome with hookup partners. Women are more likely than men to want a hookup, booty call, or friend with benefits interaction to become a romantic relationship (Armstrong et al., 2010; Bradshaw et al., 2010; Jonason et al., 2009); for instance, 65% of college women with hookup partners reported wanting to transition to a romantic relationship (Owen & Fincham, 2011b). In the event that hookups do not become relationships, women seeking that outcome are likely to experience rejection and emotional distress.

Sexual factors may also lead to negative emotional reactions among women who hook up. Although one of the main proposed benefits of hookups is sexual pleasure, survey results suggest many women do not receive sexual satisfaction during hookups. For example, only 10% of college women reporting on their most recent hookup with a new partner experienced an orgasm during the hookup (Armstrong et al., 2010); when repeat hookup partners were considered along with new hookup partners, the overall orgasm rate reached only 19% for women (England et al., 2008). College women report lower levels of sexual desire, wanting, and pleasure during hookups than during friends with benefits interactions, dating interactions, or sexual interactions within romantic

relationships (Bay-Cheng, Robinson, & Zucker, 2009). Event-level data also indicate that women do not experience sexual reciprocity when it comes to oral sex. When oral sex occurs during hookups, men are more likely to receive it than are women (England & Thomas, 2006; Penhollow et al., 2007). In hookups that were the first interaction with a new hookup partner, 80% of men, but only 46% of women reported receiving oral sex (Armstrong et al., 2010). Lastly, women are often pressured from hookup partners as well as peers to go further sexually than they want (Paul & Hayes, 2002). Because men are more likely than women to want to have oral or vaginal sex during first-time hookups (Daubman & Schatten, 2009), men may be willing to use verbal coercion to pressure hookup partners into more intimate sexual behaviors (Wright, Norton, & Matussek, 2010). Any of these three sex-related situations may cause emotional distress in women who hook up.

Several studies have assessed the mental health effects of hookup behavior in college women. Women with hookup experience reported lower self-esteem (Paul et al., 2000) and higher sexual regret (Eshbaugh & Gute, 2008) than women who had never hooked up. Another cross-sectional study found that college women who had engaged in vaginal sex outside of committed relationships reported higher depressive symptoms than women who had engaged in vaginal sex only in the context of romantic relationships (Grello, Welsh, & Harper, 2006). A recent study assessed positive (e.g., pleased, desirable) and negative (e.g., empty, confused) emotional reactions to hookups; 49% of college women reported only negative emotional reactions, and another 25% reported mixed reactions (Owen et al., 2010).

Only two longitudinal studies of the effect of sexual hookups on college students'

mental health have been published thus far. The first study assessed psychological distress over the first semester of college among three groups of college women (Fielder & Carey, 2010a): (a) an inexperienced group, which had never hooked up at any point during the study, (b) a transition group, which had never hooked up before college but hooked up for the first time during the first semester of college, and (c) an experienced group, which had hooked up before college. The results indicated a trend toward increased psychological distress among the transition group, but the small size of this group ($n = 11$) limited statistical power. The pattern of means among the three groups over time was consistent with a negative effect of sexual hookups on women's mental health. That is, the inexperienced and transition groups reported lower distress at study entry compared to the experienced group, and the inexperienced group reported lower distress at the end of the first semester of college compared to the transition and experienced groups, which both had hookup experience by that point (Fielder & Carey, 2010a).

The second longitudinal study examined depressive symptoms of men and women as a function of hookup behavior. Controlling for baseline level of depressive symptoms, having one or more non-penetrative (i.e., kissing and/or sexual touching only) or penetrative sex (i.e., oral, vaginal, and/or anal sex) hookups during the semester did not predict depression at the end of the semester (Owen, Fincham, & Moore, 2011). However, there was an interaction between penetrative sex hookups and depression. Participants who had reported more depressive symptoms at baseline and then hooked up reported fewer depressive symptoms at the end of the semester compared to participants who did not hook up, whereas participants who had reported fewer depressive symptoms

at baseline and then hooked up reported more depressive symptoms at the end of the semester compared to participants who did not hook up. Thus, for the most distressed participants, hooking up led to decreases in depression, but for the least distressed participants, hooking up led to increases in depression. These results suggest a complex relationship between hooking up and mental health.

Summary and critique of the literature. The research reviewed heretofore suggests that sexual hookup behavior may have varied effects on college women's mental health. On the one hand, hookups may lead to positive mental health outcomes for some women. The high prevalence of hookup behavior (England et al., 2008) suggests that it confers benefits on participants, and qualitative research has identified a variety of personal, sexual, and social benefits of hooking up that may bolster mental health (Plante, 2006; Paul, 2006; Paul & Hayes, 2002). Furthermore, at the event level, women report enjoying hookups, on average (Fielder & Carey, 2010b), and 26% of college women report only positive emotional reactions to their hookups (Owen et al., 2010). A longitudinal study found that more distressed college students reported reductions in depressive symptoms following penetrative sex hookups, leading Owen et al. (2011) to suggest that it may be used as a coping mechanism.

On the other hand, hookups may lead to negative mental health outcomes. This review has identified numerous ways whereby hookups may negatively affect women's emotional health, including women's attitudes toward casual sex, conservative sexual scripts for women, lack of intimacy in hookups, potential for a bad reputation, lack of desired outcome with the hookup partner, sexual dissatisfaction, lack of sexual reciprocity, and pressure to engage in unwanted sexual behavior. The results of several

cross-sectional studies (Eshbaugh & Gute, 2008; Grello et al., 2006; Paul et al., 2000) and two longitudinal studies (Fielder & Carey, 2010a; Owen et al., 2011) have revealed negative emotional effects among women who engage in sexual hookups. In addition, half of college women report only negative emotional reactions to their hookup experiences (Owen et al., 2010). Overall, the limited research suggests that sexual hookup behavior will positively affect the mental health of a minority of college women and will negatively affect the mental health of the majority of college women.

Conclusions regarding the effects of hookups on mental health need to be considered preliminary because (a) there is a paucity of research on the effects of hooking up on mental health, and (b) most extant studies are cross-sectional or qualitative. Only two longitudinal studies with negative mental health outcomes have been conducted, and one was limited by a small sample size (Fielder & Carey, 2010a). In addition, (c) a narrow set of outcomes has been examined, with most studies focusing on psychological distress or self-esteem. Positive mental health outcomes have not been assessed prospectively. Finally, (d) the clinical significance of changes in mental health that result from hookup behavior has not been assessed.

Due to the limitations of previous research, the current study included a one-year longitudinal assessment of the effect of sexual hookup behavior on mental health among first-year female college students. Monthly assessments were employed to increase the chance of detecting changes in mental health. This study included four indicators of poor mental health: depression, anxiety, negative affect, and perceived stress. In addition, a depression diagnosis variable was included so that the clinical significance of any changes in mental health could be evaluated. This research also contributes to the

literature by assessing the positive mental health consequences of sexual hookup behavior using three indicators: positive affect, life satisfaction, and self-esteem.

Sexual Victimization

Prevalence. Sexual victimization (SV) is disturbingly common on college campuses. Many women experience SV during their time at college, with 19% of college women reporting forced oral, vaginal, or anal sex since starting college (Gross, Winslett, Roberts, & Gohm, 2006); the majority (84%) of these experiences occurred during the first or second year of college. In two surveys, 31% and 37% of first-year female college students reported experiencing some type of SV during their first year of college (Humphrey & White, 2000; Testa, Hoffman, & Livingston, 2010). Classified by their most severe experience, 6-10% of first-year female college students reported unwanted sexual contact, 4-12% reported sexual coercion, 4-7% reported attempted rape, and 6% reported rape. Surveys of college males have found that 26-33% admit perpetrating SV (Abbey, McAuslan, & Ross, 1998; Abbey, McAuslan, Zawacki, Clinton, & Buck, 2001). In sum, SV is prevalent on college campuses, and first-year female students appear especially vulnerable.

Hookups and sexual victimization: Possible mechanisms. Sexual hookup behavior may increase women's risk for SV via alcohol use, men's misperceptions of women's sexual interest, and increased opportunity.

Effects of alcohol. First, alcohol use and hookup behavior are correlated (Owen et al., 2010), and alcohol use is a strong predictor of oral and vaginal sex hookup behavior (Fielder & Carey, 2010a; Owen et al., 2011). Alcohol use may have several functions for individuals who hook up, including providing the "liquid courage" needed to pursue a

hookup (Stoner, George, Peters, & Norris, 2007, p. 228) or serving as an excuse or scapegoat after a hookup (Vander Ven & Beck, 2009). Event-level studies indicate that 64% to 80% of college students consumed alcohol before their most recent hookups (Downing-Matibag & Geisinger, 2009; Fielder & Carey, 2010b). College women reported consuming a median of four alcoholic drinks prior to their most recent hookups, and college men reported a median of six (England et al., 2008). Another study estimated undergraduates' blood alcohol contents (BAC) during their most recent hookups; 13% had a BAC between .08 and .12, and 28% had a BAC of .12 or higher (England & Thomas, 2006). Thus, alcohol use and intoxication are common features of hookup experiences; at the same time, alcohol use is a significant risk factor for SV (Sochting, Fairbrother, & Koch, 2004). A study of the temporal association between alcohol use and SV among female college students revealed that the odds of SV were 7.3 times higher on drinking days than non-drinking days (Parks & Fals-Stewart, 2004).

Alcohol use increases risk of SV through its effects on both men and women. Several of alcohol's effects on men increase the likelihood that men will perpetrate SV. First, men interpret alcohol consumption by women as a signal of sexual availability or willingness (Corcoran & Thomas, 1991; George & Stoner, 2001). Second, intoxication increases the likelihood of a man misperceiving a woman's sexual intentions (Abbey, Zawacki, Buck, Clinton, & McAuslan, 2001). Third, intoxication increases men's perceptions of women's enjoyment or arousal in sexually aggressive situations (Abbey, 2002; Gross, Bennett, Sloan, Marx, & Juergens, 2001). Fourth, alcohol use increases men's acceptance of and intentions to be sexually aggressive (Bernat, Calhoun, & Stolp, 1998; Testa, 2004).

Alcohol also affects women in ways that increase the likelihood that a woman will become a victim of sexual assault. Intoxication decreases women's ability to detect risk (Abbey, 2002; Luiselle & Fuqua, 2007). Moreover, intoxicated women are more likely to engage in risky behavior (e.g., invite partner to spend the night) with an intoxicated partner with whom they do *not* want to have sex (Testa, Livingston, & Collins, 2000). Besides the effects of alcohol, women also have a general tendency to overestimate their ability to manage risk for SV, have unrealistic optimism even when they recognize risks, and accept risks if there is a potential for a relationship (Livingston & Testa, 2000).

Misperceptions of sexual interest. Men's misperception's of women's sexual interest is a risk factor for SV (Abbey, Zawacki, et al., 2001). Several features of hookups indicate a high likelihood that men will misperceive women's sexual intentions. First, college students may be uncertain as to which sexual behaviors will occur during their hookups because hookup is an ambiguous term used to mean different things (Bogle, 2008a; England et al., 2008). Ambiguity in sexual situations increases risk for SV (Livingston, Hequembourg, Testa, & VanZile-Tamsen, 2007). Men and women overestimate the other gender's comfort with sexual behaviors occurring during a hookup (Lambert, Kahn, & Apple, 2003; Reiber & Garcia, 2010). During hookups, partners do not usually talk about what is happening (Littleton, Tabernik, Canales, & Backstrom, 2009; Paul & Hayes, 2002), leaving the potential for misunderstandings over what behaviors will occur. Furthermore, non-verbal sexual communication is more common than verbal sexual communication, so errors of interpretation are possible (Beres, 2010; Vannier & O'Sullivan, 2010). In sum, the ambiguous nature of hookups and lack of

communication between partners may result in men misperceiving women's intentions for sexual activity.

Second, gender differences in expectations for hookups are common. Qualitative research suggests that men and women have different expectations for how far hookups will progress sexually (Littleton et al., 2009). College men are more likely than women to expect a partner to go further sexually (Wright et al., 2010). Men are more comfortable than women with engaging in sexual touching, oral sex, and vaginal sex during hookups (Lambert et al., 2003; Reiber & Garcia, 2010). Another study found that 62% of men but only 18% of women would be comfortable having oral or vaginal sex during their first hookup with a partner (Daubman & Schatten, 2009). Gender differences in motives for engaging in hookups may result in mismatched expectations (Paul et al., 2008).

Third, affiliation motives may lead women may acquiesce to unwanted sexual advances during hookups. During hookups, women who do not want to engage in penetrative sex may experience conflict between social affiliation motives and self-protection motives (Hammen, 2009; Norris, Nurius, & Dimeff, 1996). Compared to men, women generally want more of a relationship after a hookup (Garcia & Reiber, 2008), so they may go further than they want sexually to preserve possibilities for future relationship contact with their hookup partners. In addition, women may feel obligated to take care of their hookup partner's sexual needs due to traditional gender roles (Hill, 2002; Impett & Peplau, 2003). Men may interpret any indication of consent for less intimate behaviors (e.g., kissing) to mean women also consent to more intimate sexual behaviors.

Increased opportunity. A third way in which hookup behavior may increase risk

for SV is by providing more opportunities for victimization to occur. Having a high number of consensual sex partners increases risk for SV simply by providing more opportunities to encounter a sexually aggressive partner (Franklin, 2010). Due to the lack of commitment inherent in hookup behavior, a high number of hookup partners over the course of college is possible. One study of undergraduates found that among those who had ever hooked up (using a broad definition), the average number of hookup partners was 12.7 for men and 11.3 for women (Daubman & Schatten, 2009). Another study of first-semester female college students found that the average numbers of hookup partners with whom participants had kissed, engaged in sexual touching, and engaged in oral sex were 9.7, 4.0, and 1.8, respectively (Fielder & Carey, 2010b); these averages reflect the number of lifetime hookup partners after one semester of college. Given the frequency of hookup behavior in college, the potential for a high number of hookup partners over the course of four years is evident.

Hookups and sexual victimization. Few studies have specifically investigated the association between hookup behavior and SV. One study of college women found that 22% of all sexual assaults and 13% of all rapes started out as hookups (Littleton et al., 2009). The same study included a qualitative analysis of women's rape and hookup scripts; 98% of women did not perceive hookups as potential situations in which SV may occur. Another study revealed that 78% of unwanted oral, vaginal, or anal sex incidents during college occurred during hookups (Flack et al., 2007). Of the students who had never engaged in hookup behavior, none reported unwanted sex during college; in contrast, 25% of those with hookup experience reported unwanted oral, vaginal, or anal sex during college. A longitudinal study found that hookup behavior during high school

and the first semester of college was a risk factor for SV during the first year of college (Testa, Hoffman, & Livingston, 2010). Lastly, 12% of college men admitted using verbal coercion during a hookup to get a partner to go farther sexually than she had initially expressed interest in (Wright et al., 2010).

Summary and critique of the literature. SV occurs frequently on college campuses, and first-year students appear to be at increased risk. Several features of sexual hookup behavior may increase risk for SV. Both hookups and SV share a strong association with alcohol use. The ambiguity of hookups and gender differences in expectations for hookups present the opportunity for men to misperceive women's sexual intentions during hookups. Also, having more sexual partners increases the chance of encountering a sexually aggressive partner. The results from the limited research on hookups and SV suggest that women who hook up are at increased risk. However, only one longitudinal study has been conducted thus far. Therefore, the current study assessed the effect of sexual hookup behavior on risk for SV throughout the first year of college.

Sexually Transmitted Diseases

Prevalence. STDs are common among young people and negatively impact health. STDs may lead to shame and guilt and can cause reproductive health problems. An estimated 9.1 million new cases of STDs occurred among 15- to 24-year-olds in the United States in 2000 (Weinstock, Berman, & Cates, 2004), including 1.9 million cases of trichomoniasis, 1.5 million cases of chlamydia, and 430,000 cases of gonorrhea. Prevalence rates among college students differ between studies in which diagnoses were self-reported or were confirmed via STD testing. The Fall 2009 National College Health Assessment (ACHA, 2010) found that 1.1% and 0.4% of college students self-reported a

diagnosis of chlamydia and gonorrhea, respectively, in the past year. Among the general college student population, testing for chlamydia has found rates of 3.4% and 9.7% (James, Simpson, & Chamberlain, 2008; Sipkin, Gillam, & Grady, 2003), and testing among women visiting university health centers has found rates of 2.3% and 3.0% (Cook et al., 1999; Richardson et al., 2003). The only study to test college students for gonorrhea found a prevalence of 1.5% (James et al., 2008). No studies on prevalence rates of trichomoniasis among college students were found.

Sexual risk behavior. Hooking up may increase risk for STDs because sexual behaviors that may result in STD transmission frequently occur and are often unprotected. When asked about the relative frequency of sexual behaviors during their hookups, 26% of college women reported that they have vaginal sex always or most of the time; 16% reported that they perform oral sex, and 19% reported that they receive oral sex always or most of the time during hookups (Penhollow et al., 2007). Event-level studies of college students' most recent hookups have shown that 15-27% involved oral sex, and 27-38% involved vaginal sex (England et al., 2008; Fielder & Carey, 2010b).

Sexual hookup behavior may increase STD risk via unprotected sex. Most college students are unaware of the health risks of oral sex (Chambers, 2007; Remez, 2000), and less than 5% report being concerned about contracting STDs from oral sex during hookups (Downing-Matibag & Geisinger, 2009). Although oral sex is less risky than vaginal sex (Institute of Medicine, 1997), bacterial and viral STDs can be transmitted through oral sex (Edwards & Carne, 1998a, 1998b). Perhaps due to this lack of knowledge, condoms are not routinely used during oral sex hookups. An event-level study of female college students' most recent hookups revealed that none of the

participants who engaged in oral sex used condoms (Fielder & Carey, 2010b). Vaginal sex hookups are also frequently unprotected. Twenty percent of undergraduates reported that they do not use condoms during hookups that involve vaginal sex (Paul et al., 2000). Event-level data on most recent hookups indicate that only 69% of female students who engaged in vaginal sex reported condom use (Fielder & Carey, 2010b). Many college students use contraception primarily to prevent pregnancy (Siegel, Klein, & Roghmann, 1999), rather than for STD prevention, as STD risk is not a concern of most college students, including those who hook up (Downing-Matibag & Geisinger, 2009).

Multiple sexual partners. Hookup behavior may also increase STD risk because of the possibility of multiple sexual partners. Because hookup partners are not in committed relationships, they are free to have other partners. Limited data on number of hookup partners suggest that many college students accumulate relatively high numbers of hookup partners. For example, the average number of hookup partners (using a broad definition) in a sample of mostly upper-level undergraduates was 12.7 for men and 11.3 for women (Daubman & Schatten, 2009). College women in another study reported an average of 4.6 hookup partners and 2.6 friends with benefits partners (Bay-Cheng et al., 2009). Not all of these hookup partners engage in penetrative sex, but the ones that do are at increased risk for STDs. Having multiple sexual partners increases risk for STDs (DiClemente et al., 2005) by providing more opportunities for exposure to STDs. Risk is increased even if the different partners do not overlap in time (Kelley, Borawski, Flocke, & Keen, 2003).

Concurrent sexual partners. A third way in which hooking up may increase risk of STDs is through concurrent sexual partners, which increases risk for STD transmission

(Lenoir, Adler, Borzekowski, Tschann, & Ellen, 2007). Because hookup partners make no commitments to one another, they may engage in hookups with other partners while having an ongoing hookup situation. Adolescents and emerging adults often wrongly perceive partner concurrency when in committed relationships (Drumright, Gorbach, & Holmes, 2004; Lenoir, et al., 2007), and they are even less likely to know this information as hookup partners. Few data on concurrent partners in the hookup context are available, but one study found that 16% of individuals with a current friends with benefits relationship had two concurrent friends with benefits partners (Lehmiller et al., 2010); an additional 8% reported three or more concurrent friends with benefits partners. College students are unlikely to know if their hookup partners have concurrent partners, which may affect their evaluation of whether barrier contraception should be used for protection against STDs.

Summary and critique of the literature. Numerous features of hookups suggest an increased risk of STDs for students who engage in sexual hookup behavior. Oral sex and vaginal sex occur frequently during hookups (England et al., 2008), so STD transmission is possible if either partner is infected. College students almost never use condoms during oral sex hookups, and they do not use condoms consistently during vaginal sex hookups (Fielder & Carey, 2010b). Moreover, due to the lack of commitment inherent in hooking up, having multiple or concurrent partners is common. Despite the high number of risk factors for STD transmission related to hookup behavior, few studies have investigated the relationship between STD risk and hooking up. Only one event-level study (Fielder & Carey, 2010b) and one cross-sectional study (Paul et al., 2000) have assessed condom use during hookups, and neither one investigated hookup behavior

in relation to STDs. No longitudinal studies have specifically examined the association between hookup behavior and STDs. Therefore, the current study prospectively assessed the effect of sexual hookup behavior on STD incidence among first-year female college students.

Sexual Hookups as a Unique Risk Factor for Health Consequences

In order to determine whether sexual hookup behavior poses a unique risk to young women, sexual behavior in the context of traditional romantic relationships was used as a basis of comparison. In this manner, it was possible to assess whether sexual hookup behavior confers unique risk for health consequences beyond that of sexual behavior in general. Sex within romantic relationships (henceforth referred to as sexual romantic behavior) may also impact mental health and increase risk for SV and STDs.

Limited research exists on the association between sexual romantic behavior and mental health. Studies of younger adolescents (i.e., ages 12-16) have found that romantic relationships are associated with poorer emotional health (Davila et al., 2009; Zimmer-Gembeck, Siebenbruner, & Collins, 2001), but this pattern did not hold for girls aged 17 or older (Joyner & Udry, 2000; Shulman, Walsh, Weisman, & Schelyer, 2009). Studies of college students have suggested that romantic relationships are important for mental health, particularly among women; being in a relationship was associated with having fewer depressive symptoms (Simon & Barrett, 2010). Furthermore, students in committed relationships reported fewer mental health problems than single students (Braithwaite, Delevi, & Fincham, 2010). College women perceived a host of benefits resulting from romantic relationships, including companionship, feeling loved, happiness, exclusivity, intimacy, self-esteem, security, and sexual gratification (Sedikides, Oliver, &

Campbell, 1994); conversely, college women also perceived numerous costs of romantic relationships, such as stress, dependence on partner, loss of identity and freedom, fights, and investments of time and effort. The encompassing nature of these costs and benefits illustrates the potential for romantic relationships to affect women's mental health.

Notably, a major limitation of prior research is its focus on the romantic relationship status and lack of attention on the sexual behavior of the relationship partners.

Nonetheless, a connection between sexual romantic behavior and mental health is plausible.

SV within the context of dating or romantic relationships is not uncommon (Vézina & Hébert, 2007). Having had a romantic relationship partner in the past 18 months was associated with increased odds of experiencing forced sexual intercourse for adolescent girls (Raghavan, Bogart, Elliott, Vestal, & Schuster, 2004). Sexual coercion by a dating partner was reported by 31% of American college women (Chan, Straus, Brownridge, Tiwari, & Leung, 2008). A recent study found that most sexual coercion of women by their male relationship partners led to unwanted sexual contact (e.g., kissing, sexual touching) and was accomplished through verbal coercion (e.g., arguing with partner until she gives in to sexual advances; Brousseau, Bergeron, Hébert, & McDuff, 2011). Unwanted sexual contact and verbal sexual coercion on the part of the current relationship partner were reported by up 19% of women, whereas attempted and completed vaginal rape were reported by only 2%. Overall, there is evidence that romantic relationship partners perpetrate SV against college women (Smith, White, & Holland, 2003). Sexual precedence may be an important factor within romantic relationships, as individuals may feel that previous sexual interactions incur an obligation

for future sexual interactions (Adams-Curtis & Forbes, 2004).

Sex within romantic relationships also carries risk for STDs. Condoms are used less frequently with romantic partners than casual partners (Ott, Adler, Millstein, Tschann, & Ellen, 2002). Romantic partners' reluctance to use condoms may be related to efforts to demonstrate trust (Bailey et al., 2010). Condom use may be especially low for couples using hormonal contraceptives to prevent pregnancy (Ott et al., 2002; Weisman, Plichta, Nathanson, Ensminger, & Robinson, 1991), as they may not perceive a need for barrier contraceptives to prevent STD transmission. Condom use is important due to the possibility of one or more relationship partners having undetected or undisclosed STDs, as well as concurrent partners. For example, in a study of couples of at least six months duration, 10% of women were unaware of their partner's recent STD diagnosis or infidelity (Witte, El-Bassel, Gilbert, Wu, & Chang, 2010). Studies with adolescents and emerging adults have found high rates of undisclosed sexual partner concurrency (Drumright et al., 2004; Lenoir et al., 2006). Men are more likely to have concurrent partners (Lenoir et al., 2006), and women are less likely than men to know about their partners' concurrent partners (Harvey, Bird, Hederson, Beckman, & Huszti, 2004). In addition to having concurrent partners, having sequential partners also increases risk for STDs (Kelley et al., 2003). Serial monogamy, or having sequential monogamous relationships, is a common practice among American college students (Corbin & Fromme, 2002). Despite most relationship partners having had multiple sexual partners in the past, never having been tested for STDs, and not establishing that theirs is a mutually monogamous and disease free relationship prior to the first sexual interaction, college students perceive little risk for STDs with their romantic relationship partners, even when

knowing them for less than one month (Corbin & Fromme, 2002). Taken together, these findings suggest that sexual behavior within the context of romantic relationships carries risk for STDs.

As the main alternative sexual behavior pattern exhibited by young people besides hooking up, sexual romantic behavior provides an important comparison condition for sexual hookup behavior. Notably, there are several differences between sexual interactions occurring within the context of romantic relationships compared to hookups. First, the former occurs with a committed partner with whom emotional intimacy is presumably shared, whereas the latter occurs with a partner who is uncommitted and engaging in a way that is designed to avoid emotional attachment. Second, romantic encounters are more likely to involve oral and vaginal sex, and less likely to be preceded by alcohol use, compared to hookups (Fielder & Carey, 2010b). Third, women report enjoying romantic encounters more and regretting them less than hookups. Fourth, women are more likely to experience orgasm during romantic encounters than during hookups (England et al., 2007). Despite these differences, sexual romantic behavior was included as a covariate to evaluate the unique risk conferred by sexual hookup behavior, beyond any risk conferred by general sexual activity. Sexual hookup behavior was expected to increase risk for negative mental health outcomes, SV, and STDs even after statistically controlling for sexual romantic behavior.

Study Aims

The literature suggests that sexual hookup behavior may have health consequences for college women. Mental health may be positively or negatively affected and risk for experiencing SV and contracting STDs may be increased. The first aim of

this study was to assess the effects of sexual hookup behavior on women's mental health using a longitudinal research design. The second aim was to examine the association between sexual hookup behavior and risk for SV. The third aim was to evaluate the effect of sexual hookup behavior on risk for STDs.

Hypotheses

Hypothesis 1: Engaging in sexual hookup behavior will adversely affect women's mental health.

H1a: Compared to women who do not engage in sexual hookup behavior, women who engage in sexual hookup behavior will report higher initial levels of depression, anxiety, negative affect, and perceived stress, and lower initial levels of positive affect, life satisfaction, and self-esteem.

H1b: Changes in mental health will be a function of changes in sexual hookup behavior, such that increases in hookup behavior will predict increases in anxiety, depression, negative affect, and perceived stress as well as decreases in positive affect, life satisfaction, and self-esteem.

H1c: Compared to women who do not engage in sexual hookup behavior, women who engage in sexual hookup behavior will be more likely to meet diagnostic criteria for major depressive disorder or other depressive disorder.

Hypothesis 2: Engaging in sexual hookup behavior during the study will increase women's risk of experiencing sexual victimization during the study. Compared to women who do not engage in sexual hookup behavior, women who engage in sexual hookup behavior will be more likely to experience sexual victimization.

Hypothesis 3: Engaging in sexual hookup behavior during the study will increase women's risk of contracting an STD during the study. Compared to women who do not engage in sexual hookup behavior, women who engage in sexual hookup behavior will be more likely to contract an STD.

Method

Participants

Participants were 483 incoming first-year female undergraduates attending Syracuse University (SU). Exclusion criteria were: under age 18, over age 25, scholarship athlete, and transfer student.² Participants had to have been at least 18 years old when they completed the baseline survey. Individuals under age 18 were excluded due to logistical difficulties associated with obtaining parental consent prior to their participation. Individuals older than age 25 were excluded due to the study's focus on emerging adults and traditional college students.

Measures

Table 1 graphically illustrates which measures were used at each assessment interval over the course of the 13-month study. Table 2 contains a more detailed summary of the constructs, measures, variables yielded, and analytic plan for each variable. Given the frequency and length of the surveys in the current study, brief versions of some measures were used to decrease the potential for respondent fatigue (Catania, Gibson, Marin, Coates, & Greenblatt, 1990).

Demographics. At baseline, participants were asked their age (in years), race/ethnicity, Hispanic origin, and sexual orientation (see Appendix A for demographic

² Scholarship athletes were ineligible due to National Collegiate Athletic Association restrictions on receiving payments of any sort while a student-athlete. Transfer students were ineligible because they were not incoming first-year students.

questions). Participants were asked their race/ethnicity (all that apply), and responses were collapsed into four categories: Asian, Black, White, and other/multiple. Participants were also asked if they consider themselves to be Hispanic/Latina. Sexual orientation was assessed with a question adapted from the ACHA National College Health Assessment II (ACHA, 2008), and responses were collapsed into heterosexual and other. Religiosity was also measured at baseline with the global religiosity self-ranking item from the Brief Multidimensional Measure of Religiousness/Spirituality (Fetzer Institute/National Institute on Aging Working Group, 1999). Participants were asked to what extent they consider themselves religious on a 4-point Likert scale from 1 (not religious at all) to 4 (very religious).

Participants were asked their relationship status (single or in a committed relationship) at every assessment. At wave seven, participants were asked whether they joined a sorority during the Spring 2010 semester. At wave eight, participants were asked about international student status³ using two questions: (1) were you born a United States (US) citizen and (2) did you attend high school in the US? Also at wave eight, participants were asked about socioeconomic status (SES) using a 10-point SES ladder (Adler, Epel, Castellazzo, & Ickovics, 2000), on which they ranked their family relative to other American families. Subjective SES is strongly related to objective measures of SES (Ostrove, Adler, Kuppermann, & Washington, 2000), such as education, income, and occupation, which may not yet be relevant for most traditional college students themselves.

³ Participants who were not born US citizens but attended high school in the US are likely to be more acculturated to American culture than those whose initial exposure to the US occurred at college entry.

Alcohol use. At baseline, participants completed a modified version of the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985), which assessed the number of standard drinks consumed each day in a typical week in the last month. A standard drink was defined as a 12-ounce can or bottle of beer, a 5-ounce glass of wine, or a shot of liquor either straight or in a mixed drink, according to published guidelines (Dufour, 1999). The DDQ yielded two alcohol use variables: (a) a dichotomous indicator of alcohol use at baseline, and (b) typical drinks per week at baseline.

Sexual behavior.

Preliminary questions. At the beginning of the sexual behavior section of each survey, participants were reminded that honest responding was essential to help improve health services for other female college students. Providing this rationale for asking about participants' sexual behavior was designed to establish trust and improve data quality (Weinhardt, Forsyth, Carey, Jaworski, & Durant, 1998). Prior to the assessment of sexual hookup behavior, participants were asked about "physical intimacy" (see Appendix B) to orient them to the provided definitions of romantic and casual partners and also to determine skip patterns for the sexual behavior assessment. Survey questions were sequenced from least sensitive to most sensitive (Catania et al., 1990), and a preliminary question about physical intimacy provided a less threatening introduction to sexual behavior assessment than questions about oral and vaginal sex.

Participants were given the following definition of physical intimacy: "closeness with a partner that might include kissing, sexual touching, or any type of sexual behavior." Participants were told they would be asked about physical intimacy with two different types of partners: romantic and casual. Romantic partners were defined as

“someone whom you were dating or in a romantic relationship with at the time of the physical intimacy.” Casual partners were defined as “someone whom you were not dating or in a romantic relationship with at the time of the physical intimacy, and there was no mutual expectation of a romantic commitment. Some people call these hookups.” To further distinguish the two partner types, all occurrences of “romantic partner” in the survey appeared in red font, and all occurrences of “casual partner” appeared in blue font.

The initial page of the sexual behavior assessment section asked participants, in two separate questions, with how many romantic and casual partners they had been physically intimate. These and other sexual behavior questions were worded to place the “burden of denial” on participants (Weinhardt et al., 1998, p. 178). At baseline, participants were asked about their entire lifetime; at waves 2-13, participants were asked about the last month. All last-month intervals were specified with anchor dates (e.g., January 1-31) to facilitate recall (Weinhardt et al., 1998). Participants who indicated physical intimacy with zero romantic partners skipped out of further questions about romantic encounters. Participants who indicated physical intimacy with one or more romantic partners or who left the question blank proceeded to further questions about sexual behavior with romantic partners (see Romantic behavior section). Participants who indicated physical intimacy with zero casual partners skipped out of further questions about hookups. Participants who indicated physical intimacy with one or more casual partners or who left the question blank proceeded to further questions about sexual behavior with casual partners (see Hookup behavior section).

Participants who indicated physical intimacy with either a romantic or casual partner were provided with definitions of oral and vaginal sex. Oral sex was defined as

“when either partner puts their mouth on the other partner’s genitals,” and vaginal sex was defined as “when a man puts his penis in a woman’s vagina.” Participants were reminded of the researchers’ expectation that some, but not all, participants would have experienced oral and vaginal sex; this statement was included to imply a non-judgmental attitude toward all responses (Catania et al., 1990). To minimize confusion, further questions about casual partners were prefaced by a reminder of the definition of casual partner and instructions not to include romantic partners in that section.

Hookup behavior. Sexual hookup behavior was assessed at every occasion using six items adapted from previous research on hooking up among college students (Fielder & Carey, 2010a, 2010b). Rather than asking participants directly about hookups (e.g., with how many people have you hooked up?), participants were asked about engaging in specific sexual behaviors (i.e., oral and vaginal sex) with casual partners. A sexual hookup was operationally defined as oral or vaginal sex with a casual partner. Use of the word *hookup* was intentionally minimized in the assessment due to its ambiguous nature (Bogle, 2008a; Paul & Hayes 2002) and the potential for proactive interference (Anderson & Neely, 1996), which may have caused participants to respond with their idiosyncratic understandings of the term, rather than a common definition, in mind. Participants were given the following definition of a casual partner: “someone whom you were not dating or in a romantic relationship with at the time of the physical intimacy, and there was no mutual expectation of a romantic commitment. Some people call these hookups.”

Six items assessed the number of oral sex (performed), oral sex (received), and

vaginal sex hookup events and partners⁴ within a given time interval. At baseline, participants were asked about their entire lifetime (see Appendix C); at waves 2-13, participants were asked about the last month (see Appendix D). Participants were asked how many casual partners they had given oral sex to, received oral sex from, and had vaginal sex with. Participants who did not report oral or vaginal sex with a casual partner in the time interval skipped out of questions about the number of hookup events. Participants who indicated giving or receiving oral sex with one or more casual partners were asked how many times, with all of their casual partners (in that time interval) combined, they gave oral sex and received oral sex. Participants who indicated having vaginal sex with one or more casual partners were asked how many times, with all of their casual partners (in that time interval) combined, they had vaginal sex.

Hookup questions were free-response format, following recommendations for assessment of sexual behavior frequency (Catania et al., 1990). Responses for number of hookup events and partners were intended to be used as count data, rather than dichotomized or separated into categories. Count data are recommended for use in situations where even one additional event may confer additional risk (in this case, for STD transmission or SV; Schroder, Carey, & Vanable, 2003a). However, due to low rates

⁴ The number of partners variables were not used in any analyses because our assessment approach did not allow us to determine whether partners were new or repeat partners. The questions were designed to minimize respondent burden and optimize candid reporting. However, if a participant hooked up with the same partner during different months, summing the number of partners across waves would have inflated the number of hookup partners; this situation was likely because the same partners frequently hook up multiple times (Fielder & Carey, 2010b). The potential for counting partners multiple times was even higher for romantic partners. For example, a participant who was in a long-term relationship (and sexually active with her partner every month) during the study would have reported having one romantic partner each month at all 12 waves; she would have been coded as having 12 partners, when she only had one. Due to this limitation with the number of partners measure, it was not used in the present study. The numbers of events variables were used because the events were unique across waves. The numbers of events (within each wave) across the three types of sexual behavior were not necessarily unique, however. Because our assessment approach did not allow us to distinguish this, the number of events was not summed across oral sex (performed), oral sex (received), and vaginal sex.

of hookup behavior by wave, many analyses necessitated dichotomous variables.

For each of the three sexual behavior types, several summary variables were created for waves 2-13 (see Table 2 for a summary of measures): (a) dichotomous indicators of engaging in each type of hookup behavior during the last month, (b) a dichotomous indicator of engaging in each type of hookup behavior during the study (i.e., at any point from waves 2-13), and (c) a continuous indicator of the total number of hookup events of each type during the study. Other summary variables for any sexual hookup behavior (performed oral sex, received oral sex, *or* had vaginal sex) were created by collapsing across all three types of hookup behavior: (a) a dichotomous indicator of any sexual hookup behavior during the study (i.e., at any point from waves 2-13), and (b) a dichotomous indicator of any lifetime sexual hookup behavior (i.e., at any point from waves 1-13).

Romantic behavior. Sexual romantic behavior was assessed at every occasion using six items adapted from previous research (Fielder & Carey, 2010a, 2010b). Participants were asked about engaging in specific sexual behaviors (i.e., oral and vaginal sex) with romantic partners. A romantic encounter was operationally defined as oral or vaginal sex with a romantic partner. Participants were given the following definition of a romantic partner: “someone whom you were dating or in a romantic relationship with at the time of the physical intimacy.”

Six items assessed the number of oral sex (performed), oral sex (received), and vaginal sex romantic events and partners within a given time interval. At baseline, participants were asked about their entire lifetime; at waves 2-13, participants were asked about the last month. Participants were asked how many romantic partners they had given

oral sex to, received oral sex from, and had vaginal sex with. Participants who did not report oral or vaginal sex with a romantic partner in the time interval were not asked about the number of romantic events. Participants who indicated giving or receiving oral sex with one or more romantic partners were asked how many times, with all of their romantic partners (in that time interval) combined, they gave oral sex and received oral sex. Participants who indicated having vaginal sex with one or more romantic partners were asked how many times, with all of their romantic partners (in that time interval) combined, they had vaginal sex.

Romantic questions were free-response format, following recommendations for assessment of sexual behavior frequency (Catania et al., 1990). Responses for number of romantic events and partners were intended to be used as count data, rather than dichotomized or separated into categories. However, due to low rates of hookup behavior by wave, many analyses necessitated dichotomous variables, so romantic behavior variables were dichotomized as well.

For each of the three sexual behavior types, several summary variables were created for waves 2-13 (see Table 2 for a summary of measures): (a) dichotomous indicators of engaging in each type of romantic behavior during the last month, (b) a dichotomous indicator of engaging in each type of romantic behavior during the study (i.e., at any point from waves 2-13), and (c) a continuous indicator of the total number of romantic events of each type during the study. Other summary variables of any sexual romantic behavior (performed oral sex, received oral sex, *or* had vaginal sex) were created by collapsing across all three types of romantic behavior: (a) a dichotomous indicator of any sexual romantic behavior during the study (i.e., at any point from waves

2-13), and (b) a dichotomous indicator of any lifetime sexual romantic behavior (i.e., at any point from waves 1-13).

Two categorical variables were created from a combination of the hookup and romantic behavior data. Participants were categorized based on their sexual behavior patterns: neither hookups nor romantic encounters, only hookups, only romantic encounters, or both hookups and romantic encounters. One variable referenced sexual behavior during the study, and the second referenced lifetime sexual behavior.

Outcomes.

Mental health.

Depression. Depression was measured at every assessment with the nine-item Patient Health Questionnaire-9 (PHQ-9; Spitzer, Kroenke, & Williams, 1999). Participants indicated how often they were bothered by each symptom over the last two weeks using a Likert-type scale from 0 to 3. Sample items are “little interest or pleasure in doing things” and “feeling down, depressed, or hopeless” (see Appendix E). Response options were: not at all (0), several days (1), more than half the days (2), and nearly every day (3). Scores for all nine items were summed to create a total score, ranging from 0 to 27. Higher scores indicate a higher level of depressive symptoms. PHQ-9 score provided a continuous measure of depressive symptom severity. Scores of 0-4 indicate minimal depression, 5-9 mild, 10-14 moderate, 15-19 moderately severe, and 20-27 severe (Kroenke, Spitzer, & Williams, 2001).

The suggested PHQ-9 scoring algorithm (Spitzer et al., 1999; see Appendix F) was used to provide provisional diagnoses of major depressive disorder or other depressive disorder. This scoring algorithm was based on the criteria for a major

depressive episode from the fourth edition of the Diagnostic and Statistical Manual (DSM-IV; American Psychiatric Association [APA], 1994). Two dichotomous variables were created to distinguish participants who met criteria for any depression diagnosis (either major depressive disorder or other depressive disorder): (a) at baseline and (b) at any point during the study (i.e., during waves 2-13). The two different ways of using PHQ-9 scores allowed an evaluation of both symptom severity and a proxy indicator of a depressive disorder.

The PHQ-9 is internally consistent (Cronbach's $\alpha = .86-.89$) and reliable (two-day test-retest $r = .84$; Kroenke et al., 2001), with excellent receiver operating curve properties. Area under the curve for diagnoses of major depression made by mental health professionals was .95. Evidence for the validity of the PHQ-9 is strong (Martin, Rief, Klaiberg, & Braehler, 2006; Spitzer et al., 1999). The PHQ-9 was originally created for use in primary care settings but has been used with college student samples (Eisenberg, Gollust, Golberstein, & Hefner, 2007; Garlow et al., 2008; Zivin, Eisenberg, Gollust, & Golberstein, 2009).

Participants were also asked about history of depression prior to college using one item. Participants indicated if they had ever been diagnosed with a mood disorder before coming to college, henceforth referred to as pre-college depression diagnosis.

Anxiety. Anxiety was measured at every assessment with the seven-item Generalized Anxiety Disorder-7 (GAD-7; Spitzer, Kroenke, Williams, & Lowe, 2006). Participants indicated how often they were bothered by each symptom over the last two weeks on a Likert-type scale from 0 to 3. Sample items are “feeling nervous, anxious, or edge” and “worrying too much about different things” (see Appendix G). Response

options were: not at all (0), several days (1), more than half the days (2), and nearly every day (3). Scores for all seven items were summed to create a total score, ranging from 0 to 21. Higher scores indicate greater anxiety. GAD-7 score was used as a continuous variable indicating severity of anxiety symptoms. Scores of 0-4 indicate minimal anxiety, 5-9 mild, 10-14 moderate, and 15-21 severe (Spitzer et al., 2006).

The GAD-7 has good internal consistency (Cronbach's $\alpha = .92$) and good one-week test-retest reliability ($r = .83$; Spitzer et al., 2006). Confirmatory factor analyses (CFA) have indicated that all seven items load on a single factor that is separate from depression, and the scale showed gender and age invariance (Löwe et al., 2008). Although designed to screen for GAD only, the GAD-7 has good receiver operating characteristic performance for a variety of anxiety diagnoses made by mental health professionals, with an area under the curve of .91 for GAD, .85 for panic disorder, .83 for social phobia, .83 for post-traumatic stress disorder, and .96 for any anxiety disorder (Kroenke, Spitzer, Williams, Monahan, & Löwe, 2007). The GAD-7 has demonstrated convergent, criterion, and construct validity (Löwe et al., 2008; Spitzer et al., 2006). The GAD-7 was developed for use in primary care but has also been used in the general population (Löwe et al., 2008) and in college student samples (Ivezaj et al., 2010; Saules et al., 2009).

Negative affect. Negative affect was measured at every assessment with the five-item Negative Affect subscale from the International Positive and Negative Affect Schedule Short Form (I-PANAS-SF; Thompson, 2007). Positive and negative affect are separate dimensions, rather than opposite aspects of one dimension. Negative affect includes states of distress, anger, guilt, and nervousness (Watson, Clark, & Tellegen,

1988). The I-PANAS-SF was developed from the original 20-item Positive and Negative Affect Schedule (PANAS; Watson et al., 1988), with items selected to minimize non-redundancy and ambiguity.

Although the items were based on the I-PANAS-SF, the instructions and response options were from the PANAS because they were more appropriate for asking about short, specific periods of time. Participants indicated the extent to which they felt each way during the last month on a Likert-type scale from 1 to 5. Sample items are “afraid” and “hostile” (see Appendix H). Response options were: very slightly or not at all (1), a little (2), moderately (3), quite a bit (4), and extremely (5). Scores for all five items were summed to create a total score, ranging from 5 to 25. Higher scores indicate greater negative affect.

The I-PANAS-SF Negative Affect subscale has adequate internal consistency (Cronbach’s $\alpha = .76-.80$) and good two-month test-retest reliability ($r = .84$; Thompson, 2007). Scores for the Negative Affect subscale of the I-PANAS-SF correlate highly with scores for the Negative Affect Schedule from the PANAS ($r = .95$ for negative affect). Positive and negative affect are negatively correlated ($r = -.32$). The I-PANAS-SF has demonstrated convergent validity, and CFA has indicated good fit of a two-factor model (Thompson, 2007). The I-PANAS-SF has been used with college student samples (Oliver, Markland, & Hardy, 2010; Yoo, Burrola, & Steger, 2010).

Perceived stress. Perceived stress, or an individual’s appraisal of his or her life situation as stressful, was assessed using the four-item Perceived Stress Scale (PSS-4; Cohen, Kamarck, & Mermelstein, 1983). The PSS-4 is a subjective global stress measure that references the last month. A sample item is “In the last month, how often have you

felt confident about your ability to handle your personal problems?” (see Appendix I). Response options were on a Likert-type scale from 0 to 4: never (0), almost never (1), sometimes (2), fairly often (3), and very often (4). Two positively-worded items were reversed scored. Scores for all four items were summed to create a total score, ranging from 0 to 16. Higher scores indicate greater perceived stress.

The PSS-4 has adequate internal consistency (Cronbach's $\alpha = .72$). Two-month test-retest reliability of the PSS-4 is moderate ($r = .55$), as would be expected given the possibility of changing events in individuals' lives from month to month (Cohen et al., 1983). The PSS-4 has demonstrated construct validity, and factor analysis has indicated that the PSS-4 measures a unidimensional factor (Cohen & Williamson, 1988). The PSS-4 has been used with college student samples (Cohen et al., 1983; Reifman & Dunkel-Schetter, 1990). The PSS-4 is less psychometrically strong than the 10-item or 14-item version of the PSS, but it is acceptable for use in situations when brevity of measures is paramount (Cohen & Williamson, 1988).

Positive affect. Positive affect was measured at every assessment with the five-item Positive Affect subscale from the I-PANAS-SF (Thompson, 2007). Positive affect includes states of enthusiasm, energy, and alertness (Watson et al., 1988). Participants indicated the extent to which they felt each way during the last month on a Likert-type scale from 1 to 5. Sample items are “active” and “determined” (see Appendix J). Response options were: very slightly or not at all (1), a little (2), moderately (3), quite a bit (4), and extremely (5). Scores for all five items were summed to create a total score, ranging from 5 to 25. Higher scores indicate greater positive affect.

The I-PANAS-SF Positive Affect subscale has adequate internal consistency

(Cronbach's $\alpha = .74-.78$) and good two-month test-retest reliability ($r = .84$; Thompson, 2007). Scores for the Positive Affect subscale of the I-PANAS-SF correlate highly with scores for the Positive Affect Schedule from the PANAS ($r = .92$). Positive and negative affect are negatively correlated ($r = -.32$). The I-PANAS-SF has demonstrated convergent validity, and CFA has indicated good fit of a two-factor model (Thompson, 2007). The I-PANAS-SF has been used with college student samples (Oliver et al., 2010; Yoo et al., 2010).

Life satisfaction. Life satisfaction was measured every four months with the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985), which consists of five items that assess subjective, global life satisfaction according to an individual's own criteria. A sample item is "I am satisfied with my life" (see Appendix K). Participants indicated their agreement with each item on a Likert-type scale from 1 to 7. Response options were: strongly disagree (1), disagree (2), slightly disagree (3), neither agree nor disagree (4), slightly agree (5), agree (6), and strongly agree (7). Scores for all five items were summed to create a total score, ranging from 7 to 35. Higher scores indicate higher life satisfaction.

The SWLS has good internal consistency ($\alpha = .79-.89$) and two-month test-retest reliability ($r = .82$; Pavot & Diener, 1993). Over longer periods, the scale's test-retest reliability is lower (e.g., four-year test-retest $r = .54$), indicating that scores are sensitive to change in individuals' life circumstances over time. The SWLS has demonstrated construct validity (Pavot & Diener, 1993), and CFA has indicated that it measures a unidimensional factor (Atienza, Balaguer, & Garcia-Merita, 2003). The SWLS has been used extensively with college student samples (e.g., Ganem et al., 2009; Matheny et al.,

2002; Seder & Oishi, 2009).

Self-esteem. Self-esteem was measured every four months with the 10-item Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), which is the most widely used measure of self-esteem (Blascovich & Tomaka, 1991). The RSES was designed to assess individuals' global evaluations of themselves. A sample item is "On the whole, I am satisfied with myself" (see Appendix L). Participants indicated their agreement with each item on a Likert-type scale from 1 to 4. Response options were: strongly disagree (1), disagree (2), agree (3), and strongly agree (4). Scores from all 10 items were summed to create a total score, ranging from 10 to 40. Higher scores indicate higher self-esteem.

The RSES has high internal consistency (Cronbach's $\alpha = .77-.88$) and one-week test-retest reliability ($r = .82$; Blascovich & Tomaka, 1991). Some studies have found that the RSES is unidimensional, whereas others have found two factors; the two factors correspond to positively- and negatively-worded items, suggesting that the two factors result mainly from response sets, and the scale measures one construct as intended (Hensley & Roberts, 1976). The RSES has demonstrated convergent validity (Blascovich & Tomaka, 1991) and has been used extensively with college student samples (e.g., Conseur, Hathcote, & Kim, 2008; Delinsky & Wilson, 2008; Ganem, de Heer, & Morera, 2009).

Sexual victimization.

Background on measure. SV was assessed every four months using items adapted from the revised Sexual Experiences Survey (Koss et al., 2007), which has demonstrated reliability (Koss & Gidycz, 1985) and validity (Testa, VanZile-Tamsen, Livingston, & Koss, 2004). The original and revised versions of the Sexual Experiences Survey avoid

potentially stigmatizing words, such as rape and sexual assault, in favor of behaviorally-specific questions that ask about experiences with unwanted sexual contact, oral sex, attempted vaginal rape, completed vaginal rape, anal sex, and other penetration with finger(s) or objects. Behaviorally-specific questions elicit higher rates of SV compared to broad screening questions (e.g., have you ever been raped, have you ever been forced to have sex?), because they are less upsetting and provide more effective memory cues, especially for individuals who do not label their SV experience as “rape” (Fisher, 2009).

The original Sexual Experiences Survey (Koss, Gidycz, & Wisniewski, 1987) is the most commonly used measure in the SV literature, but it is limited by ambiguity regarding consent (i.e., “when you didn’t want to” does not imply that the woman indicated her lack of consent) and lack of agreement between alcohol/drugs items and legal definitions of rape. Also, research has found higher rates of SV when questions first specify the type of tactic (e.g., physical force, verbal coercion) followed by the type of sexual contact (e.g., oral sex, vaginal sex), compared to vice versa (Abbey, Parkhill, & Koss, 2005). The revised Sexual Experiences Survey was designed to address shortcomings of the original measure (Koss et al., 2007). However, the revised measure includes 35 items, making its length prohibitive, and has such a high level of specificity that some items are very rarely endorsed (M. Testa, personal communication, July 27, 2009).

The revised Sexual Experiences Survey was adapted for use in a sample of first-year female college students (Testa, Hoffman, & Livingston, 2010; Testa, Hoffman, Livingston, & Turrisi, 2010); this version (henceforth called the adapted Sexual Experiences Survey) was used in the current study. The adapted Sexual Experiences

Survey has 20 items (see Appendix M), formed by crossing four perpetrator tactics (overwhelm you with arguments about sex or continual pressure for sex, threaten to harm you or someone close to you, use physical force, and perform sexual acts while you were incapacitated by drugs or alcohol and unable to object or consent) with five types of sexual contact (fondle, kiss, or touch sexually; oral sex; try to have sexual intercourse, but it did not happen; succeed in making you have sexual intercourse; and anal sex or penetration with a finger or objects). Participants indicated how many times each experience (i.e., each of 20 combinations of the 4 tactics and 5 types of sexual contact) happened “when you indicated that you didn’t want to,” during a specific time interval.

Operational definition of sexual victimization. In recent years, scholarly and legal definitions of rape have broadened from narrow conceptualizations focused on vaginal sex to include other forms of sexual contact, such as fondling and oral sex (Koss, 1996). In addition, the range of tactics has broadened from physical force to include issuing verbal threats of harm and taking advantage of individuals who are incapacitated due to alcohol or drugs (Cook, Gidycz, Koss, & Murphy, 2011). Nonetheless, issues related to expression of consent or non-consent remain, complicated by different types of responses (e.g., verbal vs. nonverbal, direct vs. indirect). Accordingly, scholars in psychology and law as well as government and international organizations have yet to reach consensus on a universally-used definition of SV and rape.

Definitions of SV and rape generally include three components (Cook et al., 2011): (a) a description of the sex act(s) that occurred (e.g., vaginal sex), (b) a description of the tactic(s) used to effect the sex act (e.g., physical force), and (c) a description of how non-consent was indicated or why consent could not be given (e.g., victim was

incapacitated). Most scholarly and legal definitions agree on three points: (a) oral, vaginal, and anal sex are sex acts within the realm of SV; (b) physical force, threats of physical force, and substance-induced incapacitation are tactics within the realm of SV, and more specifically, rape; and (c) verbal expression of non-consent and inability to consent (e.g., due to intoxication) are indications of non-consent within the realm of SV. As a result, many SV researchers use operational definitions of SV that map onto these definitions. Although other forms of SV, denoted by other sex acts (e.g., unwanted sexual contact, such as kissing or fondling) or other tactics (e.g., verbal coercion, such as continual pressure for sex) are measured, they are usually classified separately (by either the sex act, the tactic, or both) from SV that meets legal definitions of rape (cf. Corbin et al., 2001; Gidycz et al., 2007; Humphrey & White, 2000; Testa, Hoffman, Livingston, & Turrisi, 2010; Turchik et al., 2007).

Two issues were carefully considered during the selection of the operational definition of SV for the current study. The first consideration was which of the five sex acts to include. An overall measure of any SV (i.e., including any of the five sex acts assessed) is not specific and includes unwanted sexual contact (e.g., fondling, kissing, or sexual touching). There appear to be differences in the level of emotional consequences experienced by victims of unwanted sexual contact compared to attempted or completed oral or vaginal rape, with victims of the latter reporting more severe psychological effects (Crown & Roberts, 2007). Also, with kissing or fondling, there is no risk of STD transmission or pregnancy, as there would be with oral or vaginal sex. The overall incidence of SV was relatively high, with one-third of participants reporting at least once incident of SV during the study. The general measure of any SV was not used as an

outcome.⁵ SV involving anal sex or penetration with a finger or objects was the least common type of SV during the study; this category also combines two different types of sexual acts, making it impossible to determine the specific act that occurred.

Accordingly, anal sex or other penetration was not used as an outcome.

The second consideration, debated in the field, was which of the tactics to include. Verbal coercion, which includes begging, manipulating, applying continual pressure, arguing, or threatening negative consequences, is a common experience for many women (Livingston, Buddie, Testa, & VanZile-Tamsen, 2004). Feminist scholars argue that despite its failure to map onto legal definitions of rape or SV, sex acts effected by verbal coercion should be considered SV (Abbey, BeShears, Clinton-Sherrod, & McAuslan, 2004). Indeed, the “[i]mpact of a verbally or physically forced sexual experience on the victim is not necessarily determined by whether or not the incident met criminal standards in a specific jurisdiction” (Abbey et al., 2004, p. 370). Although some women reported no consequences as a result of verbal sexual coercion, many reported feeling used or regretful and having problems in their relationship (Livingston et al., 2004). Thus, verbal coercion is not without consequence. Nevertheless, verbal coercion is perceived by women as less severe or traumatic compared to other tactics used to effect SV (Abbey et al., 2004; Testa, VanZile-Tamsen, Livingston, & Koss, 2004). Verbal coercion appears to be qualitatively different from the other three tactics, in which it is clear that the victim had no agency in the decision for sex acts to occur, due to fear for her safety or incapacitation. In addition, verbal coercion is an ambiguous phrase, encompassing many different experiences that may or may not be similar (e.g., begging

⁵ The decision not to include unwanted sexual contact in the operational definition of SV does not reflect a belief that unwanted sexual contact is in any way acceptable or inconsequential.

vs. threatening to end the relationship). The encompassing nature of the phrase may be one reason why verbal sexual coercion is so common; including verbal coercion as a tactic in the current study would have approximately doubled the rates of each kind of SV. Although further study of verbal sexual coercion is warranted, it was excluded from the operational definition of SV in the current study.

To sum, following standard practice in the field, the operational definition of SV for the current study comprised oral sex, attempted vaginal intercourse, or completed vaginal intercourse that occurred via physical force, threats of harm, or incapacitation. These forms of SV are henceforth referred to as oral sex SV, attempted vaginal rape, and completed vaginal rape, respectively. Using this definition ensured that the experiences classified as SV would be in line with what is typically classified as such in the extant literature. Hence, rates of SV in this study would be similar to those reported with other samples of first-year college women, and experiences classified as SV would also map on to legal definitions of rape. These outcomes were also selected due to their behavioral specificity as well as their severity and potential for emotional (Crown & Roberts, 2007) and/or physical (e.g., STDs) consequences. Finally, use of oral and vaginal sex acts as outcomes allowed for matching of SV outcomes with sexual behavior predictors (i.e., oral sex hookups and romantic encounters with oral sex SV, and vaginal sex hookups and romantic encounters with attempted and completed vaginal rape).

Sexual Experiences Survey items were asked in reference to a different portion of participants' lives at waves 1, 5, 9, and 13. At baseline, participants were asked about SV since age 14 (i.e., from your 14th birthday until today). At wave five, participants were asked about SV since starting college (i.e., from August 26, 2009 until today). At wave

nine, participants were asked about SV since the beginning of the calendar year (i.e., from January 1, 2010 until today). At wave 13, participants were asked about SV since the beginning of the summer (i.e., from May 1, 2010 until today). Response options were: 0, 1, 2, 3, and 4+ times.

Scoring. The adapted Sexual Experiences Survey has been scored both dichotomously and continuously (Testa, Hoffman, & Livingston, 2010). Dichotomous (yes/no) scoring was primarily used in the present study due to the short time frame and relatively low frequency of SV. Three dichotomous indicators of pre-college oral sex SV, attempted vaginal rape, and completed vaginal rape were created from wave one responses for use as covariates. The total number of pre-college events of each SV outcome was calculated by summing across the three tactics. Three dichotomous summary variables were created to distinguish participants who reported experiencing one or more incidents of oral sex SV, attempted vaginal rape, and completed vaginal rape (via physical force, threats of harm, or incapacitation due to alcohol or drugs) at any point during the study (i.e., waves 2-13). For each of the three SV outcomes, participants' responses were collapsed across the three tactics and across waves 5, 9, and 13. The total number of each type of SV event during the study was calculated by summing across the three tactics and across waves 5, 9, and 13.

Sexually transmitted diseases. Because STD infections are a relatively low frequency event, self-report assessments of STD diagnoses occurred every four months instead of monthly. Three self-report questions were used to assess participants' STD status at waves 1, 5, 9, and 13. At each of these assessments, all participants were asked if they had been tested for an STD. The reference period at baseline was lifetime (see

Appendix N), and the reference period at waves 5, 9, and 13 covered only the time since the last assessment of STD status (see Appendix O). Participants who indicated that they had been tested for an STD were also asked if they had been diagnosed with an STD; those responding affirmatively were asked to select the STD(s) they had been diagnosed with from a list. STDs were also assessed by biological testing at the end of the academic year (approximately wave nine).

New STD diagnosis was a dichotomous outcome based on participants' self-reports at waves 5, 9, and 13 as well as biological testing at wave 9. That is, participants were classified as having a new STD based on either a self-report of an STD diagnosis at any of the three follow-up assessments, or a laboratory-confirmed STD diagnosis at wave 9. Dichotomous indicators of lifetime STD testing and diagnosis were also created by combining participants' responses from the baseline and follow-up reference periods.

Biological testing. Due to the anticipated low prevalence and the high cost of STD testing, biological STD testing occurred only once throughout the course of the study. The end of the Spring 2010 semester, at the end of April (approximately wave nine), was used for three reasons. First, it was the last opportunity to test participants before they left campus for summer vacation. Second, the timing allowed for an evaluation of the effects of participants' sexual risk behavior in the first year of college. Third, participants likely trusted the research team to treat them respectfully and felt more comfortable participating in the STD testing phase after being in the study for eight months. Although the final survey occurred at wave 13, when most participants returned to campus for their second year of college, that time of year was impractical because students were busy moving in to housing and less likely to attend testing appointments.

Participants were tested for three common bacterial STDs: *Chlamydia trachomatis* (CT), *Neisseria gonorrhoeae* (Gc), and *Trichomonas vaginalis* (TV). These STDs were selected based on empirical, logistical, and financial reasons. CT, Gc, and TV are prevalent among Americans aged 15-24 (Weinstock et al., 2004) and are often asymptomatic (Nsuami, Cammarata, Brooks, Taylor, & Martin, 2004; Swygard, Seña, Hobbs, & Cohen, 2004). Recent screening studies with college samples found prevalence of 3.8-8.8% for CT and 1.3% for Gc (James et al., 2008; Sipkin, Gillam, & Grady, 2003). Recent large-scale studies have found TV prevalence rates of 2.5% and 2.1% among American females aged 14-19 and 2.3% among those aged 20-29 (Forhan et al., 2009; Sutton, Sternberg, Koumans, McQuillan, Berman, & Markowitz, 2007). All three infections can be detected easily and accurately using a single self-collected vaginal swab (see below). Urine samples, though non-invasive, are inappropriate for the detection of TV due to low sensitivity (Lawing, Hedges, & Schwebke, 2000). Another logistical consideration was that all three infections can be cured with a single dose of an antibiotic. Testing for these pathogens is cost effective because all three tests can be conducted from a single specimen (Caliendo et al., 2005). Testing for other common STDs, such as human papillomavirus (HPV) or genital herpes, was not possible due to the high cost and invasive nature of Pap smears and blood draws, respectively.

Testing was conducted at the Caliendo Laboratory at Emory University's Center for AIDS Research. The laboratory was certified through the state of Georgia and the Center for Medicare and Medicaid Services Clinical Laboratory Improvement Amendments. Testing for CT and Gc used the Becton Dickinson ProbeTec ET amplified DNA assay. The test is approved by the United States Food and Drug Administration and

uses homogenous strand displacement amplification and fluorescent energy transfer to detect the presence of CT and Gc. The sensitivity of the CT assay is 92.0%, and the specificity is 96.6%. The sensitivity of the Gc assay is 95.2%, and the specificity is 98.8%. Testing for TV used Taq-Man polymerase chain reaction (PCR). The test uses a homogenous kinetic PCR to amplify and detect DNA from TV with an internal probe that fluoresces upon activity by the Taq polymerase. The sensitivity of the TV assay is 100%, and the specificity is 99.6%. The TV test was developed and validated by the laboratory conducting our tests (Caliendo et al., 2005), and its methodology allows for testing for CT, Gc, and TV from a single specimen collected by participants via vaginal swab.

Specimens were obtained using self-collected vaginal swabs (i.e., participants themselves, rather than clinicians, obtained the specimens). Vaginal swabs were used because they are now the recommended specimen type for women, according to the National Institutes of Health (Hobbs et al., 2008) and Association of Public Health Laboratories (2009). In contrast to urine specimens, which are non-invasive but have strict, time-sensitive processing requirements (Hobbs et al., 2008; Shafir & Sorvilo, 2006) and may be difficult to transport, vaginal swabs require almost no processing by research staff at collection sites and remain viable with up to one week of transport time. In addition to these logistical advantages, vaginal swabs are more sensitive in the detection of CT and Gc than urine samples, and as sensitive as endocervical swabs (Hobbs et al., 2008). TV primarily affects the vagina, rather than the cervix, so vaginal swabs are optimal for detection of this pathogen. Women prefer self-collected vaginal swabs to pelvic examinations by clinicians (Holland-Hall, Wiesenfeld, & Murray, 2002), and self-obtained swabs perform as well as clinician-obtained vaginal swabs (Schwebke,

Morgan, & Pinson, 1997). Studies with adolescent female samples have also shown that 95-99% found self-collected vaginal swabs easy to collect, and 95-97% would be willing to test themselves again using this method (Holland-Hall et al., 2002; Wiesenfeld et al., 2001). Numerous other studies have demonstrated the feasibility of using self-collected vaginal swabs with adolescent females (Serlin et al., 2002; Smith, Harrington, Wingood, Oh, Hook, & DiClemente, 2001; Tebb, Pauku, Pai-Dhungat, Gyamfi, & Shafer, 2004).

Procedure

Recruitment. Institutional Review Board approval for all study procedures was obtained prior to starting recruitment for the study. Several recruitment strategies were used. Following procedures used successfully with college students (Gollust, Eisenberg, & Golberstein, 2008; Kaysen, Neighbors, Martell, Fossos, & Larimer, 2006; Parks, Pardi, & Bradizza, 2006), the initial recruitment effort began with a mass mailing to potential participants one month before the Fall 2009 semester began. Incoming first-year female SU students ($N = 1,000$) were mailed recruitment letters (see Appendix P) in early August 2009. A mass mailing was used to enhance the legitimacy of the study, as students received a letter printed on SU letterhead, which clearly associated the study with SU. The mailings also served to capture students' attention before they moved to campus. The SU Office of Institutional Research and Assessment coordinated selection of the names and addresses of 1,000 incoming first-year female students out of approximately 1,400 eligible students. Scholarship athletes, transfer students, international students,⁶ and students who would not have turned 18 by the beginning of Fall 2009 semester were excluded from the mailing.

The recruitment letter introduced the study and invited women to sign up on a

⁶ International students were excluded from the mailing due to high postage costs.

website to receive further information. The letter included an appeal to participants' altruistic motivations (i.e., study results will be used to help improve health services for college women across the country) as well as a list of personal incentives (i.e., entry into a raffle for tickets to a musical theater performance for signing up on the website, a free gift bag for attending an orientation session, and \$160 total compensation for participating in the study) that were available to interested students. In addition, the letter clearly tied the study to SU and emphasized the unique opportunity students had to join the study.

Following the initial mailing, approximately 230 interested students signed up on the study website over the next nine days, after which signups slowed significantly. One week after the initial mailing, an additional 400 letters were mailed out to eligible students who had not been selected to receive a letter in the initial mailing.

Approximately 120 interested students signed up on the study website over the next eight days, after which signups slowed significantly. During the last week of August and the first two weeks of September, between 0 and 8 additional interested students signed up on the study website per day. Website signups ended on September 15, with a total of 434 signups since August 5. Of these 434 interested students, 293 (68%) attended an orientation session and enrolled in the study.

The study website (see Appendix Q) briefly described the purpose of the study, explained what participants would be asked to do, and invited participants to provide their email addresses so they could be contacted closer to the start of the Fall 2009 semester. Like the recruitment letter, the website text appealed to altruistic motivations and also described incentives that students would receive for signing up. Interested

students submitted their names and contact information through the secure website; as an incentive, their names were entered in a raffle for two tickets to a popular musical theater performance. A brief acknowledgement email (see Appendix R) was sent to students who signed up on the website not only to confirm receipt of their information and their entry into the ticket raffle, but also to alert them of a second email (i.e., the recruitment email) to be sent out the week that incoming first-year students moved to campus. The recruitment email (see Appendix S) was sent to students one week before classes for the Fall 2009 semester began. The email included easy instructions for signing up for an orientation session as well as study contact information to encourage students to tell other first-year female students about the study. Students who did not respond to the initial recruitment email were emailed once per week until they responded, up to a maximum of three times.

The initial recruitment effort using the mass mailing did not yield the desired recruitment goal, so three additional recruitment strategies were used. First, participants who attended orientation sessions were given a recruitment card (see Appendix T) with study contact information printed on it; they were encouraged to give the card to another first-year female student (e.g., roommate, hallmate) who had not yet joined the study. Second, recruitment flyers (see Appendix U) were posted around campus advertising an opportunity for first-year female students who were at least 18 years old to join a research study. The flyers were posted in high-traffic areas around campus. Between word of mouth and flyers, 66 interested students asked for information about the study, and 53 (80%) attended an orientation session and enrolled in the study. Third, the psychology department participant pool was used. A brief study description (see Appendix V) was

posted on the department's online research system (Sona). System controls ensured that the study description was accessible only to female first-year students who were at least 18 years old. Students were offered one Sona credit (equivalent to one hour of research participation) for the introductory psychology course (PSY205) for attending the orientation session and completing the baseline survey. Students were notified that joining the study made them eligible to receive monetary compensation, rather than research credit, for follow-up surveys. Out of 137 interested students who signed up through Sona, 137 attended an orientation and enrolled in the study.

Data collection.

Web-based surveys. All survey data were collected online using LimeSurvey software (Schmitz, 2003). The baseline survey was administered in person on individual computers, whereas the follow-up surveys (waves 2-13) were completed remotely from a location of participants' choosing. Web-based surveys, rather than paper-and-pencil surveys, were used for numerous reasons. Web-based data collection affords researchers many advantages compared to traditional methods: more candid responding about sensitive topics (including sexual behavior), higher response rates, lower cost, less time required for data collection, and no need for data entry (Ahern, 2005; Greenlaw & Brown-Welty, 2009; Lefever, Dal, & Matthiasdottir, 2007; Turner et al., 1998). In addition to these benefits to researchers, participants also benefit from web-based data collection. For participants, the advantages of web-based surveys over paper-and-pencil surveys include: more convenient, easier and faster to complete (due to user-friendly survey interfaces and skip patterns), more control over pace, less social pressure from researchers, and accommodating of youth's preferences for advanced technology (Ahern,

2005; Barchard & Williams, 2008; Lefever et al., 2007; Touvier et al., 2010).

Nevertheless, web-based data collection may have some disadvantages as well. For instance, the majority of psychological scales have been developed in the paper-and-pencil format, and their reliability and validity in the web-based format cannot be assumed. However, recent studies have compared many scales, assessing such constructs as sexual behavior and attitudes, personality, mood, stress, and health behaviors, across both formats. Results have consistently shown that scale scores and psychometric properties (e.g., internal consistency, test-retest reliability) are equivalent for web-based and paper-based surveys (Cronk & West, 2002; Fortson, Scotti, Del Ben, & Chen, 2006; Meyerson & Tryon, 2003; Touvier et al., 2010). Also, data collected online are no more likely than data from paper surveys to be affected by response sets (e.g., always answering “no”; Gosling, Vazire, Srivastava, & John, 2004). Overall, data from web-based surveys appear consistent with data collected using traditional survey methods. A second common concern about web-based data collection is the participants’ inability to ask the researcher for clarification on words or questions they do not understand in the survey (Barchard & Williams, 2008; Durant & Carey, 2000). To address this issue, the baseline survey was completed in person, so participants had opportunities to ask questions. Furthermore, terms that may have been confusing, including types of partners and types of sexual interaction, were defined in every survey (Weinhardt et al., 1998). Therefore, the few potential concerns with web-based data collection did not supersede its many advantages for both researchers and participants.

Orientation and baseline survey. Students were required to attend a brief (20-minute) orientation session prior to administration of the baseline survey. The purpose of

the orientation sessions was multifaceted. First, the informed consent process was completed verbally to facilitate understanding of the study and allow for questions to be answered easily. Second, participants had a positive interaction with friendly, professional research staff, which should have helped to increase their trust in the legitimacy and confidentiality of the study. Third, study staff could personally (i.e., face to face) appeal to participants to join the study and remain active for its duration, which increases enrollment (K. Fromme, personal communication, July 27, 2009) and may help reduce attrition. Fourth, participants were able to ask for clarification about terms and questions in the survey. Fifth, data quality was improved due to in-person completion of the measures in a private, quiet area. Sixth, participants received immediate positive reinforcement for their participation through their cash payment.

The orientation sessions were held in small groups of no more than 12 students and were staffed by two female research staff. Students who did not schedule an appointment ahead of time were asked to complete a brief screening measure to ensure that they met study eligibility criteria (i.e., at least 18 years old, incoming first-year student, not a scholarship athlete). In addition, all students, including those who signed up on the website, were asked if they were at least 18 years old at the beginning of the session to ensure that no underage participants enrolled in the study.

The orientation session included an introduction to the study (see Appendix W), an outline of what would be asked of participants, an explanation of compensation for the surveys and the STD testing, an explanation of the risks and benefits of participation, and other aspects of the informed consent process. The importance of remaining active in the study for its entire duration was emphasized to help minimize attrition. Students were

given two copies of the consent form (see Appendix X): one to return signed, and one to keep. Participants recruited through Sona received a different consent form (see Appendix Y) due to differences in compensation for the initial survey (i.e., research credit instead of \$20). Students who returned a signed consent form were participants in the study. All students were also given a “Campus Health Resources” handout (see Appendix Z). Moreover, all students who attended the orientation session received a free gift bag⁷ regardless of their choice to participate in the study.

Participants were seated at individual computer stations to increase privacy and encourage honest responding. Each participant was given a contact information form (see Appendix AA) that had been preprinted with a unique four-digit identification code. Following published guidelines for minimizing attrition in longitudinal studies (Ribisl et al., 1996), participants were asked to provide complete contact information at baseline.

Each participant was given a list of terms (see Appendix BB) that appeared on the survey (e.g., casual partner, oral sex) along with definitions of what these terms meant. A few questions on the survey were quickly explained using examples to ensure that participants knew how to answer the questions (e.g., if the question asks how old you are when you first had oral sex, but you have never had oral sex, put zero rather than skipping that question). Participants were then instructed to enter the identification code on the bottom of their contact information form into the survey entry page on their individual computer; entering the code allowed them to start the survey.⁸ Participants were encouraged to ask for clarification if any questions on the survey were unclear. The

⁷ The gift bag consisted of an orange drawstring backpack, a highlighter, a pen, and a magnet; all items except for the backpack were printed with study contact information.

⁸ Access to the survey was restricted to individuals with valid identification codes (i.e., only study participants). Once an identification code was submitted in a completed survey, it became invalid; thus, participants could not complete the survey more than once.

baseline survey was designed such that the majority of participants would be able to complete it in 30 minutes or less.

Upon completion of the survey, participants were paid \$20 cash, asked to sign a payment receipt, thanked for their participation, and given a free gift bag as they left. Participants were entered into a database to connect their name and other contact information to their identification code for tracking and payment purposes. However, identifying information was stored separately from survey responses to protect participants' privacy (Barchard & Williams, 2008). Data were transmitted to a secure server using 128-bit secure sockets layer (SSL) encryption to ensure privacy.

Follow-up surveys. Follow-up surveys began at the end of September 2009 (wave 2) and continued through the end of August 2010 (wave 13; see Table 3 for details on the context of the study timeline). The feasibility of using monthly assessments with college students has been well established (e.g., Del Boca, Greenbaum, & Goldman, 2004). A monthly assessment schedule was used for three reasons. First, data quality and reliability would be optimized due to brief response intervals of one month (Schroder, Carey, & Vanable, 2003b). Second, this schedule allowed for frequent monitoring of mental health indicators, which is important because the onset interval of any potential effects of hookups on mental health is unknown. Third, compared to a weekly or bi-weekly assessment schedule, the monthly assessment schedule decreased respondent burden, which should have helped to minimize attrition over the course of the study.

All follow-up surveys were completed remotely. Participants received \$10 for each survey they completed from wave 2-11, \$15 for wave 12, and \$20 for wave 13. These amounts were chosen to balance fair compensation with minimal coercion. The

increase in compensation for the final two surveys helped guard against higher attrition during the summer months. Most follow-up surveys were designed to be completed in 15 minutes, but the wave 5, 9, and 13 surveys required 20 minutes. Each month's survey was sent to participants on either the last day of that month or the first day of the next month, depending on logistic constraints (e.g., weekends, timing of holidays).

Participants received an email (see Appendix CC) to their preferred email address with a link to the survey for that month; they were able to complete the survey any time before the survey deadline from a location of their choosing. Participants had eight days to complete each survey. Emails included the participants' identification code, which was required to access the survey online. To prompt fast responding, participants were eligible to win prizes in a raffle drawing that was tied to timely responses.⁹ Surveys were deactivated and inaccessible to participants once the survey deadline passed.

Participants received up to two additional reminder emails if they failed to complete the survey after the initial email. Participants also received one phone call (see Appendix DD) or text message (see Appendix EE) reminder for the surveys that occurred outside of the academic year calendar (i.e., wave 5 over winter break and waves 10-12 over the summer). If participants did not answer the phone, a brief voice message was left. These additional reminders were necessary to keep the response rate up during breaks because participants were away from campus and potentially less likely to check their email.

⁹ Participants' names were entered into a monthly raffle for two \$50 prizes if they completed a survey. Participants received three raffle entries if they completed the survey within 24 hours of receiving the initial email and two raffle entries if they completed the survey within 48 hours of receiving the initial email. Participants who completed the survey more than 48 hours after receiving the initial email but before the survey deadline received one raffle entry. Thus, participants maximized their chances to win a raffle prize if they completed the survey as soon as possible.

Participants were mailed a check for \$10 (or \$15 at wave 12 or \$20 at wave 13) upon completion of each follow-up survey. Checks were mailed out within one week of survey deadlines. Participants received a confirmation email (see Appendix FF) to confirm receipt of their responses, thank them for participation, and notify them that their check would arrive soon. Prompt compensation was designed to reinforce compliance with follow-up assessments. Checks were sent through campus mail during the academic year and mailed to participants' home addresses during breaks. Raffle winners received an additional check for \$50.

Sexually transmitted disease testing. Participants were invited to provide a biological specimen for STD testing at the end of the academic year (i.e., April 2010, wave nine). Participants were tested for three bacterial STDs: chlamydia, gonorrhea, and trichomoniasis.

In late March 2010, participants were emailed (see Appendix GG) about the opportunity to sign up for free, confidential STD testing. Instructions for scheduling an appointment on one of five testing days, all of which were Saturdays, were provided. Saturdays were chosen to minimize scheduling conflicts related to students' class schedules during the week as well as minimize disruption at the testing location. Participants received up to five emails, sent once per week, until they scheduled an appointment for testing.

STD testing occurred at Syracuse University Health Services (SUHS), which is SU's on-campus health center. This location benefitted participants as well as the researcher. First, participants likely knew where SUHS is since the majority used the health center's services during their first semester (Fielder, Owen, Carey, & Carey,

2010). Second, all first-year students lived on campus and therefore lived relatively close to SUHS. Third, the medical setting was likely to increase the legitimacy of the testing experience. Fourth, the physical layout of SUHS with multiple patient rooms and bathrooms increased the efficiency of the testing appointments by allowing small groups of participants to be tested at once rather than individually. Research staff had access to approximately half of SUHS' clinic space. Participants were in a separate area of the clinic from SUHS' regular Saturday patients, to increase participants' sense of privacy. Participants sat in small groups of 10 or fewer during the consent process, and they had their own individual bathroom or patient room to use during specimen collection.

The STD testing appointment took 20-30 minutes. Participants were asked to verify and/or update the contact information they had reported at the beginning of the year. Next, research staff explained the specimen collection process (see Appendix HH), risks and benefits, compensation, procedure for informing participants of positive test results, mandatory reporting to the Onondaga County Health Department, the possibility of partner notification efforts by the Health Department, the need to release a copy of test results to SUHS to obtain treatment free of charge, and the procedure for receiving treatment through the SUHS pharmacy. Participants were asked to initial their preference for authorizing research staff to provide a copy of the positive test result to SUHS in order to provide treatment free of charge; participants who declined this authorization needed to seek treatment from their own health care provider or the Health Department. Participants were reminded that they could opt not to participate in STD testing and still continue to complete monthly surveys. Participants were given two copies of the STD testing consent form (see Appendix II): one to sign if they wished to participate, and one

to keep.

To protect participants' privacy, their biological sample was labeled with their unique identification code rather than their name. Participants were given a vaginal swab kit, which was placed in an opaque bag for privacy. The plastic sleeve around the vaginal swab was labeled with the participant's identification code, the testing date, and the study identification code, per laboratory guidelines. Participants also receive a detailed, illustrated list of instructions (see Appendix JJ) for the specimen collection procedure. Participants were escorted to either an individual bathroom or an individual patient room, where they self-collected their vaginal swab specimen. Participants were instructed to insert the swab about two inches into the vagina, rotate it for 15-30 seconds, carefully withdraw the swab from the vagina, and secure the swab firmly in the plastic sleeve. Participants returned their swab kit in the opaque bag to research staff.

Participants received \$20 for providing the biological specimen. They were asked to sign a payment receipt and thanked for their participation. A follow-up email (see Appendix KK) was sent to remind participants that results would take one to two weeks, and they would be contacted only in the event of a positive test result. Specimens were processed for immediate and weekend storage in a cooler and a refrigerator, respectively, according to laboratory protocols. On Monday mornings after testing days, specimens were processed for transport and mailed in insulated shipping containers with ice packs, according to laboratory protocols. Testing was conducted within two days of receipt of the specimens in the laboratory.

Given the high volume of testing, participants were not notified of negative test results. Participants with positive test results for any of the three STDs were called with

the results (see Appendix LL). Participants who reported symptoms were encouraged to make an appointment at SUHS. The procedure for receiving treatment free of charge through SUHS was reviewed. Participants who authorized a copy of their test result being shared with SUHS received a prescription, written by a SUHS physician, for the appropriate antibiotic. Drug allergies were checked prior to the physician writing the prescription. Prescriptions were made available for participants to pick up at the SUHS pharmacy, located in SUHS, during the pharmacy's regular business hours. Positive test results for chlamydia or gonorrhea were reported to the Onondaga County Health Department per state law and protocol. Trichomoniasis was not a reportable infection at the time the study was conducted.

Preliminary Data Analysis

Preliminary data screening was conducted prior to data analysis. Steps included examination of missing data, outliers, normality, and psychometric properties of scales.

Missing data

Mental health. Some participants had missing data on individual scale items (e.g., one item out of a nine-item depression scale), and some had missing data on all individual scale items. All of the mental health scales required items to be summed, so missing data on individual items would have caused the total scale score to be artificially low. Accordingly, person-mean imputation was used for the few missing individual items, as long as a participant had responded to at least half of the scale items. That is, the mean of the other scale items that were answered by that participant was imputed for the individual missing item. If a participant had missing data for all of the scale items or if she had missing data for more than half of the scale items, the total scale score was set to

missing. However, most participants with any missing data had only one missing item. For example, for anxiety, 92 participants (2% of the total number of participants who responded across all 13 surveys) had a total of 94 missing individual items (0.2% of the total number of anxiety items across all participants across 13 surveys) across all 13 waves. For all of the mental health outcomes, missing data were rare.

Sexual victimization. There were few missing data for the SV items. Across all four waves at which SV was assessed and across all 483 participants, 88% of 1932 possible cases (i.e., 483 participants multiplied by four waves) had complete data for all 20 individual SV items. Of the 225 cases with missing data for SV items, 170 (76% of missing data cases) were cases of participants not completing that wave's survey, 46 (20%) were cases in which participants had missing data for five or fewer of the 20 individual SV items, and 9 (4%) were cases in which participants completed that wave's survey but left all 20 individual SV items blank. Scale scores for SV were calculated by summing scores for multiple SV items. At all four waves, approximately 90% of participants with any missing data were missing only one item out of 20. Because the primary outcomes were dichotomous, and there were many other items to sum together, it was unlikely that missing one item would have a major impact on the overall scale score. For the remaining ~10% of missing data cases, the highest number of missing responses was five; again, many other items were still available to sum. Accordingly, missing data were not imputed for individual SV items. Missing data were also not imputed for scale scores for the 170 cases in which participants did not complete the survey or the 9 cases in which participants left all 20 SV items blank.

Sexually transmitted diseases. The majority of participants (77%) had complete

data for all four occasions of self-reported STD diagnosis, and the majority (64%) participated in the STD testing offered through the study. Missing data for STD diagnoses were not imputed. At each of the four waves, no more than three participants left the STD diagnosis question blank; thus, almost all missing data were due to participants not completing that wave's survey at all. No participants had missing data for all four self-reports of STD diagnosis, but 20 (4% of the full sample) had missing data for all three follow-up self-reports of STD diagnosis (waves 5, 9, and 13). Overall, 110 participants (23%) had missing data on at least one out of the four self-reports of STD diagnosis. For the laboratory STD testing provided through the study, 173 participants (36%) did not participate.

Hookup and romantic behavior. Missing data for hookup or romantic behavior questions were not imputed. However, these responses were examined for data quality. There were three situations in which data quality was suspect. First, a few participants indicated they had fewer instances of sexual behavior than partners for that behavior (e.g., two casual vaginal sex partners in the last month, but one instance of vaginal sex in the last month). The response to the more specific question (number of partners) should be more trustworthy, so in these cases the number of times was increased to match the number of partners; in the majority of cases, the number of times was increased by one. For participants who reported one partner but no instances of the behavior, event-level data¹⁰ for the respective partner type (i.e., casual or romantic, depending on which partner type was in question) were examined for corroborating information. If the event-level

¹⁰ Event-level data were collected on the most recent interaction with both casual and romantic partners each month; these data were collected for a separate study and thus were not described in the methods or results. The event-level data captured whether the interaction was in the last month and which sexual behaviors (i.e., performed oral sex, received oral sex, and had vaginal sex) occurred with casual and/or romantic partners.

data suggested the participant engaged in the sexual behavior in question, then the number of times was changed from zero to one to match the participant's response for number of partners (with the understanding that there may have been more than one event, but there was no way to estimate the number of events). Across all 483 participants and all 13 waves, this correction was made 8 times (affecting 0.1% of all responses) for performing oral sex on casual partners, 4 times (0.1%) for receiving oral sex from casual partners, 7 times (0.1%) for vaginal sex with casual partners, 4 times (0.1%) for performing oral sex on romantic partners, 13 times (0.2%) for receiving oral sex from romantic partners, and 5 times (0.1%) for vaginal sex with romantic partners.

Second, a few participants indicated they had one sexual partner but no instances of that behavior (e.g., one romantic vaginal sex partner in the last month, but no instances of vaginal sex in the last month). Participants may have considered someone a sexual partner even if they did not sexually interact with them that particular month (e.g., a long-distance boyfriend). For these participants, the event-level data for the respective partner type (i.e., casual or romantic, depending on which partner type was in question) were again examined for corroborating information. If the event-level data suggested the participant either had no interaction that month or did not engage in the sexual behavior in question, the number of partners was changed from one to zero to match the participant's response for number of events. Across all 483 participants and all 13 waves, this correction was made 3 times (affecting 0.1% of all responses) for performing oral sex on casual partners, 8 times (0.1%) for receiving oral sex from casual partners, 3 times (0.1%) for vaginal sex with casual partners, 9 times (0.2%) for performing oral sex on romantic partners, 17 times (0.3%) for receiving oral sex from romantic partners, and 5

times (0.1%) for vaginal sex with romantic partners.

Third, a few participants' responses to number of partners were high enough to suggest they misunderstood the question (e.g., responded with the number of times instead of the number of partners). For example, a participant indicated she had 15 romantic vaginal sex partners in one month, and had vaginal sex with a romantic partner 15 times. Noticeably high responses were compared to monthly partner data as well as data on the total number of partners each semester (collected for a separate study). These additional data sources were checked for corroborating information that would allow a reasonable inference as to whether participants misunderstood the question. For example, if the participant who reported 15 romantic vaginal sex partners in one month reported one romantic vaginal sex partner every other month that semester, and reported having one romantic vaginal sex partner during the semester, then the report of 15 partners was changed to 1. This correction was made 1 time (affecting 0.0% of all responses) for performing oral sex on casual partners, 1 time (0.0%) for receiving oral sex from casual partners, 0 times for vaginal sex with casual partners, 7 times (0.1%) for performing oral sex on romantic partners, 10 times (0.2%) for receiving oral sex from romantic partners, and 10 times (0.2%) for vaginal sex with romantic partners.

These minimal adjustments were not expected to alter any findings. Overall, for casual partners, out of approximately 5,640 reports across all 13 waves, a total of 12 corrections were made for performing oral sex (affecting 0.2% of all responses), 13 (0.2%) for receiving oral sex, and 10 (0.2%) for vaginal sex. Overall, for romantic partners, out of approximately 5,640 reports across all 13 waves, a total of 20 corrections were made for performing oral sex (affecting 0.4% of all responses), 40 (0.7%) for

receiving oral sex, and 20 (0.4%) for vaginal sex. Thus, very few data had to be adjusted for the sake of ensuring accuracy and data quality.

Outliers and normality

The mental health, sexual victimization, and sexual behavior variables were checked for outliers. Outliers were indicated by a z -score of greater than 3.29 or less than -3.29 (Tabachnick & Fidell, 2007) and were re-coded to three standard deviations from the mean (Kline, 2005).

Mental health. Across all participants and all 13 waves, there were 37 outliers on anxiety (0.7% of all anxiety responses). There were 68 outliers for depression (1%), 26 for negative affect (0.5%), 4 for perceived stress (0.1%), 1 for positive affect (0.02%), 3 for self-esteem (0.2%), and none for life satisfaction.

Histograms illustrating the distributions of the mental health variables at each wave were examined for univariate normality. Normal distribution of the predictors increases the likelihood of multivariate normality (Kline, 2005). Anxiety, depression, negative affect, and perceived stress were positively skewed, whereas life satisfaction and self-esteem were negatively skewed, and positive affect was relatively normally distributed.

Few participants reported high anxiety, and skew ranged from 1.02 to 1.48 across all 13 waves; after a square root transformation ($x + 1$), skew ranged from 0.26 to 0.72. Few participants reported high depressive symptoms, and skew ranged from 1.19 to 1.81; after a square root transformation, skew ranged from 0.33 to 0.90. Few participants reported high negative affect, and skew ranged from 0.42 to 1.30; after a square root transformation, skew ranged from 0.32 to 0.85. Skew was slightly better for a log-based

10 transformation ($x + 1$), but square root was used to keep similar scales as all other mental health variables, for which a square root transformation was more appropriate. Few participants reported very high stress levels, and skew ranged from 0.10 to 0.56; after a square root transformation, skew ranged from -0.52 to -0.10.

Positive affect was fairly normally distributed for most of the 13 waves. However, because all other mental health variables were transformed, the variance of positive affect (untransformed) was more than 10 times greater than the variances of the other transformed mental health variables. Therefore, a square root transformation was performed on positive affect to avoid a problem with ill-scaled variances (Kline, 2005). Skew ranged from -0.36 to 0.09 for the raw variables and -0.73 to -0.32 after transformation. Few participants reported low life satisfaction, and skew ranged from -0.79 to -0.59 for the raw variables; after a reflected square root transformation ($[\text{maximum score} + 1] - x$), skew ranged from -0.03 to -0.18. Few participants reported low self-esteem, and skew ranged from -0.73 to -0.46 for the raw variables; after a reflected square root transformation, skew ranged from -0.14 to 0.03.

Sexual victimization. Among the 289 participants included in the oral sex SV analyses, there were 10 outliers (4% of all valid responses) for number of pre-college oral sex SV events and 4 outliers (1%) for number of oral sex SV events during the study. For the predictors, there were 4 outliers (1%) for typical drinks per week, 9 (3%) for number of performed oral sex hookup events during the study, 4 (1%) for number of received oral sex hookup events, 7 (2%) for number of performed oral sex romantic events, and 6 (2%) for number of received oral sex romantic events.

Among the 282 participants included in the attempted vaginal rape analyses, there

were 5 outliers (2% of all valid responses) for number of pre-college attempted vaginal rape events and 6 outliers (2%) for number of attempted vaginal rape events during the study. For the predictors, there were 5 outliers (2%) for typical drinks per week, 5 (2%) for number of vaginal sex hookup events during the study, and 6 (2%) for number of vaginal sex romantic events.

Among the 282 participants included in the completed vaginal rape analyses, there were 5 outliers (2% of all valid responses) for number of pre-college completed vaginal rape events and 3 outliers (1%) for number of completed vaginal rape events during the study. For the predictors, there were 5 outliers (2%) for typical drinks per week, 6 (2%) for number of vaginal sex hookup events during the study, and 6 (2%) for number of vaginal sex romantic events.

Hookup and romantic behavior. Across all 13 waves, there were 99 (2% of all valid responses on this variable) outliers for number of casual oral sex (performed) events, 85 (2%) outliers for number of casual oral sex (received) events, 76 (1%) outliers for number of casual vaginal sex events, 112 (2%) outliers for number of casual oral sex (performed) partners, 90 (2%) outliers for number of casual oral sex (received) partners, and 121 (2%) outliers for number of casual vaginal sex partners.

Across all 13 waves, there were 112 (2%) outliers for number of romantic oral sex (performed) events, 91 (2%) outliers for number of romantic oral sex (received) events, 119 (2%) outliers for number of romantic vaginal sex events, 34 (0.6%) outliers for number of romantic oral sex (performed) partners, 29 (0.5%) outliers for number of romantic oral sex (received) partners, and 38 (0.7%) outliers for number of romantic vaginal sex partners.

Psychometric Properties and Validity of Mental Health Scales

The psychometric properties of the seven composite mental health scales were examined. Cronbach's alpha (standardized) was calculated to assess internal consistency. Alphas ranged from .86-.91 for anxiety (see Table 4), .81-.89 for depression (see Table 5), .68-.86 for negative affect (see Table 6), .69-.80 for perceived stress (see Table 7), .77-.86 for positive affect (see Table 8), .89-.93 for life satisfaction (see Table 9), and .90-.93 for self-esteem (see Table 10).

The mental health outcomes were related in expected fashion (see Table 11 for baseline correlation matrix), providing evidence of their validity. There were significant positive correlations among all four indicators of poor mental health, r_s .46-.65, $p_s < .001$, and there were significant positive correlations among the three indicators of good mental health, r_s .30-.64, $p_s < .001$. There were significant negative correlations among almost all of the four indicators of poor mental health and the three indicators of good mental health, r_s -.60 to -.12, $p_s < .01$. The only non-significant relationship was between negative and positive affect, $r = -.002$, ns .

Data Analytic Approach

Hypothesis 1: Mental health.

General mental health.

Introduction to latent growth curve modeling. Hypotheses 1a and 1b were tested using multivariate latent growth curve modeling (LGCM). LGCM is an application of confirmatory factor analysis, which employs structural equation modeling (SEM) methodology. Observed repeated measures are used as indicators of an unobserved, or latent, trajectory (Bollen & Curran, 2006). Latent growth curves model individuals'

trajectories over time, while also incorporating individual differences in trajectories over time to describe the overall average trajectory (Duncan, Duncan, & Strycker, 2006).

Thus, intra-individual change and inter-individual change are captured in the same model. LGCM is a flexible analytic tool that can accommodate both time-invariant (e.g., ethnicity) and time-varying (e.g., relationship status) predictors as well as both continuous and categorical outcomes.

LGCM allows for a variety of questions to be answered (Baltes & Nesselroade, 1979; Bollen & Curran, 2006). First, do individuals change over time? Individuals' data can be examined over time to see if they follow a linear or non-linear trajectory or remain stable from baseline. Second, are there between-person differences in within-person change over time? There may be group differences in both the initial status or level and the rate of change. Third, are there relationships in behavior change over time? Multivariate LGCM allows an exploration of how changes in multiple variables over time are related. Fourth, what predicts within-person change over time? Predictors of intra-individual change can be tested for their effect on the rate of change. Fifth, what predicts between-person differences in within-person change over time? Predictors of inter-individual change can also be explored.

Advantages of LGCM. LGCM is favored over traditional repeated measures analyses for several reasons. First, repeated measures analysis of variance (ANOVA) assumes equal, independent error variance across all repeated measures occasions (Kline, 2005), which may not reflect reality. Multivariate ANOVA (MANOVA) does not share this assumption, but it is limited to observed variables, which are assumed to be measured without measurement error (Duncan et al., 2006); again, this assumption may not reflect

reality. In contrast, LGCM incorporates latent variables and accounts for measurement error. Third, ANOVA and MANOVA also “treat differences among individuals in their growth trajectories as error variance” rather than as meaningful variance to be predicted (Kline, 2005, p. 278). Fourth, unlike LGCM, neither ANOVA nor MANOVA can accommodate time-varying predictors, which may differ across assessment intervals in a longitudinal study (Duncan et al., 2006). Fifth, LGCM allows for the use of likelihood-based estimators that use all available data, such as full information maximum likelihood, which is the standard estimation method for LGCM (Kline, 2005). These methods allow inclusion of all participants’ data rather than limiting data analyses to only those individuals with complete data across all assessments. Sixth, LGCM allows researchers to test the appropriateness of the hypothesized growth trajectory (e.g., no growth, linear, quadratic). Seventh, LGCM provides statistics such as the average intercept and slope and the level of variability in both of those over time (Preacher, Wichman, MacCallum, & Briggs, 2008). Eighth, LGCM also has an important advantage over traditional SEM techniques because it allows for inclusion of a mean structure (Kline, 2005). In longitudinal studies, means are expected to change over time, and group differences in means are meaningful. Thus, the addition of a mean structure to SEM’s analysis of a covariance structure is beneficial. A mean structure is determined by regression of relevant variables on a constant of 1.0.

Univariate LGCM. In univariate LGCM, all waves of the repeated measures variable are specified as indicators of two latent growth factors (Duncan et al., 2006). The first factor is termed the intercept, initial status, or level, and it represents the baseline level of a construct. The intercept is a constant across time, so the loadings of the

indicators on this factor are set to one for all repeated measures. The second factor is linear change or slope, and it represents the slope of the individual's trajectory for a construct over time. Loadings of the indicators on the slope factor may be set to different values that correspond to measurement intervals, depending on the hypothesized trajectory of the slope. For example, evenly-spaced, increasing loadings (e.g., 0, 1, 2, 3...) would be used to specify a linear trajectory, and the square of these loadings (i.e., 0, 1, 4, 9) would be used to specify a quadratic trajectory. With a continuous outcome, when the initial measurement is coded as 0, the intercept represents the average level of the outcome at baseline. Unlike other statistical techniques that assume no relationship, with LGCM the intercept and slope factors are allowed to co-vary; their covariance indicates the extent to which the initial level predicts future change (Kline, 2005).

Several fixed- and random-effects group-level parameters result from the LGCM analysis. A fixed effect is a single value for a population, whereas a random effect represents variance in the distribution (Curran, Obeidat, & Losardo, 2010). Both the intercept and slope growth factors have a mean and a variance (Duncan et al., 2006). The means for the intercept and slope growth factors are fixed effects representing the average intercept and slope, respectively, across all individuals. Intercepts and slopes are allowed to vary across individuals because some may start higher or lower than the mean initial level, and some may change faster or slower than the mean rate of change. The variances for the intercept and slope growth factors are random effects, indicating the presence of inter-individual differences in the initial level or the rate of change, respectively (Bollen & Curran, 2006). The covariance between the intercept and slope factors indicates the degree of relationship between the initial level and the rate of

change. Residual variances for each repeated measure indicate the time-specific measurement error for continuous variables, or the variance not accounted for by the underlying growth process. Taken together, these parameters describe the group's mean trajectory and the degree to which individuals' trajectories vary around the mean trajectory (Curran & Hussong, 2003).

A LGCM with no predictors or covariates is called an unconditional model. The repeated measures are influenced only by the underlying latent trajectory captured by the intercept and slope growth factors (Bollen & Curran, 2006). When there is significant inter-individual variability in the intercept or slope growth factors in the unconditional model, predictor variables can be added to try to explain this variance. A model including predictors is called a conditional model because the fixed and random effects are conditioned on the predictors as well as the latent trajectory (Curran et al., 2010). The growth curve parameters (i.e., the intercept and slope growth factors), rather than the repeated measures variables, are then treated as outcomes that may be predicted (Duncan et al., 2006).

Multivariate LGCM. Bivariate or multivariate LGCM is also referred to in the literature as parallel process LGCM, associative LGCM, simultaneous growth modeling, and multivariate latent trajectory modeling (Preacher et al., 2008). Multivariate LGCM is simply an extension of the univariate LGCM in which each repeated measures outcome variable has its own growth curve model (Grimm, 2007). This technique allows examination of important developmental questions, including how change in one variable is associated with change in another variable over time. There are different approaches to multivariate LGCM. The associative model is a first-order approach used to “examine the

correlations among developmental parameters for pairs of behaviors” (Duncan et al., 2006, p. 64). The results indicate whether the intercepts and slopes of each variable are related, which suggests common developmental trends. A second-order approach, in which higher-order latent factors are modeled to account for first-order latent factors, is also possible using either a factor-of-curves or a curve-of-factors approach to test whether a higher-order construct explains the relationship among several first-order growth factors (Duncan et al., 2006); the second-order approach was not used in the current study due to differences in measurement intervals and acuteness of the mental health outcomes.

Several steps are required for multivariate LGCM. First, each outcome is modeled separately to determine the most appropriate trajectory as well as to confirm the presence of inter-individual variation in the growth factors (Duncan et al., 2006). To begin, a model is fit with only the repeated measures variables. Several trajectories, including no growth, linear change, and non-linear change (e.g., quadratic), are tested to determine the appropriate trajectory. The fit of different models can be evaluated with absolute and incremental fit indices used in SEM (Hu & Bentler, 1999), or in the case of completely nested models (e.g., linear growth and no growth), with the likelihood ratio chi-square test (Bollen & Curran, 2006). If the intercept or slope growth factor is significantly different from zero and has significant variance, predictors can then be added to the model to explain the model parameters. In the case of multivariate LGCM, potential predictors include the intercept and slope growth factors from the other outcome variables, as well as time-invariant covariates (e.g., gender, ethnicity). Once the appropriate trajectories for the different outcomes have been determined separately, a simultaneous growth model with all repeated measures variables is fit and predictors can

be tested. Although the covariance of the intercept and slope growth factors for the different outcomes can be evaluated, directional paths may be specified between the factors to test specific hypotheses (Preacher et al., 2008).

Approach to testing hypotheses 1a and 1b. Hypotheses 1a and 1b were tested with multivariate LGCM. Performing oral sex, receiving oral sex, and vaginal sex hookup behavior were each tested in separate models¹¹ for each of the seven mental health outcomes.¹² To test Hypothesis 1a, the relationships among the intercepts of the mental health and sexual hookup behavior outcomes were analyzed. Support for Hypothesis 1a would be indicated by significant positive effects for the regression of the intercepts of anxiety, depression, negative affect, and perceived stress on the intercepts of the sexual hookup behavior outcomes. A positive regression coefficient would indicate that women with a higher probability of hooking up at the first measurement occasion had higher initial levels of poor mental health. Conversely, support for Hypothesis 1a would also be indicated by significant negative effects for the regression of the intercepts of positive affect, self-esteem, and life satisfaction on the intercepts of the sexual hookup behavior outcomes. A negative regression coefficient would indicate that women with a higher probability of hooking up at the first measurement occasion had lower initial

¹¹ Performing oral sex, receiving oral sex, and having vaginal sex were assessed in separate questions, so there was no way to determine whether a participant engaged in both types of oral sex and vaginal sex during the same or separate events, or with the same or different partners. Rather than combine the three behaviors into one model, separate models were used to explore potential differences in patterns of effects (e.g., performing vs. receiving oral sex, oral sex vs. vaginal sex).

¹² The mental health constructs were tested separately, rather than as indicators of a higher-order factor representing mental health, for several reasons. First, the standardized measures we used for the constructs had different measurement intervals; items for depression and anxiety referenced the last two weeks, items for negative affect, perceived stress, and positive affect referenced the last month, and items for self-esteem and life satisfaction did not have a specific reference period. Second, the constructs differ in their temporal nature; some (e.g., depression, anxiety) are likely to be fairly acute, whereas others (e.g., positive and negative affect, life satisfaction) may be more stable, long-standing constructs. Third, related to acuteness, depression and anxiety can have clinical and severe symptoms, and high levels of these constructs are less common compared to other less severe symptoms, such as perceived stress. Therefore, there was a conceptual rationale for using separate LGCM for each mental health outcome.

levels of good mental health.

For the longitudinal test of Hypothesis 1b, the relationships among the slopes of the mental health and sexual hookup behavior outcomes were analyzed. Support for Hypothesis 1b would be indicated by significant positive effects for the regression of the slopes of anxiety, depression, negative affect, and perceived stress on the slopes of the sexual hookup behavior outcomes. A positive regression coefficient would indicate that increases in the probability of hookup behavior were associated with increases in poor mental health outcomes over time. Conversely, support for Hypothesis 1b would also be indicated by significant negative effects for the regression of the slopes of positive affect, self-esteem, and life satisfaction on the slopes of the sexual hookup behavior outcomes. A negative regression coefficient would indicate that increases in the probability of hookup behavior were associated with decreases in good mental health outcomes over time. All LGCM was conducted using Mplus, version 6 (Muthén & Muthén, 2010).

Depression diagnoses. Logistic regression was used to test Hypothesis 1c about the association between sexual hookup behavior and depression diagnoses. The PHQ-9 scoring algorithm (Spitzer et al., 1999; see Appendix F) was used to categorize participants who met DSM-IV criteria for a depression diagnosis (major depressive disorder or other depression disorder). The outcome for this analysis was having a depression diagnosis during the study (i.e., at any point from waves 2-13). The predictor for this analysis was sexual hookup behavior during the study; separate analyses were conducted for performing oral sex, receiving oral sex, having vaginal sex, and any sexual hookup behavior. Analyses were conducted using both dichotomous and continuous predictors. Analyses using dichotomous predictors examined the association of sexual

hookup behavior and depression diagnosis during the study, controlling for pre-college depression diagnosis, baseline depression diagnosis, and romantic sexual behavior during the study. Analyses using continuous predictors examined the association of the number of sexual hookup events and depression diagnosis during the study, controlling for pre-college depression diagnosis, baseline depression diagnosis, and number of sexual romantic events during the study. All logistic regression analyses were conducted using SAS, version 9.2 (SAS Institute, 2008).

Assumptions of logistic regression, such as an adequate ratio of cases to predictors, absence of multicollinearity among the predictors, and linear relationships between continuous predictors and the logit of the outcome, were checked (Tabachnick & Fidell, 2007). Published recommendations suggest a ratio of at least 10 outcome events per predictor tested in logistic regression (Peduzzi, Concato, Kemper, Holford, & Feinstein, 1996). The ratio of events to predictors was 29 to 1 for depression diagnosis during the study. The highest correlation between any pair of predictors in any of the models was .26, indicating an absence of multicollinearity. For analyses with continuous predictors, the Box-Tidwell transformation test was used to check for linearity in the logit, which is an assumption of logistic regression that continuous predictors are linearly related to the logit form of the outcome (Tabachnick & Fidell, 2007). Interactions between all continuous predictors and their natural logarithms were added at once to the model. Significant interactions suggested a violation of the assumption of linearity in the logit; a Bonferroni-corrected alpha level of .007 was used (.05 divided by 7 parameters in the model [4 predictors, 2 interaction terms, and the intercept]; Tabachnick & Fidell, 2007). There were no significant interactions for the analyses conducted with number of

oral sex (performed), oral sex (received), or vaginal sex events.

Univariate logistic regression analyses were conducted initially to test the association between sexual hookup behavior and depression diagnosis during the study. Next, covariates selected on the basis of a combination of theoretical, empirical, and statistical factors were added to the model. Thus, the relationship between sexual hookup behavior and depression diagnosis was evaluated in a multivariate context to determine whether hookups conferred additional risk for depression diagnosis after controlling for pre-college depression diagnosis, baseline depression diagnosis, and sexual romantic behavior. Odds ratios (OR) are reported to illustrate effect size, along with 95% confidence intervals (CI). If the 95% CI for an odds ratio includes 1.0, the effect is not statistically significant at $p < 0.05$. Each multivariate model had four predictors in all, and interactions between all six combinations of predictors were tested. To avoid inflating type I error when evaluating potential interactions, a Bonferroni-corrected alpha level of .008 was used (.05 divided by 6 interactions). No interaction terms reached statistical significance for any of the models with dichotomous or continuous predictors.

Several follow-up analyses were conducted. The main analyses were also conducted using only those women who had no history of depression (prior to college or at baseline). The relationship between sexual behavior and depression diagnosis during the study was also examined among: (a) women who had no history of sexual hookup behavior prior to college, and (b) women who had no history of sexual romantic behavior prior to college.

Hypothesis 2: Sexual victimization. Logistic regression¹³ was used to test for an

¹³ Several other data analytic approaches were considered and found to be inappropriate due to either statistical or conceptual issues. To take advantage of the longitudinal nature of the data, a latent growth

association between sexual hookup behavior and SV. SV outcomes were dichotomized due to limited variability in the number of SV events during the study. Assumptions of logistic regression, such as an adequate ratio of cases to variables, absence of multicollinearity among the predictors, and linear relationships between continuous predictors and the logit of the outcome, were checked (Tabachnick & Fidell, 2007). Published recommendations suggest a ratio of at least 10 outcome events per predictor tested in logistic regression to ensure unbiased parameter estimates (Peduzzi et al., 1996). The ratio of events to predictors was 6 to 1 for oral sex SV, 10 to 1 for attempted vaginal rape, and 6 to 1 for completed vaginal rape. The highest correlation between any pair of predictors in any of the three models was .42, indicating an absence of multicollinearity.

Analyses were conducted using both dichotomous and continuous predictors. Analyses using dichotomous predictors examined the association of sexual hookup behavior during the study and SV outcomes, controlling for several dichotomous covariates: history of SV, baseline alcohol use, sorority membership, and romantic sexual behavior during the study. Analyses using continuous predictors examined the association of the number of sexual hookup events during the study and SV outcomes, controlling for several covariates: number of pre-college SV events, number of typical

curve modeling framework was considered initially. Two-part models, which model the occurrence of the outcome in part one and the frequency of the outcome given that it occurs in part two, would not converge due to the rare nature of the SV outcomes within the three measurement intervals (waves 2-5, 6-9, and 10-13). Within the LGCM framework, count regression (e.g., Poisson, negative binomial) was also attempted. Standard ordinary least squares regression uses the normal distribution for its probability distribution, so it is not appropriate for count data, which cannot take on negative or non-integer values by definition and are usually positively skewed (Atkins & Gallop, 2007). Zero-inflated Poisson and negative binomial models were attempted to accommodate the high proportion of zero responses (i.e., approximately 85-95% depending on the measurement interval and type of SV) in the outcomes. However, because the SV outcomes were so rare and zero-inflated models had difficulty converging, dichotomization was deemed necessary. As a result, two-part growth curve models were no longer applicable. Moreover, unconditional LGCMs using dichotomized outcomes revealed that SV experiences were not time-dependent (i.e., there were no changes in mean probability of experiencing SV over time and no significant inter-individual differences in how the mean changed over time), indicating that the LGCM framework was not an informative approach to analysis.

drinks per week at baseline, sorority membership, and number of romantic events during the study. For analyses with continuous predictors, the Box-Tidwell transformation test was used to check for linearity in the logit (Tabachnick & Fidell, 2007). Interactions between all continuous predictors and their natural logarithms were added at once to the model. Interactions significant at a Bonferroni-corrected alpha level of .005 (.05 divided by 10 parameters in the model [5 predictors, 4 interaction terms, and the intercept]; Tabachnick & Fidell, 2007) suggested a violation of the assumption of linearity in the logit. There were no statistically significant interactions.

Univariate analyses were conducted initially to test the association between hookup behavior and SV outcomes. Next, covariates selected on the basis of a combination of theoretical, empirical, and statistical factors were added to the model. Thus, the relationship between hookup behavior and SV outcomes was evaluated in a multivariate context to determine whether hookups conferred additional risk for SV after controlling for other known risk factors, including previous SV (Breitenbecher, 2001) and alcohol use (Abbey, 2002), as well as for relevant sociodemographic characteristics (viz., sorority membership) and sexual romantic behavior. Odds ratios (OR) are reported to illustrate effect size, along with 95% CIs. Each multivariate model had five predictors in all, and interactions between all 10 combinations of predictors were tested. To avoid inflating type I error when evaluating potential interactions, a Bonferroni-corrected alpha level of .005 (.05 divided by 10 interactions) was used. No interaction terms reached statistical significance for any of the models with dichotomous or continuous predictors.

Direct logistic regression, using simultaneous entry of variables into the model, was used for all multivariate models. All continuous predictors were centered at their

means to facilitate interpretation. In addition to odds ratios, two effect size measures are reported. For McFadden's ρ^2 , values in the range of .2-.4 are highly satisfactory (Tabachnick & Fidell, 2007). The area under the receiver operating curve, c , can range from .5 (chance prediction) to 1.0 (perfect prediction).

Hypothesis 3: Sexually transmitted diseases. Chi-square tests of independence were used to test for an association between sexual hookup behavior and STDs. The independent variable was any sexual hookup behavior during the study, and the dependent variable was new STD diagnosis. A chi-square test of independence was also used to run a parallel test for sexual romantic behavior. Due to the low number of STDs reported during the study, the same analyses were also conducted using lifetime indicators of sexual hookup behavior, sexual romantic behavior, and STD diagnosis. Logistic regression was used to test for an association between the number of hookup events and STD diagnosis during the study. Separate analyses were conducted for number of oral sex (performed), oral sex (received), and vaginal sex hookup events. With only seven STD cases, the ratio of predictors to events was 7 to 1, which is below the recommended level for logistic regression, indicating potential for biased parameter estimates (Peduzzi et al., 1996).

Results

Participants

A total of 483 participants enrolled in the study and completed the baseline survey. Most participants (61%) heard about the study through the recruitment letter and website; 28% signed up through the psychology department participant pool, and 11% came from word of mouth referrals and flyer response. Most participants (94%) were 18

years old at baseline ($M = 18.1$, $SD = 0.3$, range: 18-21). The average standing on the SES ladder was 6.2 ($SD = 1.7$, median = 6.0, range: 1-10). Participants indicated they were somewhat religious on average ($M = 2.2$, $SD = 0.9$, median = 2, range: 1-4). Table 12 lists proportions for categorical demographic characteristics. Racial/ethnic breakdown of the sample was 66% White, 11% Asian, 10% Black, and 13% other/multiple races. Nine percent of participants self-identified as Hispanic/Latina. Almost all (96%) participants identified as heterosexual. Twenty-three percent of participants reported they joined a sorority during their second semester on campus. Eighty-nine percent of participants reported they were born a US citizen, and 98% attended high school in the US. At baseline, 29% reported they were in a romantic relationship. Throughout the study, 29-33% reported they were in a relationship each month.

Survey Completion and Attrition

On average, participants completed 11.7 surveys ($SD = 2.5$). The median and mode for number of completed surveys was 13. Sixty-four percent completed all 13 surveys, and another 13% completed 12 out of 13 surveys. Over 86% completed 10 or more surveys (see Table 13). Table 14 lists the percentage of the full sample and the count of participants who completed and did not complete each of the 12 follow-up surveys. Response rates for the follow-up surveys ranged from a low of 81% at wave 11 to a high of 97% at wave 2. Hence, attrition rates ranged from a low of 3% at wave 2 to a high of 19% at wave 11. Response rates remained above 90% through wave seven, when they began to decline. Response rates were lowest during the summer months, when most students did not reside on campus.

Table 14 also provides descriptive statistics for the completion times for all 12

follow-up surveys. Median completion times ranged from 10 to 17 minutes for most surveys. The final survey had a median completion time of 21 minutes, likely due to numerous qualitative questions (for a separate study) that took longer to answer.

Participants who completed all 13 surveys ($n = 309$, 64%) and those who missed one or more surveys ($n = 174$, 36%) were compared on demographic characteristics, sexual behavior, mental health, sexual victimization, and STD history. Due to the high number of comparisons, the chance for type I error would be inflated if alpha for each variable were set at .05. To keep the family-wise alpha at .05, a Bonferroni-corrected alpha level was used within each group (e.g., demographics, mental health) of comparisons. Chi-squared tests were used for categorical variables, and between-samples t -tests were used for continuous variables.

For demographic characteristics, the Bonferroni-corrected alpha level was .005 (.05/10). There were no statistically significant differences between completers and attriters on age, race/ethnicity, Hispanic origin, sexual orientation, SES, sorority membership, relationship status, US citizenship, attending high school in the US, or religiosity. For sexual behavior, the Bonferroni-corrected alpha level was .004 (.05/12). There were no differences between completers and attriters on lifetime number of casual or romantic events or partners for performing oral sex, receiving oral sex, vaginal sex partners. For mental health, the Bonferroni-corrected alpha level was .007 (.05/7). There were no differences between completers and attriters on baseline anxiety, depression, negative affect, perceived stress, positive affect, life satisfaction, or self-esteem. There was no difference between completers and attriters in likelihood of experiencing any SV before college, but completers reported fewer SV events of any type before college

compared to attriters, Satterthwaite $t(295.4) = -2.25, p = .025, d = -0.23$. There was no difference between completers and attriters in rates of pre-college STD diagnosis.

Overall, there were few differences between participants who completed the entire study and those who were lost to attrition at one or more waves. Accordingly, participants with missing data were included in analyses whenever the analytic method allowed.

Data Quality

Baseline surveys were completed in-person after the orientation session. Based on observations from research staff, most participants took between 15 and 25 minutes to complete the baseline survey, and none took less than 10 minutes. To assess data quality for follow-up surveys, completion times were inspected for all follow-up surveys, which were completed remotely online. Participants with a completion time of zero or one minute were not counted as completers.¹⁴ Due to the length of the surveys, even if participants' responses led them to skip out of all of the sexual behavior and other health behavior questions, it was highly unlikely that anyone could finish the survey in less than two minutes. Across all 13 waves, there were four participants who had a zero or one-minute completion time, a total of 13 times. The average number of items completed in these 13 cases was 1.9 ($SD = 2.7$, median = 1, mode = 0, range: 0-9). These participants appeared to have clicked through the survey without responding to any questions. The few questions that were answered in these cases were set to missing, and the participant was considered a non-completer of that survey.

Rates of Sexual Behavior

Sexual hookup behavior.

Before college. Overall, 34% of participants ($n = 164$) reported that they had

¹⁴ Completion rates reported in Table 14 reflect this adjustment.

engaged in any sexual hookup behavior (i.e., performed oral sex, received oral sex, or had vaginal sex with a casual partner) prior to starting college. Prior to college entry, 26% ($n = 126$) reported performing oral sex on a casual partner. Among women with a history of oral sex (performed) hookup behavior, the mean number of events was 4.8 ($SD = 4.3$, median = 3, range: 1-14), and the mean number of partners was 2.4 ($SD = 1.6$, median = 2, range: 1-6). Prior to college entry, 21% of participants ($n = 101$) reported receiving oral sex from a casual partner. Among women with a history of oral sex (received) hookup behavior, the mean number of events was 3.5 ($SD = 2.9$, median = 2, range: 1-9), and the mean number of partners was 1.8 ($SD = 1.0$, median = 1, range: 1-4). Prior to college entry, 21% of participants ($n = 99$) reported having vaginal sex with a casual partner. Among women with a history of vaginal sex hookup behavior, the mean number of events was 6.9 ($SD = 7.7$, median = 4, range: 1-30), and the mean number of partners was 2.3 ($SD = 1.5$, median = 2, range: 1-5).

During the study. Overall, 40% of participants ($n = 195$) reported that they engaged in any sexual hookup behavior during the study (waves 2-13). Figure 1 displays the proportion of participants who engaged in oral sex (performed), oral sex (received), and vaginal sex hookup behavior in the last month for waves 2-13.

Table 15 displays the proportion of participants who performed oral sex on a casual partner in the last month, by wave. Monthly rates of oral sex (performed) hookup behavior ranged from a low of 5% during the summer to a high of 13%. Throughout the course of the study, 32% of participants ($n = 154$) performed oral sex on a casual partner. Table 16 displays descriptive statistics (by wave) for number of hookup events and partners in the last month for oral sex (performed). Among women who engaged in oral

sex (performed) hookup behavior, the median number of events per month was usually one or two, and the median number of partners per month was always one.

Table 17 displays the proportion of participants who received oral sex from a casual partner in the last month, by wave. Monthly rates of oral sex (received) hookup behavior ranged from a low of 4% during the summer to a high of 10% at the end of the Spring semester. Throughout the course of the study, 30% of participants ($n = 146$) received oral sex from a casual partner. Table 18 displays descriptive statistics (by wave) for number of hookup events and partners in the last month for oral sex (received). Among women who engaged in oral sex (received) hookup behavior, the median number of events per month was usually one, and the median number of partners per month was always one.

Table 19 displays the proportion of participants who had vaginal sex with a casual partner in the last month, by wave. Monthly rates of vaginal sex hookup behavior ranged from a low of 6% during the summer to a high of 13% during the Fall semester. Throughout the course of the study, 32% of participants ($n = 153$) had vaginal sex with a casual partner. Table 20 displays descriptive statistics (by wave) for number of hookup events and partners in the last month for vaginal sex. Among women who engaged in vaginal sex hookup behavior, the median number of events per month was usually one or two, and the median number of partners per month was always one.

Lifetime. By the end of the study (as of wave 13), 41% of participants ($n = 200$) reported lifetime experience performing oral sex on a casual partner, 39% ($n = 190$) reported receiving oral sex from a casual partner, and 37% ($n = 180$) reported having vaginal sex with a casual partner. Overall, by the start of their sophomore year of college,

51% of the sample ($n = 246$) participants reported engaging in an oral or vaginal sex hookup during their lifetime.

Sexual romantic behavior.

Before college. Overall, 58% of participants ($n = 282$) reported that they had engaged in any sexual romantic behavior (i.e., performed oral sex, received oral sex, or had vaginal sex with a romantic partner) prior to starting college. Prior to college entry, 51% of participants ($n = 248$) reported performing oral sex on a romantic partner. Among women with a history of oral sex (performed) romantic behavior, the mean number of events was 26.3 ($SD = 38.5$, median = 10, range: 1-200), and the mean number of partners was 1.9 ($SD = 1.1$, median = 2, range: 1-5). Prior to college entry, 51% of participants ($n = 247$) reported receiving oral sex from a romantic partner. Among women with a history of oral sex received romantic behavior, the mean number of events was 21.0 ($SD = 32.1$, median = 10, range: 1-163), and the mean number of partners was 1.6 ($SD = 0.9$, median = 1, range: 1-5). Prior to college entry, 48% of participants ($n = 230$) reported having vaginal sex with a romantic partner. Among women with a history of vaginal sex romantic behavior, the mean number of events was 53.3 ($SD = 75.8$, median = 30, range: 1-350), and the mean number of partners was 1.7 ($SD = 0.9$, median = 1, range: 1-5).

During the study. Overall, 56% of participants ($n = 271$) reported that they engaged in any sexual romantic behavior during the study (waves 2-13). Figure 1 displays the proportion of participants who engaged in oral sex (performed), oral sex (received), and vaginal sex romantic behavior in the last month for waves 2-13.

Table 21 displays the proportion of participants who performed oral sex on a

romantic partner in the last month, by wave. Monthly rates of oral sex (performed) romantic behavior ranged from a low of 21% early in the Fall semester to a high of 32% during the summer. Throughout the course of the study, 50% of participants ($n = 240$) performed oral sex on a romantic partner. Table 22 displays descriptive statistics (by wave) for number of romantic events and partners in the last month for oral sex (performed). Among women who engaged in oral sex (performed) romantic behavior, the median number of events per month was usually three, and the median number of partners per month was always one.

Table 23 displays the proportion of participants who received oral sex from a romantic partner in the last month, by wave. Monthly rates of oral sex (received) romantic behavior ranged from a low of 19% early in the Fall semester to a high of 30% in the summer. Throughout the course of the study, 49% of participants ($n = 236$) received oral sex from a romantic partner. Table 24 displays descriptive statistics (by wave) for number of romantic events and partners in the last month for oral sex (received). Among women who engaged in oral sex (received) romantic behavior, the median number of events per month was usually three, and the median number of partners per month was always one.

Table 25 displays the proportion of participants who had vaginal sex with a romantic partner in the last month, by wave. Monthly rates of vaginal sex romantic behavior ranged from a low of 22% early in the Fall semester to a high of 33% in the summer. Throughout the course of the study, 51% of participants ($n = 244$) had vaginal sex with a romantic partner. Table 26 displays descriptive statistics (by wave) for number of romantic events and partners in the last month for vaginal sex. Among women who

engaged in vaginal sex romantic behavior, the median number of events per month was usually five or six, and the median number of partners per month was always one.

Lifetime. By the end of the study (as of wave 13), 62% of participants ($n = 299$) reported lifetime experience performing oral sex on a romantic partner, 62% ($n = 299$) reported receiving oral sex from a romantic partner, and 59% ($n = 285$) reported having vaginal sex with a romantic partner. Overall, by the start of their sophomore year of college, 68% of the sample ($n = 329$) participants reported engaging in an oral or vaginal sex romantic encounter during their lifetime.

Mental Health

General mental health.

Descriptive statistics for all seven mental health outcomes are presented by wave in Tables 4-10. Visual inspection of the means over time suggests that anxiety, depression, negative affect, perceived stress, and positive affect all declined gradually throughout the course of the study, as illustrated in Figure 2. For the four negative mental health outcomes, there was a small decrease around waves 5-6, which corresponds to winter break, and a small increase around wave 7, which corresponds to the start of the Spring semester. Furthermore, for all five outcomes, there was a decrease between waves 9-10, which corresponds to the end of the Spring semester and the beginning of summer. Self-esteem and life satisfaction, which were assessed every four waves, showed very little change over time (see Figure 3).

Selection of covariates. Ten demographic variables were tested as potential covariates for the mental health analyses. ANOVA was used with categorical variables, and between-samples *t*-tests or linear regression was used with continuous variables. For

each mental health outcome, there were 10 comparisons, so a Bonferroni-corrected alpha level of .005 was used to avoid inflating type I error. Age, race, Hispanic ethnicity, sexual orientation, sorority membership, SES, baseline relationship status, US citizenship, attending high school in the US, and religiosity were not significantly associated with anxiety, depression, negative affect, perceived stress, or self-esteem. SES, attending high school in the US, and religiosity were significantly associated with positive affect. SES was positively associated with positive affect, $b = .30$, $p = .003$, as was religiosity, $b = .79$, $p < .001$. Participants who attended high school in the US reported higher levels of positive affect ($M = 18.5$) compared to those who attended high school elsewhere ($M = 14.8$), $t(426) = -3.40$, $p = .001$. Sexual orientation and religiosity were significantly associated with life satisfaction. Heterosexual participants reported higher life satisfaction ($M = 25.4$) compared to sexual minorities ($M = 21.1$), $t(478) = 2.90$, $p = .004$. Religiosity was positively associated with life satisfaction, $b = 1.02$, $p = .002$. Demographic covariates were added to the model for positive affect after first testing the univariate effect of hookup behavior on positive affect.

Preliminary steps. The next sections describe the extensive preliminary analyses that were required prior to conducting multivariate LGCM. Steps included evaluating the appropriateness of including the baseline measures, testing the feasibility of modeling with count versus dichotomous variables, determining how many waves to include in the models, and dealing with missing data.

The baseline measures of sexual behavior were not included in the analysis because they referenced lifetime behavior up to the point of college entry. The follow-up measures of sexual behavior referenced the past month only. Accordingly, there was a

large discrepancy between the reference period for the baseline and follow-up measures (i.e., up to several years vs. one month), and there could not be a natural trajectory connecting the pre-college and college measures. Therefore, the trajectories for sexual behavior and mental health began at wave two.

Dichotomous indicators of sexual behavior were used as the outcomes. Initially, the sexual behavior variables were modeled as count data because the number of hookup events per month is a count variable that cannot be negative or a non-integer value. However, due to the low proportion (i.e., 5-13%) of participants engaging in each type of hookup behavior by wave, and limited variability in the number of events among those who did hook up, the models were almost always unable to converge without problems in estimation. Therefore, dichotomous indicators of hookup behavior for each wave were used as the outcomes. For categorical outcomes, the mean of the intercept growth factor was fixed at zero in Mplus (Muthén & Muthén, 2010). A logit link function and a numerical integration algorithm were used, and thresholds were held equal over time by default. Traditional model fit indices (e.g., root mean square error of approximation [RMSEA], Comparative Fit Index [CFI], Tucker-Lewis Index [TLI]) are not currently available for models using dichotomous outcomes and maximum likelihood estimation, but the chi-square, or likelihood ratio, test statistic provides a basic test of model fit, and information-based measures (e.g., Akaike Information Criterion [AIC], Bayesian Information Criterion [BIC]) allow for model comparisons. A non-significant chi-square test statistic indicates good model fit (Bollen & Curran, 2006). However, there is excess power with large sample sizes, so models are often highly significant even when they have good fit.

For most mental health and sexual behavior outcomes, the trajectories modeled covered waves 2-9, rather than the entire duration of the study. Initially, mental health and sexual hookup behavior throughout the entire duration of the study (i.e., waves 2-13) were modeled. However, this required combining the academic year (waves 2-9), when participants were living on campus, and the summer (waves 10-13), when most participants lived at home with their parents. During the summer, there was likely greater variability in participants' social lives, due to factors like neighborhood type and work schedules, whereas during the academic year all students were exposed to the same college environment. Also, there was a sharp drop-off in rates of sexual hookup behavior and in most mental health outcomes from the end of the Spring semester to the summer, perhaps due to reduced opportunities to hook up and reduced academic stress, respectively. Because of these abrupt decreases, it was difficult to fit unconditional models of the hookup variables and mental health outcomes with acceptable fit indices. If an acceptable fit of the trajectory cannot be established, incorporating predictors may result in biased results. Therefore, only the eight waves of data from the academic year (i.e., waves 2-9, referencing September-April) were used to model most of the mental health outcomes: anxiety, depression, negative affect, perceived stress, and positive affect. Although the trajectories remained somewhat difficult to model, greater success (as indicated by better fit index values) was achieved with the shorter time period. Self-esteem and life satisfaction were measured every four months, leaving three assessments available for modeling a trajectory after factoring out the baseline assessment. Omitting the wave 13 assessment would have resulted in only two waves of data, which is insufficient for estimating a linear trajectory (Bollen & Curran, 2006). A minimum of

three repeated measures was needed to identify the model. Therefore, for these two outcomes, the trajectories covered the entire duration of the study (i.e., waves 5, 9, and 13).

The maximum likelihood (ML) estimator was used for all LGCM. ML estimation is a widely recommended, state of the art method for conducting analyses involving missing data (Schafer & Graham, 2000; Schlomer, Bauman, & Card, 2010). Also known as direct ML or full information ML, ML estimation involves an iterative process whereby different values are tested in an attempt to maximize a log likelihood function and “identify parameter values that have the highest probability of producing the sample data” (Baraldi & Ends, 2010, p. 18). Conceptually, ML estimation is like ordinary least squares regression in the sense that it tries to minimize the distance between the observed data and the parameters being estimated. ML estimation is more powerful than traditional methods for handling missing data (e.g., listwise deletion) because no data are discarded. Rather, ML uses all available data, including data from participants with missing data, to determine parameter estimates (Baraldi & Enders, 2010). Cases with complete data are weighted more heavily than cases with incomplete data. ML estimation is also preferred to methods in which missing data points are filled in, such as mean substitution, and is easier to conduct than multiple imputation (Schlomer et al., 2010). Mplus provides full information ML estimation under the missing at random assumption (Muthén & Muthén, 2010), which is an untestable assumption (Baraldi & Enders, 2010). ML methods produce unbiased estimations when data are missing at random or missing completely at random.

Intermediate steps. This section describes the extensive intermediary analyses

that were required prior to fitting the multivariate LGCMs. Steps included fitting univariate growth models for sexual hookup behavior, sexual romantic behavior, and all mental health outcomes.

Univariate LGCM for sexual hookup behavior. First, LGCM was conducted for the sexual hookup behavior outcomes. For each of the three outcomes (performing oral sex, receiving oral sex, and vaginal sex), the first step was to find the optimal form for the trajectory over time. An intercept-only model (see Figure 4 for an illustration), representing no growth over time, was tested first. For this model, the slope growth factor was not included, which is equivalent to setting the loadings of all repeated measures on the slope factor to zero. A linear growth model (see Figure 5) was then tested by setting the loadings of the repeated measures from waves 2-9 on the slope factor to 0-7. A quadratic growth model (see Figure 6) was also tested by setting the loadings of the repeated measures from waves 2-9 on the slope factor to the square of the linear loadings (i.e., 0, 1, 4, 9, etc.). A fourth model that incorporated a quadratic slope with zero variance (see Figure 7) was also tested. This model included a quadratic trend to try to accommodate the curvature in the proportion of participants engaging in hookup behavior over time (Curran & Hussong, 2003) and thereby improve the fit of the model. However, because there was no theoretical rationale specifically for a quadratic trend, the quadratic slope was of less interest compared to the linear slope (Preacher et al., 2008). The variance of the quadratic slope was therefore fixed to zero, but the variance of the linear slope was still estimated.

For each of the three sexual behavior variables, the four models were compared to find the most appropriate trajectory. Model comparisons for oral sex (performed), oral

sex (received), and vaginal sex hookup behavior are displayed in Tables 27, 28, and 29, respectively. Because the no growth, linear, and quadratic models are nested, meaning “the parameters of the nested model are a restrictive form of the parameters of the second model” (Bollen & Curran, 2006, p. 51), the models were compared using the chi-square test. In all three cases, the linear model fit significantly better than the no growth model, and the quadratic model fit significantly better than the linear model. Also in all three cases, the quadratic model with the variance of the quadratic slope fixed to zero did not fit significantly better than the linear model, but it was more appropriate than the linear model due to the shape of the trajectory, and had a lower BIC and was easier to interpret than the quadratic model. Therefore, the quadratic models with the quadratic slope variance fixed to zero were selected as the most appropriate models for oral sex (performed), oral sex (received), and vaginal sex hookup behavior.

The intercept and slope growth factors from the hookup behavior models describe the within-person and between-person change in rates of hooking up over time. By default in Mplus, the means of the intercept growth factors were fixed to zero. The variances of the quadratic slope growth factors were also fixed to zero. The variances of the intercept growth factors, the means of the linear and quadratic slope growth factors, and the variances of the linear slope growth factors were estimated.

For oral sex (performed) hookup behavior, the linear slope was not statistically significant, $b = 0.08$, $SE = 0.17$, $p > .05$, indicating that the probability of hooking up each month did not increase as the academic year progressed. However, significant variance in the linear slope ($M = 0.17$, $SE = .05$, $p < .01$) indicates between-person differences in change in the probability of hookup behavior over time. For oral sex

(received) hookup behavior, the linear slope was not statistically significant, $b = .19$, $SE = .20$, $p > .05$, indicating that the probability of hooking up each month did not increase as the academic year progressed. However, significant variance in the linear slope ($M = 0.16$, $SE = .06$, $p < .05$) indicates between-person differences in change in the probability of hookup behavior over time. For vaginal sex hookup behavior, the linear slope was not statistically significant, $b = 0.21$, $SE = 0.17$, $p > .05$, indicating that the probability of hooking up each month did not increase as the academic year progressed. However, significant variance in the linear slope ($M = 0.20$, $SE = .06$, $p < .01$) indicates between-person differences in change in the probability of hookup behavior over time.

Univariate LGCM for sexual romantic behavior. Second, LGCM was conducted for the sexual romantic behavior outcomes. For each of the three outcomes (performing oral sex, receiving oral sex, and vaginal sex), the first step was to find the optimal form for the trajectory over time. The same four models were tested for the romantic behavior outcomes as were tested for the hookup behavior outcomes. Model comparisons for oral sex (performed), oral sex (received), and vaginal sex romantic behavior are displayed in Tables 30, 31, and 32, respectively. In all three cases, the linear model fit significantly better than the no growth model, and the quadratic model fit significantly better than the linear model. Also in all three cases, the quadratic model with the variance of the quadratic slope fixed to zero fit significantly better than the linear model and was easier to interpret than the plain quadratic model. Therefore, the quadratic models with the quadratic slope variance fixed to zero were selected as the most appropriate models for oral sex (performed), oral sex (received), and vaginal sex romantic behavior.

The intercept and slope growth factors from the sexual romantic behavior models

describe the within-person and between-person change in the probability of romantic encounters over time. For oral sex (performed) romantic behavior, the linear slope was statistically significant, $b = 0.54$, $SE = 0.15$, $p < .001$, indicating that the probability of having romantic encounters each month increased as the academic year progressed. Significant variance in the linear slope ($M = 0.28$, $SE = .06$, $p < .001$) indicates between-person differences in change in the probability of romantic encounters over time. For oral sex (received) romantic behavior, the linear slope was statistically significant, $b = .60$, $SE = .15$, $p < .001$, indicating that the probability of having romantic encounters each month increased as the academic year progressed. Significant variance in the linear slope ($M = 0.26$, $SE = .06$, $p < .001$) indicates between-person differences in change in the probability of romantic encounters over time. For vaginal sex romantic behavior, the linear slope was statistically significant, $b = 0.65$, $SE = 0.16$, $p < .001$, indicating that the probability of having romantic encounters each month increased as the academic year progressed. Significant variance in the linear slope ($M = 0.43$, $SE = .10$, $p < .001$) indicates between-person differences in change in the probability of romantic encounters over time.

Univariate LGCM for mental health outcomes. Third, LGCM was conducted for the five mental health outcomes¹⁵ that were assessed monthly: anxiety, depression, negative affect, perceived stress, and positive affect. A series of 11 models was tested for each of the five outcomes. In addition to the no growth, linear, quadratic, and quadratic

¹⁵ Following the example of other researchers (e.g., Reitz, Prinzie, Dekovic, & Buist, 2007), scale scores for the mental health outcomes, rather than individual items, were used as the indicators. For example, rather than having the nine items of the PHQ-9 as separate indicators, the indicator for depression was the total PHQ-9 score. The indicators (i.e., measures) used in this study have been subject to extensive psychometric testing in previous research. Using item-level data over up to 12 assessments would lead to complex models that may exceed recommended subject-to-parameter ratios.

with variance of the quadratic slope fixed at zero models, additional variations of the linear and quadratic models were tested. Following standard practice, the residual variances were constrained to be equal over time, as the measurement error should not theoretically change over time (Preacher et al., 2008). Another common way to improve model fit is to include serial correlations between adjacent measurement occasions, as mental health outcomes taken during two waves that are closer in time are likely to be more similar than those taken during two waves that are farther apart in time (e.g., waves 2 and 3 vs. waves 2 and 9).

An array of fit indices was available for models with continuous outcomes. Therefore, model comparisons were based on chi-square tests, CFI, RMSEA, and the standardized root mean residual (SRMR). Following published recommendations (Preacher et al., 2008), an incremental fit index (CFI), an absolute fit index (RMSEA), and an index based on residuals (SRMR) were reported. Established cut points indicating acceptable fit are .95 or higher for CFI, .06 or lower for RMSEA, and .08 or lower for SRMR (Hu & Bentler, 1999).

Model comparisons for anxiety are displayed in Table 33. Based on the chi-square test and different fit indices, the best model¹⁶ for anxiety was a quadratic growth model with serial correlations fixed to be equal over time and the variance of the quadratic slope fixed to zero (see Figure 8 for an illustration), $\chi^2 (df = 29) = 115.41, p < .001$. The mean of the linear slope for anxiety was statistically significant, $b = -0.12, SE = 0.02, p < .001$, indicating that, as a group, participants reported decreased anxiety as the academic year progressed. Significant variance in the linear slope ($M = 0.004, SE = 0.001, p < .001$)

¹⁶ For all five mental health outcomes, there seemed to be minimal differences between the standard quadratic model and the quadratic model with the variance of the slope fixed to zero. The latter was favored because it facilitated interpretation by focusing on linear trends and also eased computational burden.

indicates between-person differences in how anxiety changed over time.

Model comparisons for depression are displayed in Table 34. The best model for depression was a quadratic growth model with residual variances and serial correlations fixed to be equal over time and the variance of the quadratic slope fixed to zero, $\chi^2 (df = 36) = 125.95, p < .001$. The mean of the linear slope for depression was statistically significant, $b = -0.10, SE = 0.02, p < .001$, indicating that participants reported decreased depression as the academic year progressed. Significant variance in the linear slope ($M = 0.005, SE = 0.001, p < .001$) indicates between-person differences in how depression changed over time.

Model comparisons for negative affect are displayed in Table 35. The best model for negative affect was a quadratic growth model with serial correlations fixed to be equal over time and the variance of the quadratic slope fixed to zero, $\chi^2 (df = 29) = 100.16, p < .001$. The mean of the linear slope for negative affect was statistically significant, $b = -0.09, SE = 0.01, p < .001$, indicating that participants reported decreased negative affect as the academic year progressed. Significant variance in the linear slope ($M = 0.002, SE = 0.000, p < .001$) indicates between-person differences in how negative affect changed over time.

Model comparisons for perceived stress are displayed in Table 36. The best model for perceived stress was a quadratic growth model with serial correlations and the variance of the quadratic slope fixed to zero, $\chi^2 (df = 23) = 60.90, p < .001$. The mean of the linear slope for perceived stress was statistically significant, $b = -0.06, SE = 0.01, p < .001$, indicating that participants reported decreased perceived stress as the academic year progressed. Significant variance in the linear slope ($M = 0.004, SE = 0.001, p < .001$)

indicates between-person differences in how perceived stress changed over time.

Model comparisons for positive affect are displayed in Table 37. The best model for positive affect was a quadratic growth model with serial correlations and the variance of the quadratic slope fixed to zero, $\chi^2 (df = 23) = 88.28, p < .001$. The mean of the linear slope for positive affect was statistically significant, $b = -0.09, SE = 0.01, p < .001$, indicating that participants reported decreased positive affect as the academic year progressed. Significant variance in the linear slope ($M = 0.003, SE = 0.000, p < .001$) indicates between-person differences in how positive affect changed over time.

Fourth, LGCM was conducted for the two mental health outcomes that were assessed every four months: self-esteem and life satisfaction. A series of four models was tested for each of the outcomes. Quadratic growth models could not be tested because there were not enough degrees of freedom to identify those models. A no growth and linear growth model were tested, along with a linear growth model with residual variances fixed to be equal and the same model but with serial correlations and the variance of the linear slope fixed to zero.

Model comparisons for self-esteem are displayed in Table 38. The linear growth model with residual variances fixed to be equal was selected as the best fitting model for self-esteem (see Figure 9 for an illustration), $\chi^2 (df = 3) = 5.64, p = .13$. The mean of the linear slope for self-esteem was not statistically significant, $b = -0.04, SE = 0.02, p = .09$, indicating that on average, participants did not experience change in self-esteem as the academic year progressed. The variance in the linear slope was also not significant ($M = 0.03, SE = 0.02, p = .12$), indicating no between-person differences in how self-esteem changed over time.

Model comparisons for life satisfaction are displayed in Table 39. The linear growth model with residual variances fixed to be equal was selected as the best fitting model for life satisfaction, $\chi^2 (df = 3) = 1.26, p = .74$. The mean of the linear slope for life satisfaction was statistically significant, $b = -0.05, SE = 0.02, p < .05$, indicating that participants reported decreased life satisfaction as the academic year progressed. Significant variance in the linear slope ($M = 0.05, SE = 0.02, p < .05$) indicates between-person differences in how life satisfaction changed over time.

Multivariate LGCM with sexual romantic behavior and mental health outcomes.

Parallel process, or multivariate latent growth curve, models were fit to assess for common developmental trends among sexual romantic behavior and mental health variables over time. Three models—one for performing oral sex, one for receiving oral sex, and one for vaginal sex—were fit for each of the seven mental health outcomes, for a total of 21 models. Similar to the models specified for sexual hookup behavior, in each model, the intercept and linear slope growth factors¹⁷ for the mental health outcomes were regressed on the intercept and linear slope growth factors for the sexual romantic behavior variables. If any of the regressions of the linear slopes for mental health on the linear slopes for romantic behavior had been significant, sexual romantic behavior would have been added as a covariate to the multivariate LGCMs with sexual hookup behavior and mental health. In this manner, the effect of sexual hookup behavior could have been tested while controlling for the effects of general sexual behavior.

Model fit information is presented in Table 40, and regression coefficients are presented in Table 41. There were no significant associations between changes in any of

¹⁷ Direct effects with the quadratic slopes were not specified because the quadratic slopes were only included to improve model fit; the linear slopes were of most interest in this analysis.

the seven mental health outcomes and changes in any of the three sexual romantic behavior outcomes over the academic year (all $ps > .14$, see Table 41). The only exception was a trend for the linear slope of oral sex (received) romantic behavior to predict the linear slope of depression, $b = -0.05$, $SE = 0.02$, $p = .05$. The negative association indicates that increases in the probability of oral sex (received) romantic behavior during the academic year were associated with decreases in depression. Because this effect was in the opposite direction as the one predicted for hookup behavior, and because the relationship between changes in oral sex (received) hookup behavior and changes in depression was not statistically significant, this covariate was not included in further analyses.

Multivariate LGCM with sexual hookup behavior and mental health outcomes.

After establishing the best fitting trajectory for the hookup behavior and mental health outcomes separately, multivariate LGCM was conducted. Parallel process, or multivariate latent growth curve, models were fit to assess for common developmental trends among the sexual behavior and mental health variables over time. Three models—one for performing oral sex, one for receiving oral sex, and one for vaginal sex—were fit for each of the seven mental health outcomes, for a total of 21 models. Figure 10 illustrates the multivariate model for oral sex (performed) hookup behavior and anxiety. In each model, the intercept and linear slope growth factors¹⁸ for the mental health outcomes were regressed on the intercept and linear slope growth factors for the sexual hookup behavior variables. Regression of the mental health intercept on the hookup behavior intercept assessed whether the initial level of sexual hookup behavior predicted the initial

¹⁸ Direct effects with the quadratic slopes were not specified because the quadratic slopes were only included to improve model fit; the linear slopes were of most interest in this analysis.

level of mental health as suggested in Hypothesis 1a. Regression of the mental health slope on the hookup behavior slope provided a test of the directional effects in Hypothesis 1b. Regression of the mental health slope on the sexual hookup behavior intercept, and the sexual hookup behavior slope on the mental health intercept, examined how the initial level of one construct related to changes in the other. Model fit information is presented in Table 42, and regression coefficients are presented in Table 43.

Anxiety. There were no significant associations between changes in anxiety and changes in sexual hookup behavior over the academic year (see Table 43). For all three sexual hookup behavior outcomes, there were no significant associations between the linear slopes of anxiety and hookup behavior, between the intercepts of anxiety and hookup behavior, between the intercept of anxiety and the linear slope of hookup behavior, or between the intercept of hookup behavior and the linear slope of anxiety.

Depression. There were no significant associations between changes in depression and changes in sexual hookup behavior over the academic year (see Table 43). For all three sexual hookup behavior outcomes, there were no significant associations between the linear slopes of depression and hookup behavior, between the intercepts of depression and hookup behavior, or between the intercept of depression and the linear slope of hookup behavior. For oral sex (received), there was also no significant association between the linear slope of depression and the intercept of hookup behavior. For oral sex (performed) and vaginal sex, the regression of the linear slope of depression on the intercept of hookup behavior was statistically significant, $b = 0.006$, $SE = 0.002$, $p < .05$, and $b = 0.006$, $SE = 0.003$, $p < .05$, respectively. This indicates that participants with a

higher probability of hooking up at the beginning of the academic year tended to report greater increases in depression over time, compared to participants who initially had a lower probability of hooking up.

Negative affect. There were no significant associations between changes in negative affect and changes in sexual hookup behavior over the academic year (see Table 43). For all three sexual hookup behavior outcomes, there were no significant associations between the linear slopes of negative affect and hookup behavior, between the intercepts of negative affect and hookup behavior, between the intercept of negative affect and the linear slope of hookup behavior, or between the intercept of hookup behavior and the linear slope of negative affect.

Perceived stress. Changes in oral sex (performed) and vaginal sex hookup behavior significantly predicted changes in perceived stress¹⁹ over the academic year (see Table 43). For oral sex (performed) and vaginal sex, the linear slope of hookup behavior significantly predicted the linear slope of perceived stress, $b = 0.06$, $SE = 0.03$, $p < .05$, and $b = 0.06$, $SE = 0.03$, $p < .05$, respectively. Increases in the probability of oral sex (performed) and vaginal sex hookup behavior during the academic year were associated with increases in perceived stress. For all three sexual hookup behavior outcomes, there were no significant associations between the intercepts of perceived stress and hookup behavior, between the intercept of perceived stress and the linear slope of hookup behavior, or between the intercept of hookup behavior and the linear slope of perceived stress.

¹⁹ Alternative models tested regression of the sexual hookup behavior variables on the perceived stress variables to examine the reverse effect (i.e., the effect of perceived stress on hookup behavior). For oral sex (performed), oral sex (received), and vaginal sex, the slope on slope regressions were not statistically significant, $ps > .05$.

Positive affect. Changes in oral sex (performed) and vaginal sex hookup behavior significantly predicted changes in positive affect²⁰ over the academic year (see Table 43). For oral sex (performed) and vaginal sex, regression of the linear slope of positive affect on the linear slope of hookup behavior approached or reached statistical significance, $b = -0.04$, $SE = 0.02$, $p = .06$, and $b = -0.05$, $SE = 0.02$, $p < .05$, respectively. Increases in the probability of oral sex (performed) and vaginal sex hookup behavior during the academic year were associated with decreases in positive affect. For all three sexual hookup behavior outcomes, there were no significant associations between the intercepts of positive affect and hookup behavior or between the intercept of positive affect and the linear slope of hookup behavior. For oral sex (received) and vaginal sex, there was no association between the intercept of hookup behavior and the linear slope of positive affect. However, for oral sex (performed), the intercept of hookup behavior significantly predicted the linear slope of positive affect, $b = -0.003$, $SE = 0.002$, $p > .05$. This indicates that participants with a higher probability of hooking up at the beginning of the academic year tended to report greater decreases in positive affect over time, compared to participants who initially had a lower probability of hooking up.

Three demographic variables were significantly associated with baseline positive affect, so they were added to the multivariate LGCM as covariates. SES, religiosity, and attending high school in the US were added as time-invariant covariates (i.e., variables measured only once and theoretically stable over the course of the study); in each of the

²⁰ Alternative models tested regression of the sexual hookup behavior variables on the positive affect variables to examine the reverse effect (i.e., the effect of positive affect on hookup behavior). For oral sex (performed) and oral sex (received), the slope on slope regressions were not statistically significant, $ps > .05$. For vaginal sex, the slope on slope regression was significant at $p = .05$; however, this model has some problems with convergence, and the AIC and BIC are slightly lower for the original model. Therefore, the original model was favored.

three models, the intercept growth factor for positive affect was regressed on all three covariates. In all three models, all three covariates significantly predicted the initial level of positive affect. For the model with oral sex (performed) hookup behavior, after including the covariates, the linear slope of hookup behavior no longer significantly predicted the linear slope of positive affect, $b = -0.04$, $SE = 0.02$, $p = .066$. For the model with vaginal sex hookup behavior, the linear slope of hookup behavior no longer significantly predicted the linear slope of positive affect, $b = -0.05$, $SE = .03$, $p = .054$. Overall, including the demographic covariates for positive affect attenuated the relationship between changes in sexual hookup behavior and changes in positive affect for performing oral sex and vaginal sex; nonetheless, in both cases the trend for a relationship between increasing probability of hookup behavior and decreasing positive affect remained.

Self-esteem. The univariate LGCM results for self-esteem indicated no significant change over time and no between-person differences in change over time. Therefore, the multivariate model would not be expected to have significant findings; nonetheless, the results are reported for consistency. There were no significant associations between changes in self-esteem and changes in sexual hookup behavior over the course of the study (see Table 43). For all three sexual hookup behavior outcomes, there were no significant associations between the linear slopes of self-esteem and hookup behavior, between the intercepts of self-esteem and hookup behavior, between the intercept of self-esteem and the linear slope of hookup behavior, or between the intercept of hookup behavior and the linear slope of self-esteem.

Life satisfaction. There were no significant associations between changes in life

satisfaction and changes in sexual hookup behavior over the course of the study (see Table 43). For all three sexual hookup behavior outcomes, there were no significant associations between the linear slopes of life satisfaction and hookup behavior, between the intercepts of life satisfaction and hookup behavior, between the intercept of life satisfaction and the linear slope of hookup behavior, or between the intercept of hookup behavior and the linear slope of life satisfaction.

Depression diagnoses. Results are presented for participants who provided complete data²¹ ($n = 274, 57\%$) for all variables involved in this analysis (i.e., all 13 waves of depression symptoms; pre-college depression diagnosis; and all 12 follow-up waves of number of oral sex (performed), oral sex (received), and vaginal sex events with both casual and romantic partners). Participants who had missing data on any of the variables involved in this analysis ($n = 209, 43\%$), due to either missing surveys completely or leaving items blank, were excluded from this analysis.

Participants with and without complete data for the depression diagnosis analysis were compared on ten demographic variables as well as rates of pre-college and baseline depression diagnosis. Chi-square tests of independence were used for categorical variables, and between-samples *t*-tests were used for continuous variables. Because there were 10 comparisons for the demographic variables, a Bonferroni-corrected alpha level of .005 was used to avoid inflating type I error. There were no significant differences between the two groups on age, race, Hispanic ethnicity, sexual orientation, SES, sorority membership, baseline relationship status, US citizenship, attending high school in the US,

²¹ The analysis was limited to participants with complete data to avoid making assumptions about participants' sexual behavior or depressive symptoms during waves in which they had missing data. Maximum likelihood estimation could not be used for this analysis because the outcome was created by collapsing across 12 waves.

or religiosity. There was no difference between the two groups on pre-college depression diagnosis ($p > .05$), but there was a difference on baseline depression diagnosis, $\chi^2(1, N = 483) = 5.68, p = .02$. Participants who were excluded from the analysis due to incomplete data were more likely than participants with complete data to meet criteria for a depression diagnosis at baseline (17% vs. 10%). Although listwise deletion was not desirable because it excludes participants and reduces power, there were no minimal differences between participants with and without complete data for the depression diagnosis analysis, which decreases the likelihood of biased results.

Prevalence of depression. Based on the PHQ-9 scoring algorithms, between 8% and 18% of participants met diagnostic criteria for either major depressive disorder or other depressive disorder at any given time between waves 2-13 (see Table 44). The prevalence of depression was lowest during the summer. Eight percent of participants reported receiving a mood disorder diagnosis from a mental health professional prior to starting college (henceforth referred to as pre-college depression diagnosis). At baseline, based on PHQ-9 responses, 10% of participants met diagnostic criteria for a depression diagnosis; questions referred to the past two weeks. Considering both pre-college and baseline depression diagnoses, 41 participants (15%) reported a history of depression at baseline. Across waves 2-13, 115 participants (42%) met diagnostic criteria for either major depressive disorder or other depressive disorder at some point during the study; this was the main outcome variable for the depression diagnosis analyses.

Selection of covariates. Demographic and mental health history variables were tested as potential covariates to include in the depression diagnosis analyses. Chi-square tests of independence were used for categorical variables, McNemar's test for correlated

proportions was used for the two depression history variables, and between-samples t -tests were used for continuous variables. Because there were 10 comparisons for the demographic variables, a Bonferroni-corrected alpha level of .005 was used to avoid inflating type I error. Age, race, Hispanic ethnicity, sexual orientation, SES, sorority membership, baseline relationship status, US citizenship, attending high school in the US, and religiosity were not significantly associated with having a depression diagnosis at any time during the study. However, having a depression diagnosis at baseline was associated with having a depression diagnosis during the study, $\chi^2(1, N = 274) = 22.97$, McNemar's statistic = 80.67, $p < .001$; 85% of those with a baseline depression diagnosis met criteria for depression diagnosis later in the study, compared to 37% of those who did not have a baseline depression diagnosis. Moreover, having a pre-college depression diagnosis was associated with having a depression diagnosis during the study, $\chi^2(1, N = 274) = 6.75$, McNemar's statistic = 80.83, $p < .001$; 68% of participants with pre-college depression diagnoses met criteria for depression diagnosis later in the study, compared to 40% of participants who did not have a pre-college depression diagnosis. Therefore, baseline depression diagnosis and pre-college depression diagnosis were included as covariates in the final analyses. Romantic sexual behavior was also included as a covariate to assess the unique risk conferred by engaging in hookup behavior.

Rates of sexual hookup and romantic behavior. During the study (waves 2-13), 34% percent of participants reported performing oral sex during one or more hookups. Among these 92 women, the average number of hookups during which they performed oral sex was 6.7 ($SD = 6.4$, median = 4, range = 1-26). Thirty-three percent reported receiving oral sex during one or more hookups during the study. Among these 91 women,

the average number of hookups during which they received oral sex was 4.0 ($SD = 3.8$, median = 3, range = 1-16). Thirty-two percent reported engaging in one or more vaginal sex hookups during the study. Among these 87 women, the average number of hookups during which they had vaginal sex was 6.9 ($SD = 6.3$, median = 5, range = 1-23). Overall, 117 participants (43%) engaged in a hookup in which they performed oral sex, received oral sex, or had vaginal sex during the study.

During the study, 47% of participants reported performing oral sex during one or more romantic encounters. Among these 130 women, the average number of romantic encounters during which they performed oral sex was 32.9 ($SD = 31.9$, median = 24, range = 1-137). Forty-six percent reported receiving oral sex during one or more romantic encounters. Among these 125 women, the average number of romantic encounters during which they received oral sex was 28.5 ($SD = 31.2$, median = 17, range = 1-138). Forty-six percent reported engaging in vaginal sex during one or more romantic encounters. Among these 127 women, the average number of romantic encounters during which they had vaginal sex was 55.0 ($SD = 52.3$, median = 41, range = 1-207). Overall, 129 participants (53%) engaged in a romantic encounter in which they performed oral sex, received oral sex, or had vaginal sex during the study.

Test of Hypothesis 1c: Hookup behavior.

Oral sex (performed) hookup behavior. Compared to women who did not engage in oral sex (performed) hookup behavior during the study, women who engaged in oral sex (performed) hookup behavior were 1.8 times more likely to have a depression diagnosis during the study, likelihood ratio (LR) $\chi^2 (1, N = 274) = 4.70, p = .03, CI [1.05, 2.91]$. However, after adding covariates to the model (LR $\chi^2 [4, N = 274] = 32.80, p <$

.001), only baseline depression diagnosis (OR 8.3) was significantly associated with having a depression diagnosis during the study (see Table 45 for parameter estimates and adjusted odds ratios from the multivariate model). Pre-college depression diagnosis, oral sex (performed) romantic behavior, and oral sex (performed) hookup behavior were not significant predictors of having a depression diagnosis during the study.

Oral sex (received) hookup behavior. Compared to women who did not engage in oral sex (received) hookup behavior during the study, women who engaged in oral sex (received) hookup behavior were 1.8 times more likely to have a depression diagnosis during the study, LR χ^2 (1, $N = 274$) = 5.21, $p = .02$, CI [1.09, 3.01]. After adding covariates to the model (LR χ^2 [4, $N = 274$] = 31.47, $p < .001$), baseline depression diagnosis (OR 8.5) was significantly associated with having a depression diagnosis during the study, and oral sex (received) hookup behavior (OR 1.7) approached statistical significance (see Table 46). Pre-college depression diagnosis and oral sex (performed) romantic behavior were not significant predictors of having a depression diagnosis during the study.

Vaginal sex hookup behavior. Compared to women who did not engage in vaginal sex hookup behavior during the study, women who engaged in vaginal sex hookup behavior were 2.5 times more likely to have a depression diagnosis during the study, LR χ^2 (1, $N = 274$) = 12.51, $p < .001$, CI [1.51, 4.27]. After adding covariates to the model (LR χ^2 [4, $N = 274$] = 38.11, $p < .001$), vaginal sex hookup behavior (OR 2.4) and baseline depression diagnosis (OR 7.8) were significantly associated with having a depression diagnosis during the study (see Table 47). Pre-college depression diagnosis and vaginal sex romantic behavior were not significant predictors of having a depression

diagnosis during the study.

Any sexual hookup behavior. Compared to women who did not engage in any sexual hookup behavior during the study, women who performed oral sex, received oral sex, or had vaginal sex during a hookup were 2.2 times more likely to have a depression diagnosis during the study, LR χ^2 (1, $N = 274$) = 10.19, $p = .001$, CI [1.35, 3.62]. After adding covariates to the model (LR χ^2 [4, $N = 274$] = 37.18, $p < .001$), engaging in any sexual hookup behavior (OR 2.1) and baseline depression diagnosis (OR 8.2) were significantly associated with having a depression diagnosis during the study (see Table 48). Pre-college depression diagnosis and engaging in any sexual romantic behavior were not significant predictors of having a depression diagnosis during the study.

Test of Hypothesis H1c: Number of hookup events.

Number of oral sex (performed) hookup events. Number of oral sex (performed) hookup events during the study was not a significant predictor of having a depression diagnosis during the study, LR χ^2 (1, $N = 274$) = 1.16, $p = .28$, OR 1.0, CI [0.98, 1.08]. After adding covariates to the model, the only significant predictor was baseline depression diagnosis (OR 8.2; see Table 49).

Number of oral sex (received) hookup events. Number of oral sex (received) hookup events was not a significant predictor of having a depression diagnosis during the study, LR χ^2 (1, $N = 274$) = 0.01, $p = .92$, OR 1.0, CI [0.92, 1.09]. After adding covariates to the model, the only significant predictor was baseline depression diagnosis (OR 8.2; see Table 50).

Number of vaginal sex hookup events. Number of vaginal sex hookup events was a significant predictor of having a depression diagnosis during the study, LR χ^2 (1, $N =$

274) = 4.91, $p = .03$, OR 1.1, CI [1.01, 1.12]. After adding covariates to the model (LR χ^2 [4, $N = 274$] = 29.87, $p < .001$), baseline depression diagnosis (OR 8.3) was significantly associated with having a depression diagnosis during the study, and number of vaginal sex hookups (OR 1.05) approached statistical significance (see Table 51). Pre-college depression diagnosis and number of vaginal sex romantic encounters were not significant predictors of having a depression diagnosis during the study.

Additional analyses.

Participants without a history of depression. Additional analyses were conducted using those participants with complete data who did not have a history of depression, either prior to college or at baseline ($n = 233$). Engaging in oral sex (performed) hookup behavior during the study was not significantly associated with having a depression diagnosis during the study among women without a history of depression, OR 1.5, CI [0.84, 2.59], $p = .18$. There was a trend toward an association between oral sex (received) hookup behavior and having a depression diagnosis during the study, OR 1.7, CI [0.99, 3.06], $p = .054$. Compared to women who did not engage in vaginal sex hookup behavior during the study, women who engaged in vaginal sex hookup behavior were 2.4 times more likely to have a depression diagnosis during the study, LR χ^2 (1, $N = 233$) = 8.75, $p = .003$, CI [1.34, 4.21]. The association held even after adding romantic sexual behavior to the model (LR χ^2 [2, $N = 233$] = 10.06, $p = .007$) as a covariate. Vaginal sex hookup behavior was a significant predictor (OR 2.2, CI [1.25, 4.01], $p = .007$), but vaginal sex romantic behavior was not (OR 1.4, CI [0.79, 2.40], $p = .25$).

The numbers of hookups in which the participant performed and received oral sex were not associated with having a depression diagnosis during the study among women

without a history of depression. There was a trend toward the number of vaginal sex hookups being associated with having a depression diagnosis during the study, OR 1.05, CI [0.99, 1.12], $p = .09$. The trend maintained after number of vaginal sex romantic events was added to the model as a covariate, but the overall model became non-significant (LR χ^2 [2, $N = 233$] = 2.93, $p = .23$). There was a trend toward number of vaginal sex hookups being associated with having a depression diagnosis (OR 1.05, CI [0.99, 1.12], $p = .09$), whereas number of vaginal sex romantic events was not a predictor (OR 1.0, CI [0.99, 1.01], $p = .97$).

Participants without a history of sexual experience. Prior to college, 79 participants (29%) reported any pre-college sexual hookup behavior, and 195 (71%) reported no pre-college sexual hookup behavior. Among women with no pre-college sexual hookup experience, those who engaged in sexual hookup behavior during the study were 2.1 times more likely to have a depression diagnosis during the study, compared to those who did not, LR χ^2 (1, $N = 195$) = 5.57, $p = .02$, CI [1.13, 3.91]. After adding covariates to the model (LR χ^2 [4, $N = 195$] = 26.58, $p < .001$), engaging in any sexual hookup behavior (OR 2.0) and baseline depression diagnosis (OR 8.5) were significantly associated with having a depression diagnosis during the study among women with no pre-college sexual hookup experience (see Table 52). Pre-college depression diagnosis and engaging in any romantic sexual behavior during the study were not significant predictors of having a depression diagnosis.

A parallel analysis was conducted with participants without a history of pre-college sexual romantic behavior. Prior to college, 149 participants (55%) reported any pre-college sexual romantic behavior, and 122 (45%) reported no pre-college sexual

romantic behavior. Among women with no pre-college sexual romantic experience, those who engaged in sexual romantic behavior during the study were no more likely to have a depression diagnosis during the study than those who did not, LR χ^2 (1, $N = 122$) = 1.55, $p = .21$, OR 1.7, CI [0.73, 4.18].

Sexual Victimization

Prevalence of SV over time. Prevalence rates for different types of SV are shown for each of the four measurement intervals in Table 53. These rates include SV involving any of the five sex acts and occurring as a result of any of three tactics assessed on the Sexual Experiences Survey that map on to legal definitions of rape: threats of harm, physical force, and incapacitation due to drugs or alcohol. At baseline, 40% of participants reported at least one instance of SV since the age of 14. Rates of any SV during the first semester of college, second semester, and summer were 21%, 16%, and 14%, respectively. During the study (i.e., the participants' first year of college and the following summer), 31% reported at least one instance of SV. By the end of the study, the lifetime prevalence of any form of SV was 50%.

Participants were also classified into mutually exclusive categories based on the most severe type of SV they experienced during each measurement interval (see Table 54). Because some individuals experience multiple types of SV, SV rates are often presented in this manner to avoid inflating the overall prevalence of SV (Koss et al., 2007). The categories, in order of increasing severity, were: none; unwanted sexual contact (i.e., fondling, kissing, or sexual touching); oral sex; attempted vaginal rape; and completed vaginal rape, anal rape, or other penetration (e.g., with finger or objects). During the study, 11% of participants reported unwanted sexual contact, 1% oral sex, 9%

attempted vaginal rape, and 11% completed vaginal rape, anal rape, or other penetration.

Selection of covariates. Due to theoretical and empirical precedent documenting high risk for sexual revictimization (Breitenbecher, 2001; Classen, Palesh, & Aggarwal, 2005; Vézina & Hébert, 2007), pre-college SV was included as a covariate in all analyses. Alcohol use is a well-established risk factor for SV (Abbey, Zawacki, et al., 2001; Parks, & Fals-Stewart, 2004; Söchting, Fairbrother, & Koch, 2004), so alcohol use was included as a covariate. In addition, sexual romantic behavior was included as a covariate to assess the unique risk conferred by hookups, beyond any risk conferred by general sexual activity.

Demographic variables and baseline alcohol use were tested as potential covariates for the SV analyses. ANOVA was used with categorical variables, and linear regression was used with continuous variables. To avoid the need for three separate sets of 10 comparisons each (i.e., separate tests for oral sex SV, attempted vaginal rape, and completed vaginal rape), one outcome (number of pre-college SV events of any type) was used. Ten demographic variables were tested, so a Bonferroni-corrected alpha level of .005 was used to avoid inflating type I error. Age, race, Hispanic ethnicity, sexual orientation, SES, baseline relationship status, US citizenship, and attending high school in the US, were not significantly associated with number of pre-college SV events. However, sorority membership (reported at wave seven) was related to SV, $F(1, 436) = 12.56, p < .005$; participants who joined sororities during the study reported more SV events prior to college ($M = 6.1$) compared to participants who did not join sororities ($M = 3.6$). As expected, baseline alcohol use, as indicated by typical drinks per week, was related to SV, $b = 0.28, p < .005$. Accordingly, sorority membership and baseline alcohol

use were included as covariates in all SV analyses.

Oral sex (performed) hookups as a predictor of oral sex SV. Of the 483 participants in the study, 289 (60%) had complete data for all variables used in the oral sex SV analyses (i.e., all 4 waves of oral sex SV, all 13 waves of number of oral sex [performed] hookup and romantic events, baseline alcohol use, and sorority membership). Of these 289 participants, 29 (10%) reported oral sex SV during the study (at waves 5, 9, and/or 13); among these women, the mean number of oral sex SV events during the study was 2.46 ($SD = 1.38$, median = 2, range: 1-5). For this and all SV analyses, participants who had missing data on any of the variables involved in this analysis, due to either missing surveys completely or leaving items blank, were excluded from the analysis.²²

Participants with ($n = 289$) and without ($n = 194$) complete data on the variables used in the oral sex SV analyses were compared on demographics, pre-college oral sex SV history, and pre-college oral sex hookup and romantic behavior. Between-samples t -tests were used for continuous variables, and chi-square tests of independence were used for categorical variables; Fisher's exact test was used to obtain the p -value when cells had low expected counts. Ten demographic variables were tested, so a Bonferroni-corrected alpha level of .005 was used to avoid inflating type I error. There were no significant differences between participants with and without complete data on age, race, Hispanic ethnicity, sexual orientation, sorority membership, SES, baseline relationship status, US citizenship, attending high school in the US, or religiosity. Ten SV and sexual history

²² The SV analyses were limited to participants with complete data to avoid making assumptions about participants' sexual behavior or sexual victimization experience during waves in which they had missing data. Maximum likelihood estimation could not be used for this analysis because the outcome was created by collapsing across 12 waves.

variables were tested, so the alpha level was again set at .005. There were no significant differences between participants with and without complete data on history of pre-college oral sex SV, number of pre-college oral sex SV events, number of pre-college casual or romantic oral sex (performed and received) partners and events. Overall, there were no significant differences between participants with and without complete data.

Logistic regression was used to test the association between oral sex (performed) hookup behavior and oral sex SV. The outcome was dichotomized due to limited variability in the number of oral sex SV events during the study. Ninety percent of participants reported zero instances of oral sex SV during the study. Of the 29 participants who reported oral sex SV, 17 (59%) reported one or two events. Therefore, a dichotomous outcome was more appropriate than a count outcome with extremely limited variability.

Hookup behavior. Seven percent of participants reported pre-college oral sex SV, 58% reported alcohol use in the past month at baseline, 22% reported sorority membership, 49% reported romantic oral sex behavior during the study, and 35% reported oral sex hookup behavior during the study. The univariate association between oral sex (performed) hookup behavior and occurrence of oral sex SV during the study was explored first. Oral sex (performed) hookup behavior during the study was a significant predictor of experiencing oral sex SV during the study, LR χ^2 (1, $N = 289$) = 12.23, $p < .001$. Compared to women who did not engage in oral sex (performed) hookup behavior during the study, women who engaged in oral sex (performed) hookup behavior were 4.1 times more likely to experience oral sex SV during the study, CI [1.81, 9.10].

The association between oral sex (performed) hookup behavior and oral sex SV

remained even after controlling for dichotomous covariates. The final model with all five predictors significantly predicted the occurrence of oral sex SV during the study, LR χ^2 (5, $N = 289$) = 38.10, $p < .001$. Oral sex (performed) hookup behavior (OR 4.3) and pre-college oral sex SV (OR 16.4) were significant predictors of oral sex SV during the study (see Table 55 for parameter estimates and adjusted odds ratios from the multivariate model). McFadden's ρ^2 was .20, and c was .82 for this model.

Number of hookup events. A correlation matrix for the variables involved in the oral sex SV analyses appears in Table 56. Table 57 provides descriptive statistics for the continuous predictors. The univariate association between number of oral sex (performed) hookup events and occurrence of oral sex SV was explored first. Number of oral sex (performed) hookup events during the study was a significant predictor of experiencing oral sex SV during the study, LR χ^2 (1, $N = 289$) = 5.21, $p = .02$. With each additional oral sex (performed) hookup event occurring during the study, the odds of experiencing oral sex SV increased by 7%, OR 1.07, CI [1.01, 1.13].

The association remained even after controlling for covariates. The final model with all five predictors significantly predicted the occurrence of oral sex SV during the study, LR χ^2 (5, $N = 289$) = 29.21, $p < .001$. Number of oral sex (performed) hookup events (OR 1.08) and number of pre-college oral sex SV events (OR 7.3) were significant predictors of oral sex SV during the study (see Table 58). McFadden's ρ^2 was .16, and c was .69 for this model. For non-sorority members, with all other predictors held constant at their means, the odds of oral sex SV occurring increased by 8% with each additional oral sex (performed) hookup event during the study, OR 1.08, CI [1.01, 1.15].

Oral sex (received) hookups as a predictor of oral sex SV. Of the 483

participants in the study, 289 (60%) had complete data for all variables used in the analysis of the effect of oral sex (received) hookup behavior on risk for oral sex SV (i.e., all 4 waves of oral sex SV, all 13 waves of number of oral sex [received] hookup and romantic events, baseline alcohol use, and sorority membership). Of these 289 participants, 29 (10%) reported oral sex SV during the study (at waves 5, 9, and/or 13); among these women, the mean number of oral sex SV events during the study was 2.46 ($SD = 1.38$, median = 2, range: 1-5).

Hookup behavior. Seven percent of participants reported pre-college oral sex SV, 58% reported alcohol use in the past month at baseline, 22% reported sorority membership, 47% reported romantic oral sex behavior during the study, and 34% reported oral sex hookup behavior during the study. The univariate association between oral sex (received) hookup behavior and occurrence of oral sex SV during the study was explored first. Oral sex (received) hookup behavior during the study was a significant predictor of experiencing oral sex SV during the study, LR χ^2 (1, $N = 289$) = 10.71, $p = .001$. Compared to women who did not engage in oral sex (received) hookup behavior during the study, women who engaged in oral sex (received) hookup behavior were 3.7 times more likely to experience oral sex SV during the study, CI [1.66, 8.15].

The association remained even after controlling for dichotomous covariates. The final model with all five predictors significantly predicted the occurrence of oral sex SV during the study, LR χ^2 (5, $N = 289$) = 40.06, $p < .001$. Oral sex (received) hookup behavior (OR 4.6) and pre-college oral sex SV (OR 19.4) were significant predictors of oral sex SV during the study (see Table 59). McFadden's ρ^2 was .21, and c was .83 for this model.

Number of hookup events. A correlation matrix for the variables involved in the oral sex analyses appears in Table 56. Table 57 provides descriptive statistics for the continuous predictors. The univariate association between number of oral sex (received) hookup events and occurrence of oral sex SV was explored first. Number of oral sex (received) hookup events during the study was not a significant predictor of experiencing oral sex SV during the study, LR χ^2 (1, $N = 289$) = 2.26, $p = .13$, OR 1.1, CI [0.98, 1.21].

The association remained not statistically significant after controlling for covariates. The final model with all five predictors significantly predicted the occurrence of oral sex SV during the study, LR χ^2 (5, $N = 289$) = 26.38, $p < .001$. Number of pre-college oral sex SV events (OR 6.6) was the only significant predictor of oral sex SV during the study (see Table 60). McFadden's ρ^2 was .14, and c was .70 for this model.

Oral sex (performed and received) hookups as predictors of oral sex SV. Both types of oral sex events were analyzed in the same model to compare the effects of performing and receiving oral sex hookups on risk for oral sex SV.

Hookup behavior. The association among oral sex performed and received hookup behavior and occurrence of oral sex SV during the study was explored first. Neither oral sex (performed) hookup behavior, OR 2.6, CI [0.82, 8.29], $p = .11$, nor oral sex (received) hookup behavior, OR 1.8, CI [0.59, 5.77], $p = .29$, was a significant predictor of experiencing oral sex SV during the study. Both predictors remained not statistically significant ($ps > .13$) in the multivariate context after controlling for pre-college oral sex SV, baseline alcohol use, and sorority membership.

Number of hookup events. The association between number of oral sex performed and received hookup events and occurrence of oral sex SV was explored first.

There was a trend toward number of oral sex (performed) hookup events during the study being a significant predictor of experiencing oral sex SV during the study, OR 1.1, CI [0.99, 1.16], $p = .07$. Number of oral sex (received) hookup events during the study was not a significant predictor of experiencing oral sex SV during the study, OR 0.99, CI [0.85, 1.16], $p = .91$.

The trend association between oral sex (performed) hookup behavior and oral sex SV remained after controlling for covariates. The final model with all seven predictors significantly predicted the occurrence of oral sex SV during the study, LR χ^2 (7, $N = 289$) = 29.44, $p < .001$. Number of pre-college oral sex SV events (OR 7.2) was the only significant predictor, but number of oral sex (performed) hookup events (OR 1.1) approached statistical significance (see Table 61). McFadden's ρ^2 was .16, and c was .70 for this model.

Vaginal sex hookups as a predictor of attempted vaginal rape. Of the 483 participants in the study, 282 (58%) had complete data for all variables used in the attempted vaginal rape analyses (i.e., all 4 waves of attempted vaginal rape, all 13 waves of number of vaginal sex hookup and romantic events, baseline alcohol use, and sorority membership). Of these 282 participants, 51 (18%) reported attempted vaginal rape during the study (at waves 5, 9, and/or 13); among these women, the mean number of attempted vaginal rape events during the study was 2.21 ($SD = 1.53$, median = 2, range: 1-5).

Participants with ($n = 279$) and without ($n = 204$) complete data on the variables used in the attempted and complete vaginal rape analyses²³ were compared on

²³ There were 282 participants with complete data for the attempted vaginal rape analyses, and 282 participants with complete data for the completed vaginal rape analyses. There was overlap for 99% of participants (i.e., almost all the same participants constituted the two groups), but there were three participants with complete data for attempted rape who did not have complete data for completed rape, and

demographics, pre-college attempted and completed vaginal rape history, and pre-college vaginal sex behavior. Between-samples *t*-tests were used for continuous variables, and chi-square tests of independence were used for categorical variables; Fisher's exact test was used to obtain the *p*-value when cells had low expected counts. Ten demographic variables were tested, so a Bonferroni-corrected alpha level of .005 was used to avoid inflating type I error. There were no significant differences between participants with and without complete data on age, race, Hispanic ethnicity, sexual orientation, sorority membership, SES, baseline relationship status, US citizenship, attending high school in the US, or religiosity. Eight SV and sexual history variables were tested, so the alpha level was set at .006. There were no significant differences between participants with and without complete data on history of pre-college attempted and completed vaginal rape, number of pre-college attempted and completed vaginal rape events, number of pre-college casual vaginal sex partners and events, or number of pre-college romantic vaginal sex partners and events. Overall, there were no significant differences between participants with and without complete data.

Logistic regression was used to test the association between vaginal sex hookup behavior and attempted vaginal rape. The outcome was dichotomized due to limited variability in the number of attempted vaginal rape events during the study. More than 80% of participants reported zero instances of attempted vaginal rape during the study. Of the 51 participants who reported attempted vaginal rape, 34 (67%) reported one or two events. Therefore, a dichotomous outcome was more appropriate than a count outcome with extremely limited variability.

vice versa. To avoid an additional set of 18 comparisons, the 279 participants with complete data for both attempted and completed vaginal rape were grouped into the same analysis.

Hookup behavior. Eighteen percent of participants reported pre-college attempted vaginal rape, 58% reported alcohol use in the past month at baseline, 21% reported sorority membership, 48% reported romantic vaginal sex behavior during the study, and 32% reported vaginal sex hookup behavior during the study. The univariate association between vaginal sex hookup behavior and occurrence of attempted vaginal rape during the study was explored first. Vaginal sex hookup behavior during the study was a significant predictor of experiencing attempted vaginal rape during the study, LR χ^2 (1, $N = 282$) = 6.27, $p = .01$. Compared to women who did not engage in vaginal sex hookup behavior during the study, women who engaged in vaginal sex hookup behavior were 2.2 times more likely to experience attempted vaginal rape during the study, CI [1.20, 4.13].

The association did not remain after controlling for covariates. The final model with all five predictors significantly predicted the occurrence of attempted vaginal rape during the study, LR χ^2 (5, $N = 282$) = 42.63, $p < .001$. The only significant predictors were pre-college attempted vaginal rape (OR 5.5) and sorority membership (OR 2.9; see Table 62). McFadden's ρ^2 was .16, and c was .77 for this model.

Number of hookup events. A correlation matrix for the variables involved in the attempted vaginal rape analyses appears in Table 63. Table 64 provides descriptive statistics for the continuous predictors. The univariate association between number of vaginal sex hookup events and occurrence of attempted vaginal rape was explored first. Number of vaginal sex hookup events during the study was a significant predictor of experiencing attempted vaginal rape during the study, LR χ^2 (1, $N = 282$) = 5.23, $p = .02$. With each additional vaginal sex hookup event occurring during the study, the odds of experiencing attempted vaginal rape increased by 7%, OR 1.07, CI [1.01, 1.13].

The association between vaginal sex hookup behavior and attempted vaginal rape did not remain after controlling for covariates. The final model with all five predictors significantly predicted the occurrence of attempted vaginal rape during the study, LR χ^2 (5, $N = 282$) = 39.98, $p < .001$. The only significant predictors were number of pre-college attempted vaginal rape events (OR 2.2) and sorority membership (OR 3.8; see Table 65). McFadden's ρ^2 was .15, and c was .77 for this model.

Vaginal sex hookups as a predictor of completed vaginal rape. Of the 483 participants in the study, 282 (58%) had complete data for all variables used in the completed vaginal rape analyses (i.e., all 4 waves of completed vaginal rape, all 13 waves of number of vaginal sex hookup and romantic events, baseline alcohol use, and sorority membership). Of these 282 participants, 29 (10%) reported vaginal rape during the study (at waves 5, 9, and/or 13); among these women, the mean number of completed vaginal rape events during the study was 2.26 ($SD = 1.36$, median = 2, range: 1-5).

Logistic regression was used to test the association between vaginal sex hookup behavior and completed vaginal rape. The outcome was dichotomized due to limited variability in the number of completed vaginal rape events during the study. Ninety percent of participants reported zero instances of completed vaginal rape during the study. Of the 29 participants who reported completed vaginal rape, 17 (59%) reported one or two events. Therefore, a dichotomous outcome was more appropriate than a count outcome with extremely limited variability.

Hookup behavior. Six percent of participants reported pre-college completed vaginal rape, 58% reported alcohol use in the past month at baseline, 22% reported sorority membership, 48% reported romantic vaginal sex behavior during the study, and

33% reported vaginal sex hookup behavior during the study. The univariate association between vaginal sex hookup behavior and occurrence of completed vaginal rape during the study was explored first. Vaginal sex hookup behavior during the study was a significant predictor of experiencing completed vaginal rape during the study, LR χ^2 (1, $N = 282$) = 14.77, $p < .001$. Compared to women who did not engage in vaginal sex hookup behavior during the study, women who engaged in vaginal sex hookup behavior were 4.7 times more likely to experience completed vaginal rape during the study, CI [2.08, 10.56].

The association between vaginal sex hookup behavior and completed vaginal rape remained after controlling for covariates. The final model with all five predictors significantly predicted the occurrence of completed vaginal rape during the study, LR χ^2 (5, $N = 282$) = 27.76, $p < .001$. Vaginal sex hookup behavior (OR 3.6), vaginal sex romantic behavior (OR 3.0), and pre-college completed vaginal rape (OR 4.6) were significant predictors of completed vaginal rape during the study (see Table 66). McFadden's ρ^2 was .15, and c was .80 for this model.

Number of hookup events. A correlation matrix for the variables involved in the completed vaginal rape analyses appears in Table 63. Table 67 provides descriptive statistics for the continuous predictors. The univariate association between number of vaginal sex hookup events and occurrence of completed vaginal rape was explored first. Number of vaginal sex hookup events during the study was a significant predictor of experiencing completed vaginal rape during the study, LR χ^2 (1, $N = 282$) = 8.68, $p = .003$. With each additional vaginal sex hookup event occurring during the study, the odds of experiencing vaginal rape increased by 10%, OR 1.1, CI [1.04, 1.16].

The association remained even after controlling for covariates. The final model with all five predictors significantly predicted the occurrence of completed vaginal rape during the study, LR χ^2 (5, $N = 282$) = 14.36, $p = .01$. Number of vaginal sex hookup events (OR 1.09) and number of pre-college completed vaginal rape events (OR 2.0) were significant predictors of completed vaginal rape during the study (see Table 68). McFadden's ρ^2 was .08, and c was .77 for this model. For non-sorority members, with all other predictors held constant at their means, the odds of experiencing completed vaginal rape increased by 9% with each additional vaginal sex hookup event during the study, OR 1.09, CI [1.02, 1.15].

Sexually Transmitted Diseases

STD analyses included only the 288 participants (60% of the full sample) with complete data²⁴ for all variables involved in this analysis (i.e., 4 waves of self-reported STD diagnosis, all 13 waves of number of oral [performed and received] and vaginal sex hookup events, and all 13 waves of number of oral [performed and received] and vaginal sex romantic events). Participants who had missing data on any of the variables involved in this analysis, due to either missing surveys completely or leaving items blank, were excluded from the analysis.

Participants with ($n = 288$) and without ($n = 195$) complete data on the variables used in the STD analyses were compared on demographics, pre-college STD testing and diagnosis, and pre-college oral and vaginal sex behavior. Between-samples t -tests were used for continuous variables, and chi-square tests of independence were used for

²⁴ The analysis was limited to participants with complete data to avoid making assumptions about participants' sexual behavior and STD history during waves in which they had missing data. Maximum likelihood estimation could not be used for this analysis because the outcome was created by collapsing across 12 waves.

categorical variables; Fisher's exact test was used to obtain the p -value when cells had low expected counts. Ten demographic variables were tested, so a Bonferroni-corrected alpha level of .005 was used to avoid inflating type I error. There were no significant differences between participants with and without complete data on age, race, Hispanic ethnicity, sexual orientation, sorority membership, SES, baseline relationship status, US citizenship, attending high school in the US, or religiosity. Twelve sexual history variables were tested, so the alpha level was set at .004. There were no significant differences between participants with and without complete data on number of pre-college casual or romantic oral sex (performed) partners and events, casual or romantic oral sex (received) partners and events, casual vaginal sex partners and events, and romantic vaginal sex events. Participants without complete data ($M = 1.1$) reported more pre-college romantic vaginal sex partners than participants with complete data ($M = 0.7$), Satterthwaite $t(292.6) = 3.17, p = .002$. There were no significant differences between the two groups in rates of pre-college STD testing or diagnosis. Although listwise deletion was not desirable because it excludes participants and reduces power, there were minimal differences between participants with and without complete data for the STD testing analysis, which decreases the likelihood of biased results.

Ten demographic variables were tested as potential covariates for the STD analyses. Chi-square tests of independence were used with categorical variables, and logistic regression was used with continuous variables. Because there were 10 comparisons, a Bonferroni-corrected alpha level of .005 was used to avoid inflating type I error. Age, race, Hispanic ethnicity, sexual orientation, sorority membership, SES, baseline relationship status, US citizenship, attending high school in the US, and

religiosity were not significantly associated with pre-college STD diagnosis.

STD testing. At baseline, 46 participants²⁵ (16% of the subsample of 288) reported being tested for STDs prior to attending college. For purposes of the analysis, the 242 participants (84%) who had never been tested for STDs were considered to not have a pre-college STD diagnosis. When STD testing was offered through the study, 217 women (75%) participated, and 71 (25%) chose not to. As of the end of the study (wave 13), 217 participants (75%) reported ever being tested for STDs in their lifetime, and 71 (25%) reported never having been tested for STDs in their lifetime. For purposes of the analysis, the 71 participants who had never been tested for STDs in their lifetime were considered not to have a lifetime STD diagnosis.

STD incidence. At baseline, six participants (2.1%) self-reported a pre-college STD diagnosis. During the study, five participants self-reported a new STD diagnosis, and two had a laboratory-confirmed diagnosis through the STD testing offered through the study. Overall, seven participants (2.4%) had a new STD diagnosis during the study.

Rates of sexual hookup and romantic behavior. At baseline, 84 participants (29%) reported any pre-college sexual hookup behavior. During the study, 123 participants (43%) reported sexual hookup behavior. At baseline, 161 participants (56%) reported any pre-college sexual romantic behavior. During the study, 158 participants (55%) reported sexual romantic behavior.

Sexual behavior during the study as a predictor of STD incidence.

Dichotomous indicators of new STD diagnosis and sexual behavior during the study were

²⁵ Among the full sample of 483 participants, 92 (19%) reported being tested for STDs prior to college. The majority of the full sample ($n = 310$, 64%) participated in STD testing through the study. As of the end of the study (wave 13), 323 participants (67%) reported ever being tested for STDs in their lifetime, 95 (20%) reported never having been tested, and 65 (13%) had never been tested as of the last wave in which they participated in the study.

analyzed using chi-square tests of independence. Fisher's exact test was used to obtain p -values due to the very small cell sizes. Of the seven participants who reported a new STD diagnosis during the study, five (71%) reported sexual hookup behavior during the study, and two (29%) did not, $\chi^2(1, N = 288) = 2.42, p = .14$. Of the seven participants who reported a new STD diagnosis during the study, six (86%) reported sexual romantic behavior during the study, and one (14%) did not, $\chi^2(1, N = 288) = 2.76, p = .13$.

Sexual behavior pattern as a predictor of STD incidence. An alternative analysis was attempted to examine further the impact of hookup and romantic behavior during the study on STD risk. Both types of sexual interactions were combined into a sexual behavior pattern categorical variable with four levels: neither hookups nor romantic encounters ($n = 92, 32\%$), only hookups ($n = 38, 13\%$), only romantic encounters ($n = 73, 25\%$), and both hookups and romantic encounters ($n = 85, 30\%$). A chi-square test for independence was conducted on the sexual behavior pattern variable and new STD diagnosis during the study; Fisher's exact test was used to obtain the p -value given the small cell sizes. One STD case (14%) was from the hookups only group, two (29%) were from the romantic encounters only group, and four (57%) were from the combined group. The association between these variables was not statistically significant, $\chi^2(3, N = 288) = 4.18, p = .17$. Logistic regression was also attempted, but the model did not converge appropriately, and odds ratios and standard errors could not be estimated.

Number of sexual events as a predictor of STD incidence. Numbers of oral (performed and received) and vaginal sex hookup and romantic events²⁶ during the study were tested as predictors of acquiring a new STD diagnosis in six separate logistic

²⁶ Number of partners was not tested because there was no way to know if partners were new each month; the potential for counting partners multiple times was high, particularly for participants in romantic relationships that lasted for more than one month.

regression models, but none were significant ($ps > .60$).

Lifetime STD incidence and rates of sexual behavior. Due to the small number of STDs reported during the study, the same analysis was also conducted using lifetime STD diagnosis (as of wave 13) as the outcome variable. Twelve participants (4.2%) self-reported an STD either before or during the study, or had a laboratory-confirmed STD diagnosis during the study. One hundred and forty-seven participants (51%) reported sexual hookup behavior, and 190 (66%) reported sexual romantic behavior during their lifetimes.

Lifetime sexual behavior as a predictor of lifetime STD diagnosis. A chi-square test for independence found that lifetime sexual hookup behavior and lifetime STD diagnosis were significantly associated, $\chi^2(1, N = 288) = 5.23, p = .02$. Seven percent of women who had ever hooked up had a lifetime STD diagnosis, compared to one percent of women who had never hooked up. Univariate logistic regression showed that women who had engaged in sexual hookup behavior were 5.1 times more likely to have had an STD compared to women who had never engaged in hookups, LR $\chi^2(1, N = 288) = 5.71, p = .02, CI [1.09, 23.58]$. When sexual romantic behavior was added as a covariate, the overall model was significant, LR $\chi^2(2, N = 288) = 7.32, p = .03$, but the odds ratios for both hookup behavior ($p = .14$) and romantic behavior ($p = .27$) were not significant.

A chi-square test for independence revealed a trend toward a significant univariate association between lifetime romantic encounters and lifetime STD diagnosis, $\chi^2(1, N = 288) = 3.68, p = .055$. Six percent of participants who had ever engaged in sexual romantic behavior had a lifetime STD diagnosis, compared to one percent of

women who had never engaged in sexual romantic behavior. Logistic regression was used to examine further this univariate association. The overall model was significant, LR $\chi^2 (1, N = 288) = 4.58, p = .03$, but the OR of 6.0 was not, CI [0.76, 46.85], $p = .09$.

Lifetime sexual behavior pattern as a predictor of lifetime STD diagnosis. An alternative analysis was attempted to examine further the impact of hookup behavior and romantic encounters on STD diagnosis. Both types of sexual interactions were combined into a sexual behavior pattern categorical variable with four levels: neither hookups nor romantic encounters ($n = 78, 27\%$), only hookups ($n = 20, 7\%$), only romantic encounters ($n = 63, 22\%$), and both hookups and romantic encounters ($n = 127, 44\%$). A chi-square test for independence was conducted on the sexual behavior pattern variable and new STD diagnosis during the study; Fisher's exact test was used to obtain the p -value given the small cell sizes. One STD case (8%) was from the hookups only group, two (17%) were from the romantic encounters only group, and nine (75%) were from the combined group. The association between these variables approached statistical significance, $\chi^2 (3, N = 288) = 6.29, p = .052$. Logistic regression was also attempted, but the model did not converge appropriately, and odds ratios and standard errors could not be estimated.

Discussion

The majority of college students report hooking up (McClintock, 2010; Penhollow et al., 2007). In this sample, oral or vaginal sex hookup behavior was reported by 34% prior to college entry and 40% during the year-long study. By the start of their sophomore year of college, 51% had lifetime oral or vaginal sex hookup experience—nearly as many as had sexual romantic experience (62%). These findings corroborate prior research showing that hooking up is almost as common, if not more common, than

traditional dating or romantic relationships (Armstrong et al., 2010; Bradshaw et al., 2010). Rates of hookup behavior in the current study were somewhat lower than in some previous studies (Armstrong et al., 2010; McClintock, 2010; Reiber & Garcia, 2010); however, hookups involving only kissing or sexual touching, which are more common than penetrative sex hookups (Bay-Cheng et al., 2009; Fielder & Carey, 2010b; Testa, Hoffman, & Livingston, 2010), were included in previous studies, but not in the current study. Moreover, the sample comprised first-year college students, whereas many other studies include students from all four years. The relatively low mean and median numbers of oral and vaginal sex hookup events during the year-long follow-up suggest that many first-year college women experiment with hooking up, but do not regularly engage in it (e.g., weekly or even monthly). Experimenting with options for relationships and sexuality is part of the process of identity exploration that emerging adults undergo during this developmental period (Arnett, 2000).

The most innovative aspect of the current research was the investigation of the mental and physical health consequences of sexual hookup behavior. Because women are disproportionately vulnerable to psychological distress, SV, and STDs (relative to men), this longitudinal study examined the effects of sexual hookup behavior on mental health and risk for SV and STDs among first-year college women.

Mental Health

The results did not support Hypothesis 1a, but partially supported Hypothesis 1b. Findings from the examination of trajectories of hookup behavior and mental health during the academic year were mixed. For all seven mental health outcomes, there was no significant relationship between the intercepts for mental health and sexual hookup

behavior. This null finding indicates no significant difference in the initial levels of the mental health constructs between women with higher and lower probabilities of sexual hookup behavior at the beginning of the academic year. Thus, there was no support for Hypothesis 1a. For the majority of the mental health outcomes, there was no significant association between changes in the probability of sexual behavior and changes in mental health. However, sexual hookup behavior was associated with perceived stress and positive affect. Increases in the probability of oral sex (performed) and vaginal sex hookup behavior during the academic year predicted increases in perceived stress and decreases in positive affect. The results provide partial support for Hypothesis 1b and suggest that engaging in sexual hookup behavior can negatively impact women's mental health. Changes in the probability of sexual romantic behavior were not significantly associated with changes in mental health. This pattern suggests that it is not sexual behavior in general, but rather something unique to hooking up that affects women's mental health.

Furthermore, engaging in sexual hookup behavior was consistently related to experiencing clinically significant depression symptoms. Both performing and receiving oral sex hookup behavior were univariately associated with increased risk for depression, although including baseline depression as a covariate attenuated the relationship. Engaging in vaginal sex hookup behavior appears to confer a higher risk, as women who did so during the study were 2.5 times more likely to meet criteria for a depression diagnosis (based on PHQ-9 scores) compared to women who did not. This relationship remained statistically significant even after controlling for baseline depression, pre-college depression, and romantic vaginal sex behavior. Overall, Hypothesis 1c was

supported, as engaging any sexual hookup behavior during the study was a significant predictor of experiencing a depression diagnosis, even after controlling for covariates including baseline depression. On the other hand, engaging in sex in the context of romantic relationships was not significantly associated with depression diagnosis in any of the models, suggesting that sexual hookup behavior confers a unique risk compared to general sexual activity.

Follow-up analyses controlled for previous depression and previous sexual experience. Among women without a history of pre-college or baseline depression, vaginal sex hookup behavior, but not vaginal sex romantic behavior, predicted increased odds of experiencing a depression diagnosis for the first time. Among women with no pre-college sexual hookup experience, those who engaged in any sexual hookup behavior during the study were more likely to experience a depression diagnosis, compared to those who did not report any sexual hookup behavior. Conversely, among women with no pre-college sexual romantic experience, those who engaged in any sexual romantic behavior during the study were no more likely to experience a depression diagnosis than those who did not report any sexual romantic behavior. These results also support the hypothesis that sexual behavior in the context of hookups, rather than romantic relationships, may place college women at risk for adverse mental health consequences.

Overall, the findings suggest that hooking up may have negative mental health consequences for college women. There are several reasons why hooking up, but not sex in the context of romantic relationships, may adversely affect women's emotional health. First, compared to men, women have less favorable attitudes toward sex outside of committed relationships (Okami & Shackelford, 2001), and many women report feeling

guilty about or regretting their casual sex encounters and one-night stands (Campbell, 2008; Herold & Mewhinney, 1993). Second, women are more likely than men to engage in sex due to intimacy motives (Meston & Buss, 2007), but hookups are designed to avoid emotional attachment. Third, women who hook up risk acquiring a negative reputation, due to the sexual double standard in American society (Crawford & Popp, 2003). Fourth, many women with hookup partners report wanting to transition to a romantic relationship (Owen & Fincham, 2011b); if this transition does not occur, these women may feel rejected and experience emotional distress. Fifth, despite the supposed sexual benefits of hooking up, women may be distressed due to sexual frustration caused by unsatisfying hookups (Armstrong et al., 2010) or lack of sexual reciprocity with oral sex during hookups (England & Thomas, 2006). Finally, women may experience peer pressure or verbal coercion from hookup partners to go further sexually than they want (Paul & Hayes, 2002; Wright et al., 2010). Thus, there are a number of personal, social, and sexual explanations for why hookups may be experienced as distressing for young women. In contrast, most of these factors do not apply in the case of romantic relationships. For example, committed relationships provide a context in which it is more socially acceptable for women to have sex compared to hookups. Intimacy and trust are presumably higher with committed relationship partners compared to hookup partners, and college women are more likely to receive oral sex and have orgasms during romantic encounters than during hookups (Armstrong et al., 2010).

The results of this study are mostly consistent with the limited extant research on the mental health consequences of hooking up. The finding that increases in the probability of hookup behavior predicted increases in emotional distress (i.e., increased

perceived stress and decreased positive affect) corroborates earlier findings (Fielder & Carey, 2010a) from a longitudinal study of first-semester college women. The results are also consistent with Owen et al.'s (2010) cross-sectional study in which half of college women reported negative emotional reactions to their hookups. The association between sexual hookup behavior, but not romantic behavior, and depression replicates cross-sectional findings by Grello et al. (2006), but contrasts with Owen et al.'s (2011) longitudinal study in which penetrative sex hookup behavior during the semester did not predict depressive symptoms (as measured by the Center for Epidemiologic Studies Depression [CESD] scale) at the end of the semester. However, Owen et al. found an interaction between hookup behavior and depression, such that hookup behavior led to increased depressive symptoms among participants who were the least distressed at baseline, but decreased depressive symptoms among participants who were the most distressed at baseline. The absence of males and use of the PHQ-9 to measure depression, which is more clinically sensitive than the CESD due to its items being taken from DSM-IV diagnostic criteria for a major depressive episode (Spitzer et al., 1999), in the current study may account for the slight differences in the pattern of results.

The mixed results found in this study suggest that sexual hookup behavior may result in some adverse mental health consequences for some women. Indeed, hookup behavior was related to perceived stress, positive affect, and a dichotomous indicator of clinically significant depression; at the same time, there were null findings for anxiety, negative affect, self-esteem, life satisfaction, and depressive symptoms. There was not a clear pattern to support the hypothesis that hookups have adverse mental health consequences for women. Nonetheless, the findings are sufficient grounds on which to

call for future research in this area. Because this study was not without limitations (summarized later), more investigation is needed. Including this study, the consensus in the literature is that hooking up appears to have a negative impact on emotional health for at least some women. Therefore, future research is needed to clarify the relationship between sexual hookup behavior and emotional wellbeing and identify moderators and mediators of the association.

Sexual Victimization

The results supported Hypothesis 2, suggesting that sexual hookup behavior increases risk for SV. In general, women who engaged in oral sex (performed), oral sex (received), and vaginal sex hookup behavior during the study were more likely to experience SV. For performing oral sex hookups and vaginal sex hookups, the association with oral sex SV and completed vaginal rape, respectively, remained statistically significant even after controlling for history of pre-college oral sex SV or completed vaginal rape, alcohol use, sorority membership, and romantic oral or vaginal sex behavior. Analyses were repeated using number of hookup events during the study, and the results again supported Hypothesis 2. In this case, the number of hookups in which the participant performed oral sex, but not the number of hookups in which the participant received oral sex, predicted experiencing oral sex SV during the study. The number of hookups in which the participant had vaginal sex predicted experiencing both attempted and completed vaginal rape. With each additional oral sex (performed) or vaginal sex hookup during the study, participants' odds of experiencing oral sex SV or attempted or completed vaginal rape increased. For performing oral sex hookups and vaginal sex hookups, the association with oral sex SV and completed vaginal rape

remained statistically significant even after controlling for previous oral sex SV or completed vaginal rape, alcohol use, sorority membership, and romantic sexual behavior. Thus, hookup behavior confers a unique risk for SV.

Overall, the findings suggest that sexual hookup behavior is an important risk factor for SV among college women. Women who hooked up were more likely to experience SV compared to women who did not hook up. Among women who hooked up, risk of experiencing SV increased with each additional hookup. Further, compared to sexual behavior in the context of a romantic relationship, there appears to be unique risk resulting from the hookup situation. The association between hookup behavior and SV remained after controlling for theoretically and empirically established covariates, including previous SV (Breitenbrecher, 2001), alcohol use (Abbey, Zawacki, et al., 2001), and sorority membership (Copenhaver & Grauerholz, 1991). The size of the association was smaller than that of a previous history of SV, as all adjusted odds ratios for hookup variables were smaller than those for previous SV variables. Therefore, the results do not suggest that sexual hookup behavior is necessarily the main risk factor for SV. Nonetheless, the finding that even a single sexual hookup increases risk for SV after controlling for other known risk factors is noteworthy.

More research is needed on the different risk profiles of oral sex hookups in which women perform versus receive oral sex. The current study was the first to distinguish between different types of oral sex in relation to SV risk. A clear pattern emerged for performing oral sex hookups; in all cases it was predictive of increased risk for oral sex SV. However, for receiving oral sex hookups, the results were mixed. Oral sex (received) hookup behavior was a significant predictor of oral sex SV using

dichotomous, but not continuous, indicators. Notably, the latter analysis is stronger because it used all available information (i.e., variability in number of oral sex hookups), whereas the former analysis employed dichotomization. In addition, when both performing and receiving oral sex were included in the same model, neither was a significant predictor of experiencing oral sex SV, although the odds ratio was higher and the p -value was lower for performing oral sex.

There may be a qualitative difference between hookups in which women receive oral sex and hookups in which women either do not receive oral sex or only perform oral sex. Event-level research has found that when oral sex occurred during hookups, it was mutually exchanged 40-50% of the time, only the man received oral sex 37-45% of the time, and only the woman received oral sex 15-16% of the time (England & Thomas, 2006; England et al., 2007). Women are more likely to receive oral sex during hookups if they have hooked up with that partner four or more times, compared to a first hookup with a new partner or a second or third hookup with the same partner (Armstrong et al., 2010). Assuming that a woman would be unlikely to continue hooking up with a partner who has sexually victimized her, hooking up with the same partner multiple times may be less risky than hooking up with different partners, simply because the partner's previous behavior suggests he will not engage in SV. In contrast, with new hookup partners, their propensity for SV is unknown. Perhaps the dichotomized variable of receiving oral sex during hookups functioned more as a general indicator of sexual hookup behavior, rather than being more specific to receiving oral sex during hookups. For example, there is a difference between receiving oral sex once during any hookup during the study and receiving oral sex during the majority of or all hookups during the study. Also, a man

who is willing to perform oral sex on a hookup partner may be concerned about her sexual pleasure, or he may be hoping for reciprocity so he can receive oral sex as well; in the latter case, if the woman is not willing to perform oral sex willingly, there may be a motive for engaging in oral sex SV. However, no research has explored motives for engaging in particular sexual behaviors during hookups. Taken together, the findings relating oral sex hookups and SV suggest a need for continued research to determine whether risk differs according to the woman's role in oral sex during hookups.

Rates of SV in the current study were similar to those reported in other studies of first-year college women (Humphrey & White, 2000; Testa, Hoffman, & Livingston, 2010). Over thirty percent of the sample reported at least one instance of SV during the year-long study by way of physical force, threats of harm, or incapacitation due to alcohol or drugs. Classified by the most severe form of SV they experienced, 11% of participants reported unwanted sexual contact, 1% oral sex, 9% attempted vaginal rape, and 11% completed vaginal rape. Previous research suggests that first-year college students are at increased risk for SV (Gross et al., 2006; Humphrey & White, 2000; Kimble, Neacsiu, Flack, & Horner, 2008). Incoming students making the transition to college are new to the unsupervised lifestyle on campus and unfamiliar with campus social patterns. As a result, they may be more vulnerable to SV during their first semester or two at college.

The results are consistent with the few previous studies that have examined the link between hooking up and SV. Two studies have found that between 78-91% of unwanted oral, vaginal, or anal sex events occurring during college happened during hookups (Flack et al., 2007; 2008). A third study found a lower rate, with approximately

20% of sexual assaults and rapes starting out as hookups (Littleton et al., 2009); differences in methodology (e.g., in operational definitions of unwanted sex vs. sexual assault) likely account for the discrepancy in the results. The only longitudinal study conducted thus far found that sexual hookup behavior during high school and the first semester of college was a risk factor for experiencing SV during the first year of college (Testa, Hoffman, & Livingston, 2010). Combined with the results of the present study, there is emerging support for the connection between sexual hookup behavior and SV, including SV that meets legal definitions of rape.

Additional research is needed to elucidate the ways in which hooking up increases risk for SV. Experimenting with or increasing alcohol use, which is common for emerging adults transitioning to college (Fromme et al., 2008; White et al., 2006), may be one mechanism through which hookup behavior increases risk for SV; event-level studies have found that the majority of college women drank alcohol prior to their most recent hookup (median = 3-4 drinks; Fielder & Carey, 2010b; England et al., 2008). However, alcohol use was not a significant univariate predictor of any SV outcomes in the present study. It may be that the hookup situation explains risk, and by capturing hookup behavior, the association between alcohol use and SV was no longer significant.

Additional research, including event-level studies, is needed to address this question.

The ambiguity of the hookup situation (Bogle, 2008a), combined with gender differences in sexual expectations for hookups (Wright et al., 2010), likely serves to increase risk for SV. The lack of communication during hookups (Littleton et al., 2009; Paul & Hayes, 2002) and the tendency for men to overestimate women's comfort with sexual behavior during hookups (Lambert et al., 2003; Reiber & Garcia, 2010) similarly

create risk for SV. In addition, during hookups that are progressing further sexually than women intend, they may experience conflict between social affiliation motives and self-protection motives (Norris et al., 1996) or feel obligated to meet the hookup partner's sexual needs due to traditional gender roles (Impett & Peplau, 2003). Another mechanism through which hookup behavior may confer risk for SV involves increased exposure to more partners, which creates more opportunities to encounter a sexually aggressive partner (Franklin, 2010). More research is needed to determine the specific mechanisms through which hookups increase risk for SV.

Sexually Transmitted Diseases

Hypothesis 3 was partially supported. Sexual hookup behavior during the study was not significantly associated with STD incidence during the study. However, lifetime sexual hookup behavior was significantly associated with lifetime STD diagnosis; participants who had ever performed oral sex on, received oral sex from, or had vaginal sex with a casual partner were 5.1 times more likely to have had a lifetime STD diagnosis, compared to participants who had never engaged in sexual hookup behavior in their lifetime. However, the number of sexual hookup events was not associated with STD diagnosis.

The association between lifetime sexual hookup behavior and STD diagnosis emerged despite a very low base rate of STDs in this study. Although the finding is preliminary and needs to be replicated, this is the first study to establish an association between sexual hookup behavior and STD risk. Notably, sexual romantic behavior was also examined in relation to STD diagnosis, and the association approached statistical significance. Therefore, it remains unclear whether sexual hookup behavior confers

additional risk beyond that of general sexual activity.

If hookup behavior increases risk for STDs, it may do so in a number of ways. First, simply engaging in oral and vaginal sex increases risk compared to not engaging in sexual risk behavior. Second, inconsistent condom use during vaginal sex hookups and near-zero rates of condom use during oral sex hookups increase risk for STDs (Fielder & Carey, 2010b). Condoms may not be used for many reasons, such as the spontaneous nature of the hookup, lack of knowledge about STD risk, intoxication, use of hormonal contraceptives to prevent pregnancy, or low perceived risk of the partner. Third, hookups may increase risk for STDs compared to romantic encounters due to the casual nature of the interaction. The lack of commitment inherent in hookups suggests the possibility of multiple and concurrent sexual partners, which provide more opportunities for exposure to STDs. Few quantitative data are available on numbers of hookup partners, but one study, which used a broad definition of hookup partner that was not limited to oral or vaginal sex partners, found that college women had an average of 11.3 hookup partners (Daubman & Schatten, 2009). Another study found that 24% of individuals with friends with benefits had two or more concurrent partners (Lehmiller et al., 2010). The potential for additional partners is higher in a hookup situation compared to a romantic relationship, although infidelity is possible in the latter case.

A notable limitation of this analysis was the low base rate of STDs among the participants throughout the course of the study. Only 2.4% of participants ($n = 7$) experienced a new STD diagnosis during the study. When lifetime STD diagnosis was considered, the STD prevalence rate increased only slightly to 4.2% ($n = 12$). Therefore, given the very low number of participants who reported STD diagnoses, statistical power

was limited (Tabachnick & Fidell, 2007). The analysis fell short of the recommended ratio of 10 outcome events to 1 predictor (Peduzzi et al., 1996). Due to limited power, the results should be interpreted with caution.

Several explanations exist for the low number of self-reported and laboratory-confirmed STDs. First, this sample of first-year female college students may come from a relatively low risk population. The majority of participants were from families with middle to high SES (e.g., 79% of participants reported that their mothers attended some college, completed college, or attended graduate school). Risk for some STDs is higher among individuals of lower SES (Sionéan et al., 2001). The majority of participants were also White, and Whites have lower STD rates compared to some ethnic minorities (James et al., 2008). The majority of participants did not engage in high levels of risky sexual behavior during the study. For example, by the end of the study, 53% of participants reported zero or one lifetime oral sex partners, and 59% reported zero or one lifetime vaginal sex partners. Most participants did not engage in anal sex, which carries the highest risk for disease transmission (Institute of Medicine, 1997); only 12% of participants reported anal sex during the study. Less than half of the sample (42%) engaged in sexual hookup behavior during the study. The mean relative frequency of condom use during vaginal sex with casual partners was 4.0 ($SD = 1.3$), which corresponds to “most of the time.”

Second, a substantial proportion of participants reported never having been tested for STDs. At baseline, only 19% of the full sample of participants reported having been tested for STDs. During the study, a large proportion engaged in STD testing, many ($n = 310$) through the testing offered through the study. Nonetheless, by the end of the study,

20% of participants had never been tested for STDs, and an additional 14% had never been tested as of the last wave in which they participated in the study. Participants cannot report STD diagnoses if they have never been tested for STDs.

Third, of participants who were tested for STDs, the type of testing they received is important. Most routine STD testing (e.g., at the research site) is limited to chlamydia and gonorrhea. The STD testing offered through the study included chlamydia, gonorrhea, and trichomoniasis. Although these STDs are widespread among American youth ages 15-24, other STDs such as genital herpes and HPV are more common (Weinstock et al., 2004). Genital herpes is estimated to affect approximately 1 in 5 American women (CDC, 2010), and the prevalence of HPV in a nationally representative sample of American women was 25% among ages 14-19 and 45% among ages 20-24 (Dunne et al., 2007). Testing for viral STDs is more expensive (e.g., blood draws for herpes typing, pap smears for HPV), so they are less likely to be included in routine STD testing protocols. Participants whose only STD testing occurred through the study²⁷ have never been tested for the more common viral STDs. Accordingly, self-awareness of STD infection is limited by the specific tests undertaken.

Strengths of the Research

The current study had numerous methodological and conceptual strengths. First, a large sample of almost 500 young women was followed during an important developmental period, the transition from high school to college. The majority of participants (72%) were recruited from the general pool of all incoming first-year female

²⁷ It seems likely that for a substantial proportion of participants, their only STD testing in their lifetime occurred through the study. Only 19% reported STD testing at baseline, and only 7% reported receiving STD testing during the first semester. However, during the second semester, when STD testing was offered through the study, 65% of participants reported it.

students, as opposed to the smaller pool of those who enrolled in the introductory psychology course. Notably, this is the most comprehensive longitudinal study of sexual hookup behavior undertaken thus far. The two previous studies assessing mental health consequences of hookups both spanned only one semester and included only two assessments (one at the beginning and one at the end). Second, sexual behavior was assessed monthly, resulting in increased accuracy, compared to surveys at the end of each semester or year, due to short recall periods for participants (Schroder et al., 2003b). Consistent with previous studies (Testa, Hoffman, & Livingston, 2010), SV was assessed every semester because it is relatively infrequent. Third, online surveys were used to encourage more candid responding about sensitive topics (Turner et al., 1998) and higher response rates (Greenlaw & Brown-Welty, 2009).

Fourth, an array of mental health constructs was included. The measures used to assess anxiety, depression, negative affect, perceived stress, positive affect, life satisfaction, and self-esteem were all well-validated measures with demonstrated reliability and validity. Internal consistency and test-retest reliability were high in this sample. The various mental health constructs included both negative and positive outcomes; this was an improvement from previous studies, which tended to focus on more negative outcomes. The outcomes also included variables with both clinical and public health significance. For example, use of the PHQ-9 to measure depression provided a measure with more clinical significance: depression diagnoses. Because PHQ-9 items are based directly on DSM-IV diagnostic criteria for a major depressive episode (Spitzer et al., 1999), the PHQ-9 scoring algorithm enabled participants to be classified on the basis of meeting criteria for a depression diagnosis. This study improved upon

previous research by assessing both statistical and clinical significance of the mental health effects of sexual hookup behavior.

Fifth, the measures of sexual behavior and SV used clear operational definitions to improve accuracy. Whereas previous research on hooking up has used vague (e.g., physical encounter) or inaccurate (e.g., occurs only one time) terms in hookup definitions, the hookup measures used in the current study asked about specific sexual risk behaviors (i.e., oral and vaginal sex) with casual partners, which were defined to capture the non-committal aspect of hookups (Epstein et al., 2009). The assessment strategy used in the current study had three advantages: (a) it captured key characteristics of the hookup context (Bogle, 2008), (b) it used behaviorally specific sexual terms, and (c) it minimized problems with idiosyncratic understandings of hookup. With respect to SV, the Sexual Experiences Survey is the most commonly used measure of SV in the literature (Koss et al., 2007), in part due to its avoidance of stigmatizing words such as rape in favor of behaviorally-specific language. The adapted version of the revised Sexual Experiences Survey used in the current study has been used in large studies of first-year college women (Testa, Hoffman, & Livingston, 2010; Testa, Hoffman, Livingston, & Turrisi, 2010).

Sixth, a stringent definition of SV that maps onto legal and theoretical understandings of SV was used. That is, only those sex acts that occurred as a result of threats of physical harm to the individual or a loved one, use of physical force against the individual, or incapacitation (and inability to object or consent) of the individual due to alcohol or drugs, were considered to be SV. Because different types of sex acts are measured separately on the Sexual Experiences Survey, it was possible to match sex act

types in the SV analyses (i.e., examine whether oral sex hookups increase risk for oral sex SV and vaginal sex hookups increased risk for attempted or completed vaginal rape). Another strength of the present study was statistical consideration of numerous variables known to be related to risk for SV, including previous SV, alcohol use, and sorority membership. Additionally, by controlling for sexual behavior in the context of traditional romantic relationships, the unique effect of sexual hookup behavior on risk for SV could be explored. Including these covariates allowed for a more stringent test of the association between sexual hookup behavior and risk for SV.

Seventh, this study included biological testing for STDs. All participants were offered the opportunity to be tested for CT, Gc, and TV at no cost to them, and almost two-thirds opted to participate. The STD testing offered through the study greatly increased the proportion of participants who had ever been tested for STDs, which increased our ability to detect STDs. In addition to the testing, participants provided self-report data on STD diagnosis every four months. These questions were embedded toward the middle of the surveys to increase participants' comfort with revealing sensitive information.

Eighth, this study used a sophisticated data analytic approach for the mental health outcome data. LGCM enables both within-person and between-person variability to be modeled simultaneously (Duncan et al., 2006). The advantages of LGCM over more traditional statistical procedures include the ability to test the accuracy of hypothesized growth trajectories, include a mean structure in the model, account for measurement error, allow for time-specific measurement error, include time-invariant and time-varying covariates, model continuous and categorical outcomes, use maximum likelihood

estimation and include participants with missing data in analyses, obtain group-level statistics, and evaluate model fit with indices used in SEM (Duncan et al., 2006; Kline, 2005; Preacher et al., 2008).

Limitations and Directions for Future Research

General

There were a few limitations related to the sample used in the present study. The generalizability of the results may be limited given that the sample included participants from only one university, and most participants were upper-middle class. However, it was encouraging that the racial/ethnic distribution of the sample approximated that of all incoming first-year female SU students during the Fall 2009 semester (Office of Institutional Research and Assessment, 2011) and that of the ACHA's National College Health Assessment sample of over 30,000 students at 57 colleges and universities (ACHA, 2010). Although all incoming first-year female students (approximately 1,400) were invited to participate in the study, only 483 joined the study, for a response rate of 35%. Women who are willing to participate in a study about health behaviors and relationships may differ from those who decline in terms of demographics, personality, and risk behaviors. For instance, college students who completed their subject pool research participation requirements earlier in the semester tended to be higher in conscientiousness and have higher GPAs, compared to those who waited until later in the semester (Aviv, Zelenski, Rallo, & Larsen, 2002; Witt, Donnellan, & Orlando, 2011). Moreover, college students with higher GPAs and higher levels of social engagement were more likely to participate in survey research, whereas those with lower SES were less likely to participate (Porter & Whitcomb, 2005). Overall, research suggests that

individuals who participate in health survey research have healthier lifestyles than individuals who decline such participation, but the differences are very small (Klesges et al., 1999). Thus, the sample in the present study may be biased toward more conscientious students with higher GPAs. Future research efforts should attempt to recruit diverse samples and examine how those who decline to participate may differ from consenters. Moreover, research on the hookup behaviors of non-college-attending emerging adults is needed, as almost all hookup research relies exclusively on college student samples.

As with almost all research studies, there was attrition and missing data. Overall, retention of participants was excellent considering the length of the study; the response rate remained above 90% through wave 7, and the lowest response rate for any individual wave, which occurred during the summer, was 81%. Sixty-four percent of participants completed all 13 waves of the study, and over 86% completed 10 or more waves. However, due to missing data on key measures, the sample size for the SV analyses were limited to 289 participants (60% of the full sample) for oral sex SV and 282 participants (58%) for attempted and completed vaginal rape. The sample size for the depression diagnosis analyses was 274 (57%), and the sample size for the STD analyses was 288 (60%). Because SV, STD, depression diagnosis, and sexual behavior variables were collapsed across all 12 follow-up waves, participants with missing data had to be excluded to avoid making assumptions about their behavior during the waves they missed. Generally, individuals who are higher in conscientiousness are less likely to withdraw from a long-term study; indeed, conscientiousness and number of waves completed were positively correlated ($r = .17, p < .001$) in the present sample. Individuals

who withdraw or miss surveys likely engage in higher levels of risky behaviors, and this may be related to their failure to complete follow-ups. However, when participants with and without complete data for the affected analyses were compared, there were very few statistically significant differences. Thus, the impact of attrition on the results seems minimal in this study. Regardless, future research should continue to follow best practices to minimize attrition (Ribisl et al., 1996) and, if possible, to incorporate advanced statistical techniques to address problems with missing data, which was done for the mental health analyses by using full estimation maximum likelihood estimation.

Mental health

Several limitations of the current study suggest directions for future research with respect to exploring the mental health effects of hookup behavior. First, the monthly assessment schedule may have limited our ability to detect effects of hooking up on mental health. Although this choice improved upon the two previous longitudinal studies employing an early-semester and a late-semester assessment schedule, monthly surveys may not be able to capture acute effects on mental health. It is possible that increased psychological distress occurs soon after a hookup, such as in the hours or days immediately after. In this case, if women hooked up at the beginning of a month, but the assessment did not occur until four weeks later, it is likely that some or all emotional distress may have been passed by that time. Alternatively, emotional distress due to social (e.g., bad reputation) or interpersonal (e.g., failure of hookup to materialize into a relationship) factors may not occur until days or weeks after a hookup. Some of the mental health measures (viz., depression, anxiety) asked about the past two weeks only. Although they are well-validated and commonly used measures, retaining the original

items with the past two weeks reference period resulted in two weeks per month in which depression and anxiety were not assessed. Another measurement limitation was specific to life satisfaction and self-esteem, which were only assessed every four months to minimize respondent fatigue. Our ability to detect changes in these two constructs was likely limited by this infrequent assessment schedule.

Second, there were limitations with the measures of sexual hookup behavior. The baseline (wave one) measures referenced the participants' lifetimes prior to starting college, whereas the follow-up measures referenced the past month. Accordingly, the baseline measures could not be included in the LGCM analyses; however, this limitation is minor given that the conceptual consideration that the wave two measures actually assessed behavior during the first month of college. Our data collection approach did not allow us to know if performing oral sex, receiving oral sex, and vaginal sex occurred during the same or different encounters or with the same or different partners. Therefore, the number of events of each type could not be combined into one variable, and the three outcomes had to be analyzed separately. Rates of the three types of hookup behavior were fairly low (e.g., 5-13%) at each wave, and there was limited variability in the number of events or partners reported among women who did engage in hookups. As a result, dichotomous indicators of the three types of sexual hookup behavior were used instead of count data (i.e., number of events). Dichotomization reduces statistical power and results in loss of information (Streiner, 2002). There may be a difference between someone who engages in one hookup during the study and someone who engages in 50, but, with dichotomization, they are both placed in the same category. More specific sexual behavior measures (e.g., asking if partners were new month-to-month, asking if

different behaviors occurred with the same partner or during the same event) would have improved the study.

A third limitation of the current study was the modeling issues incurred with LGCM. Separate analyses were conducted for each of the different mental health outcomes and each type of sexual behavior, so the type I error rate may have been inflated. Also, neither the mental health nor the sexual behavior variables had clear linear trajectories during the academic year or during the course of the entire study. As a result, the mental health analyses for anxiety, depression, negative affect, perceived stress, and positive affect were limited to waves 2-9. However, there was also a conceptual reason for excluding the summer, as the participants were away from the college environment in a variety of different home environments. Because of the rise and fall in the mental health and sexual behavior outcomes, a quadratic trend was included in the growth curve models to improve model fit, but quadratic trends are rarely suggested theoretically and complicate interpretation (Preacher et al., 2008). Linear trends are of more interest in the social sciences, and the focus in the current study was on linear trends.

Lastly, the depression diagnosis outcome was based on self-reported depressive symptoms, rather than on structured diagnostic interviews. The latter would be more valid, but the cost was prohibitive for the current study. Nonetheless, the PHQ-9 has good criterion validity. In the original validation study, 93% of diagnoses of major depression disorder based on PHQ-9 scores were corroborated by structured clinical interviews given by mental health professionals within 48 hours of PHQ-9 completion (Spitzer et al., 1999). Thus, concerns about the validity of the depression diagnoses are mitigated by the strong psychometric properties of the PHQ-9 and its sensitive scoring algorithm.

The measurement limitations related to mental health and sexual behavior suggest several ideas for future research methodology. A similar study could be conducted with more frequent assessments. Weekly assessments may be more sensitive to changes in mental health, and it would be easier for participants to report on a week than a month. A daily diary study would also provide a more nuanced understanding of participants' emotional health over time while also allowing researchers to pinpoint when sexual hookups occurred. Participants could complete brief measures of sexual behavior and mental health daily. To reduce respondent burden and extend the length of a study, participants could complete mental health measures weekly, along with a sexual behavior diary asking about the past week. This approach retains the ability to know more precisely when hookups occur. The diaries would allow for event-level questions about partners (e.g., repeat vs. new) and sexual behavior. Ecological momentary assessment would allow for a more intensive understanding of the emotions related to hooking up; participants could be signaled to complete brief measures while out socializing (e.g., before and after a hookup encounter). However, conducting more frequent assessments introduces challenges of feasibility and compliance.

Additional research is needed on the benefits of sexual hookup behavior.

Although the findings from the present study suggest hooking up may result in emotional distress for some women, the effects were not severe or consistent across all mental health constructs. Therefore, we were careful not to over-state the potential dangers of hooking up. Anecdotal reports in the mass media (e.g., Stepp, 2007) offer a polarized view that hooking up is harmful to all young women, but as reviewed heretofore, the findings in the literature are tempered. The high prevalence of hooking up among women

indicates that this practice has some benefits. Better understanding of the positive consequences of this behavior will elucidate the full context in which youth choose to engage in hookup culture.

Sexual victimization

Several limitations of the current study suggest directions for future research with respect to exploring the relationship between hookup behavior and risk for SV. First, owing to the proportion of the sample with complete data and the relative infrequency of SV, the ratio of outcome events to predictors in the logistic regression analyses was lower than the recommended 10 to 1 ratio for oral sex SV and completed vaginal rape (Peduzzi et al., 1996). Accordingly, the validity of the regression models may have been affected; biased parameter or variance estimates are possible when the events to parameters ratio is less than 10 to 1. SV was a relatively rare outcome, with 10% reporting oral sex SV and 10% reporting vaginal rape during the study. Attempted vaginal rape was more frequent, with 18% reporting it during the study. Replication of the findings from the present study in other samples of college women will increase our confidence in the results. A second consequence of the SV rates was the need for dichotomization of the outcomes. Among participants who reported any of these types of SV, more than one-half reported one or two instances during the entire follow-up period. Given limited variability in the number of SV events, count regression analyses were precluded. Dichotomization of continuous variables is undesirable because it results in loss of information, reduced statistical power, and higher chance of type II error (Streiner, 2002). Although several other analytical approaches were attempted, the data necessitated dichotomization in this case.

Second, some of the measures of hookup and romantic behavior could be

improved in future studies. In particular, the measure of number of partners needs to be made more specific, so that a summary variable can be calculated without the potential for counting partners multiple times. With our methods, we could not identify whether a sexual partner reported in a given wave was new or if this partner had already been reported in a previous wave. Participants were asked how many casual and romantic partners they had oral and vaginal sex with at each wave; additional questions as to the status of those partners as new or previous were not included due to the need to limit respondent burden. This omission was problematic because individuals often hook up with the same partner repeatedly over time (Fielder & Carey, 2010b), so summing their number of hookup partners across months may have resulted in an inflated total for the study. With romantic partners, the problem of over-counting would likely be more pronounced for participants in long-term relationships. Future research should incorporate more detailed assessments of the number of hookup and romantic partners to allow for analysis of the relationship between number of hookup partners and mental health outcomes, risk for SV, and STD incidence. This will need to be done without increasing the respondent burden, which could promote withdrawal or non-compliance.

Also, because rates of sexual hookup behavior were relatively low within individual months, future research using longitudinal designs should follow participants over longer periods of time, such as the whole four years of college or the emerging adulthood age period of 18-25. College women may also be increasingly likely to hook up and to hook up more often as they advance through college; they may become more comfortable with the culture of hooking up, or they may internalize the strong social norms supportive of hooking up (Lambert et al., 2003). A longer time span would not

only allow more time for relatively rare outcomes to occur, but also allow for closer examination of developmental trajectories of sexual hookup behavior. For instance, qualitative research suggests that after graduating from college and getting a bit older, young adults eschew hookups in favor of traditional dating, which they feel is better suited to finding a potential marriage partner (Bogle, 2008a).

Third, other measurement issues were the separate assessment of SV and sexual behavior and the cross-sectional approach to data analysis. There was no way to tell if participants' hookup events or romantic events involved SV because sexual behavior and SV were measured separately. Research suggests that several features of hookups, such as ambiguity, unclear expectations, lack of communication, and intoxication, create risk for SV during hookups; SV can also occur during interactions with romantic partners. Future research should incorporate event-level assessments that ask about hookup and romantic events as well as whether SV occurred specifically during those events. An alternative approach would be to ask participants what proportion of the SV instances they experienced occurred during hookups and romantic events. In terms of study design, the present study was longitudinal, but the approach to data analysis had to be cross-sectional due to the relative infrequency of the SV outcomes. That is, the sexual behavior variables and SV outcomes were measured during the same time period, and they were collapsed across the whole study. Nonetheless, the cross-sectional analysis was not a major limitation because extant research suggests that hookups may be risky situations themselves. Indeed, the argument was made that current hookup behavior increases current risk for SV because hookups are risky situations in and of themselves. An alternative argument that was *not* necessarily made was that current hookup behavior

increases future risk for SV; this hypothesis is plausible and could be tested, but it was not the focus of the current investigation. Thus, the main limitation was the failure to combine assessment of sexual behavior and SV events.

Sexually Transmitted Diseases

Several limitations of the current study suggest directions for future research with respect to exploring the association between sexual hookup behavior and STDs. First, by the end of the study, 20% of participants had never been tested for STDs, and an additional 14% had never been tested as of the last wave in which they participated in the study. Ideally all participants would undergo STD testing. Because some STDs (i.e., genital herpes, HPV) can be transmitted through skin-to-skin contact alone, even those participants who have never engaged in oral, vaginal, or anal sex would still benefit from being tested. Second, participants were offered STD testing for three of the most common bacterial STDs, but viral STDs (viz., genital herpes and HPV) are more prevalent (Weinstock et al., 2004). Thus, a wider variety of STDs should be included in future STD testing protocols. Third, STD testing could only be offered once during the current study due to funding limitations. In longitudinal studies, STD testing would ideally be conducted at least twice: once at the beginning of the study and again later. Having multiple testing dates allows for a closer examination of the relationship between sexual behavior and STDs. Fourth, with a relatively low-risk population such as upper middle class college women, a longer study duration, such as the four years of college, may be needed to capture a significant amount of sexual risk behavior. Fifth, measures of the number of casual and romantic partners should be more specific than those used in the current study, which prevented knowing which partners were new. More specific partner

measures would allow a test of the relationship between the number of hookup partners and STD risk. Sixth, future research should investigate rates of condom use during oral and vaginal sex with casual and romantic partners.

Summary of Findings and Implications

In the current study, women who hooked up were more likely than women who did not hook up to experience depression diagnoses, although the direction of the effect cannot be determined due to the cross-sectional design of the analysis. The longitudinal general mental health analyses found that increases in the probability of sexual hookup behavior predicted increases in psychological distress. Findings from the current study indicate an association between sexual hookup behavior and risk for SV. Engaging in oral and vaginal sex hookups is a risk factor that contributes to the high rates of SV among college women. Hooking up theoretically increases women's risk for acquiring STDs through engagement in sexual risk behavior, inconsistent condom use, and high potential for multiple and concurrent partners. A lifetime history of sexual hookup behavior was associated with lifetime STD diagnosis for women in this sample, but the findings should be considered preliminary due to the low base rate of STDs.

The results of this study have implications for educational efforts and preventive interventions that would benefit young women and the greater college community. College women should be educated about the link between hooking up and SV and about the potential for negative emotional health consequences. Given the rates of sexual hookup behavior prior to college, adolescent girls in high school should also receive this information, which could be incorporated into health classes or sexual education curriculums. Educational programming (e.g., in dorms or campus health centers) can

raise awareness and conversation about the college hookup culture. Discussion of the potential negative health consequences of hooking up could be incorporated into new student orientation materials that deal with other risky behaviors (e.g., alcohol education), or into class discussion or assignments in relevant classes (e.g., health, psychology, sociology, family studies, and women's studies). Gender differences in expectations for sexual behavior and post-hookup outcomes could be discussed to demystify what actually happens during and after hookups. Also, flyers could be made available in residence halls and student health centers to inform youth about the potential risks of hookup behavior. Health care providers and mental health professionals working with college students should be aware of the high rates of hookup behavior among college students, so they can be prepared to help students address the health consequences. Health care providers should encourage students engaging in unprotected sex or sex with multiple partners to be tested for STDs. Mental health professionals and sexual assault counselors should be familiar with the hookup culture on their campus and be aware of the risk for SV in this context.

Appendix A: Demographics

Wave 1 only

How old are you (in years)? ____

What is your race/ethnicity? (select all that apply)

- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or other Pacific Islander
- White or Caucasian
- Other

Do you consider yourself to be Hispanic/Latina?

- yes
- no

Which of the following best describes you?

- heterosexual
- gay/lesbian
- bisexual
- transgender
- unsure

To what extent do you consider yourself a religious person?

- not religious at all
- slightly religious
- moderately religious
- very religious

Waves 1-13

What is your current relationship status?

- single
- committed relationship

Wave 7 only

Did you join a sorority this semester?

- yes
- no

Wave 8 only

Were you born a United States citizen?

- yes
- no

Did you attend high school in the United States?

- yes
- no

Below is a “ladder” of dots that range from 1 to 10. Think of the dots as rungs on a ladder representing where families stand in the United States. At the top of the ladder are the families who are the best off—those who have the most money, the most education, and the most respected jobs. At the bottom are the families who are the worst off—who have the least money, the least education, and the least respected jobs or no job. The higher up your family is on the ladder, the closer your family is to the families at the very top; the lower your family is, the closer you are to the families at the very bottom.

Please select the dot where you think your family stands at this time in your life, relative to other families in the United States.

- 10 (highest rung of the ladder)
- 9
- 8
- 7
- 6
- 5
- 4
- 3
- 2
- 1 (lowest rung of the ladder)

Appendix B: Physical Intimacy Questions

Example: Wave 11 survey

In Part 3, we ask about people with whom you have been physically intimate and about sexual behavior. Please remember that your name is NOT associated with the survey and that accurate information is essential to improve women's health services.

Now, you will be asked about physical intimacy with 2 different types of partners:

A **romantic partner** = someone whom you were dating or in a romantic relationship with at the time of the physical intimacy.

A **casual partner** = someone whom you were NOT dating or in a romantic relationship with at the time of the physical intimacy, and there was no mutual expectation of a romantic commitment. Some people call these hookups or friends with benefits.

By *physical intimacy*, we mean closeness with a partner that might include kissing, sexual touching, or any type of sexual behavior.

Please think about the month of June.

In the last month (June 1-30), with how many **romantic partners** have you been physically intimate? ____

In the last month (June 1-30), with how many **casual partners** have you been physically intimate? ____

For the questions on the next pages, please use these definitions.

Oral sex = when either partner puts their mouth on the other partner's genitals

Vaginal sex = when a man puts his penis in a woman's vagina

Anal sex = when a man puts his penis in a women's rectum

We understand that some girls will have had these experiences and some will not.

Enter zero (0) if you have not had the type of sex mentioned.

Appendix C: Baseline Hookup Questions

If indicated some oral or vaginal sex experience:

Finally, we ask about **casual partners**. Remember that a casual partner is someone whom you were NOT dating or in a romantic relationship with at the time of the sexual interaction, and there was no mutual expectation of a romantic commitment. Some people call these hookups. (Please do NOT count romantic partners in this section.)

Please think about your **entire lifetime**.

Over your lifetime, with how many different **casual partners** have you:

given oral sex ___

received oral sex ___

Over your lifetime, with how many different **casual partners** have you:

had vaginal sex ___

If had a casual partner for oral sex:

Over your lifetime, with all of your **casual partners** combined, how many different times have you:

given oral sex ___

received oral sex ___

If had a casual partner for vaginal sex:

Over your lifetime, with all of your **casual partners** combined, how many different times have you:

had vaginal sex ___

Appendix D: Follow-up Hookup Questions

Example: Wave 3 survey

If participant indicated physical intimacy with a casual partner in the last month:

Now we ask about **casual partners**. Remember that a casual partner is someone whom you were NOT dating or in a romantic relationship with at the time of the sexual interaction, and there was no mutual expectation of a romantic commitment. Some people call these hookups or friends with benefits. (Please do NOT count romantic partners in this section.)

Enter zero (0) if you have not had the type of sex mentioned with a **casual partner** during October.

Please think about the last month (Oct. 1-31).

First we ask about the **number of partners**.

Over the last month (Oct. 1-31), with how many different **casual partners** have you:

given oral sex ___

received oral sex ___

Over the last month (Oct. 1-31), with how many different **casual partners** have you:

had vaginal sex ___

Now we ask about the **number of times**.

If participant indicated oral sex with a casual partner in the last month:

Over the last month (Oct. 1-31), with all of your **casual partners** combined, how many different times have you:

given oral sex ___

received oral sex ___

If participant indicated vaginal sex with a casual partner in the last month:

Over the last month (Oct. 1-31), with all of your **casual partners** combined, how many different times have you:

had vaginal sex ___

Appendix E: Patient Health Questionnaire-9

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	not at all	several days	more than half the days	nearly every day
little interest or pleasure in doing things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
feeling down, depressed, or hopeless	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
trouble falling or staying asleep, or sleeping too much	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
feeling tired or having little energy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
poor appetite or overeating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
feeling bad about yourself—or that you are a failure or have let yourself or your family down	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
trouble concentrating on things, such as reading the newspaper or watching television	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
moving or speaking so slowly that other people have noticed; or the opposite— being so fidgety and restless that you have been moving around a lot more than usual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
thoughts that you would be better off dead or of hurting yourself in some way	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix F: Patient Health Questionnaire-9 Depression Diagnosis Scoring Algorithm

The PHQ-9 scoring algorithm (Spitzer et al., 1999) was used to assign diagnoses of major or other (sub-threshold) depressive disorder based on self-reported depressive symptoms. Question 1 (Q1) on the PHQ-9 (“little interest or pleasure in doing things”) assesses anhedonia. Question 2 (Q2; “feeling down, depressed, or hopeless”) assesses depressed mood. Question 9 (Q9; “thoughts that you would be better off dead or of hurting yourself in some way”) assesses suicidal ideation.

Scoring algorithm for major depressive disorder: if (a) answers to Q1 *OR* Q2 *AND* (b) five or more of Q1-9 are at least “more than half the days” (count Q9 if present at all).

Scoring algorithm for other depressive disorder: if (a) answer to Q1 or Q2 and (b) two, three, or four of Q1-9 are at least “more than half the days” (count Q9 if present at all).

Appendix G: Generalized Anxiety Disorder-7

Over the last 2 weeks, how often have you been bothered by any of the following problems?

	not at all	several days	more than half the days	nearly every day
feeling nervous, anxious or on edge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
not being able to stop or control worrying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
worrying too much about different things	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
trouble relaxing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
being so restless that it is hard to sit still	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
becoming easily annoyed or irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
feeling afraid as if something awful might happen	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix H: International Positive and Negative Affect Schedule, Short Form,

Negative Affect Schedule

This list of words describes different feelings and emotions. Indicate to what extent you have felt this way *during the last month*.

	very slightly or not at all	a little	moderately	quite a bit	extremely
upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hostile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ashamed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix I: Perceived Stress Scale-4

The next set of questions asks you about your feelings and thoughts *during the last month*. Indicate how often you felt or thought a certain way.

In the last month...

	never	almost never	sometimes	fairly often	very often
how often have you felt that you were unable to control the important things in your life?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
how often have you felt confident about your ability to handle your personal problems?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
how often have you felt that things were going your way?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
how often have you felt difficulties were piling up so high that you could not overcome them?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix J: International Positive and Negative Affect Schedule, Short Form,

Positive Affect Subscale

This list of words describes different feelings and emotions. Indicate to what extent you have felt this way *during the last month*.

	very slightly or not at all	a little	moderately	quite a bit	extremely
alert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
determined	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
attentive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix L: Rosenberg Self-Esteem Scale

Below is a list of statements dealing with your general feelings about yourself. Please rate your agreement with each statement.

	strongly disagree	disagree	agree	strongly agree
I feel that I am a person of worth, at least on an equal plane with others.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel that I have a number of good qualities.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
All in all, I am inclined to feel that I am a failure.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I am able to do things as well as most other people.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I feel I do not have much to be proud of.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I take a positive attitude toward myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On the whole, I am satisfied with myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I wish I could have more respect for myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I certainly feel useless at times.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At times I think I am no good at all.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Appendix M: Adapted Sexual Experiences Survey

Example: Wave 9 survey

Next we ask about unwanted sexual experiences. We know that these are personal questions, but it is important to understand how frequent these experiences truly are. Your information is completely confidential, and your name is not tied to your responses. We hope this helps you to feel comfortable answering each question honestly.

Indicate the number of times each experience has happened to you *since January 1, 2010* (from January 1 until today).

Since Jan. 1, how many times has anyone overwhelmed you with arguments about sex or continual pressure for sex in order to...	0	1	2	3	4+
fondle, kiss or touch you sexually when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
try to have sexual intercourse with you (but it did not happen) when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
succeed in making you have sexual intercourse when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
make you do oral sex or have it done to you when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
make you have anal sex or penetrate you with a finger or objects when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Since Jan. 1, how many times has anyone threatened to physically harm you or someone close to you in order to...	0	1	2	3	4+
fondle, kiss or touch you sexually when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
try to have sexual intercourse with you (but it did not happen) when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
succeed in making you have sexual intercourse when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
make you do oral sex or have it done to you when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
make you have anal sex or penetrate you with a finger or objects when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Indicate the number of times each experience has happened to you *since January 1, 2010* (from January 1 until today).

Since Jan. 1, how many times has anyone used physical force (such as holding you down) in order to...

	0	1	2	3	4+
fondle, kiss or touch you sexually when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

try to have sexual intercourse with you (but it did not happen) when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
---	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

succeed in making you have sexual intercourse when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
---	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

make you do oral sex or have it done to you when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
---	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

make you have anal sex or penetrate you with a finger or objects when you indicated that you didn't want to?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
--	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Since Jan. 1, how many times, when you were incapacitated (e.g., by drugs or alcohol) and unable to object or consent, has anyone ...

	0	1	2	3	4+
fondled, kissed, or touched you sexually?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

tried to have sexual intercourse with you (but it did not happen)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
--	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

made you have sexual intercourse?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
-----------------------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

made you do oral sex or have it done to you?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
--	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

made you have anal sex or penetrated you with a finger or objects?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
--	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

Appendix N: Baseline Self-Report STD Diagnosis Questions

Before you started college (before August 26), were you ever tested for a sexually transmitted disease (STD)?

- yes
- no

If yes:

Which STD(s) were you tested for? (select all that apply)

- HIV
- any other STD (for example, chlamydia)

If yes:

Before you started college (before August 26), were you ever diagnosed with a sexually transmitted disease (STD)?

- yes
- no

If yes:

Which STD(s) were you diagnosed with? (select all that apply)

- bacterial vaginosis
- chlamydia
- genital herpes (HSV-1 or HSV-2)
- genital warts (caused by HPV)
- gonorrhea
- hepatitis A, B, or C
- HIV
- HPV (but not genital warts)
- syphilis
- trichomoniasis
- other
- I don't remember

Appendix O: Follow-up Self-Report STD Diagnosis Questions

Example: Wave 5 survey

Since you started college (since Aug. 26), have you been tested for a sexually transmitted disease (STD)?

- yes
- no

If yes:

Which STD(s) were you tested for? (select all that apply)

- HIV
- any other STD (for example, chlamydia)

If yes:

Since you started college (since Aug. 26), have you been diagnosed with a sexually transmitted disease (STD)?

- yes
- no

If yes:

Which STD(s) were you diagnosed with? (select all that apply)

- bacterial vaginosis
- chlamydia
- genital herpes (HSV-1 or HSV-2)
- genital warts (caused by HPV)
- gonorrhea
- hepatitis A, B, or C
- HIV
- HPV (but not genital warts)
- syphilis
- trichomaniasis
- other
- I don't remember

Appendix P: Recruitment Letter



SYRACUSE UNIVERSITY
CENTER FOR HEALTH AND BEHAVIOR

August 3, 2009

Dear First-Year Student,

We write to invite you to participate in the **Women's Health Project**, a one-of-a-kind research study that will occur only at Syracuse University this year. This project, which is supported by a grant from the National Institutes of Health, is designed to learn how women's health behaviors and interpersonal relationships develop during the first year of college.

Participation is voluntary, and we hope that you will accept our invitation! The information that you and others provide will improve understanding of women's health. Our results will be used to improve prevention and health services for women across the country.

We value your time, so we will pay you for your contributions (**\$160**). In addition, you will have the chance to win prizes (such as tickets to *Wicked* when it is performed in Syracuse this year).

To learn more, please go to our website (<http://chb.syr.edu/projects/women>) and **enter your email address**. We will send you details about the brief information session on campus where you can learn more, pick up a **free gift bag**, and decide if you would like to join the project.

Please note: We can enroll **only the first 500 women who consent**, so please visit our website today to sign up for an info session! We hope you will consider this opportunity to contribute to this unique research project! Thank you and welcome to Syracuse!

Sincerely,

Kate B. Carey, Ph.D.
 Dean's Professor of the Sciences
 Senior Scientist

Michael P. Carey, Ph.D.
 Dean's Professor of the Sciences
 Director

Appendix Q: Website Text, Page 1

**About the Project:**

The Women's Health Project is a study of young women's health and relationships during the first year of college. This one-of-a-kind study is being supported by a grant from the National Institutes of Health and will occur only at Syracuse University starting in August 2009.

Earn \$160! Win prizes!
For details, click "Your Role"

Thank you!
The SU Women's Health Project Team

Robyn L. Fielder, M.S.
Project Coordinator
Email: rffielde@syr.edu

Kate B. Carey, Ph.D.
Professor and Senior Scientist, Co-Investigator

Michael P. Carey, Ph.D.
Professor and Director, Principal Investigator

The
Center for Health & Behavior
at Syracuse University

Appendix Q: Website Text, Page 2



SYRACUSE UNIVERSITY

*Women's Health Project*Your Role [Sign up for more info](#)**About the study:**

Contribute to a one-of-a-kind study! Earn up to \$160 as you help to improve understanding of women's health as they transition to college life. Results from this study will be used to improve prevention services for young women at universities across the country.

Your role:

Info session on campus: We will hold 20-minute info sessions during orientation week and the first week of classes. Every woman who attends will receive a small gift. Attending the info session does not obligate you to participate in the study, but it is the first step.

Survey session: At the end of the info session, you can decide if you would like to participate in the study. If you do decide to participate, you will stay to complete a 40-minute survey. You will be paid \$20 for completing this survey. (Surveys are strictly confidential.)

Next year: Over the next year, we will email you to ask you to complete 12 online surveys (15-30 minutes each) and to attend another in-person session in April 2010. For each online survey you complete, you will be paid \$10; for the in-person session, you will be paid \$20.

So, for the entire study, participation will require less than 8 hours (over one year) and you can earn \$160!

Sign up now: If you think you *might* be interested, sign up now and you will be entered into a drawing for 2 tickets to see the musical *Wicked* (coming to Syracuse this Winter)! Signing up for more information does not obligate you to participate in the study.

The
Center for Health  Behavior
at Syracuse University

Appendix Q: Website Text, Page 3



Your Role [Sign up for more info](#)

YES!! Tell me how to attend the info session and enter me in the drawing to win a pair of tickets to *Wicked!*

Note: Only first-year ("freshmen") female students at Syracuse University are eligible to participate in the SU Women's Health Project.

I am a female first-year student at SU: Yes | No

Name:

SU email address: @syr.edu

Preferred email address:

Verify preferred email:

Phone number:

[Sign up](#)

The
Center for Health & Behavior
at Syracuse University

Appendix R: Acknowledgement Email

Dear First_Name,

Thank you for contacting the Women's Health Project through our website! You have been entered into the drawing for 2 tickets to see *Wicked* in Syracuse this year. The winner will be contacted on September 15 by email.

Next up: During the week of August 24th, we will email you about the days and times when you can come in for the info session, decide if you want to participate, and pick up a free gift bag as a token of our appreciation for your time. Please be on the lookout for our email!

We hope that your preparations for SU are going well, and we look forward to your arrival on campus.

Sincerely,

The Women's Health Project Team

Robyn L. Fielder, M.S., Project Coordinator

Kate B. Carey, Ph.D., Co-Investigator

Michael P. Carey, Ph.D., Principal Investigator

<http://chb.syr.edu/projects/women>

Appendix S: Recruitment Email

Dear [First_Name],

Thank you for your interest in the Women's Health Project!

Here's how to sign up for an info session:

1. Review the dates and times below.
2. Pick your top 3 dates and times.
3. Email us at whp@chb.syr.edu with your top 3 choices for times.

We will schedule an appointment for you and send the date and time via email. We will also include a map with directions to our office.

Here are the info session times:

Friday, Aug. 28 at 1:00, 3:00, or 5:00 (make sure the time does not conflict with your convocation)

Saturday, Aug. 29 at 11:00am, 1:00, or 3:00

Sunday, Aug. 30 at 12:00, 2:00, or 4:00

Monday, Aug. 31 at 11:00am, 1:00, or 6:00

Tuesday, Sept. 1 at 11:00am, 1:00, or 7:00

Wednesday, Sept. 2 at 11:00am, 1:00, 3:00, 5:00, or 7:00

Thursday, Sept. 3 at 10:00am, 12:00, 2:00, 4:00, or 6:00

Friday, Sept. 4 at 10:00am, 12:00, 2:00, or 4:00

Remember: To participate in the project and earn \$160, you must attend an info session during your first 2 weeks on campus. If you decide to participate, you can stay and complete a survey and earn \$20 for 1 hour of your time! Attending the info session does not commit you to participate in the study. You will receive a free gift bag just for attending the info session!

Yes, other first-year female students can join the Women's Health Project. If they would like to sign up for an info session, they can email us at whp@chb.syr.edu, call us at 315-443-9942, or visit our website at <http://chb.syr.edu/projects/women>

We look forward to seeing you soon!

Sincerely,

Robyn Fielder, M.S., Project Coordinator
for the Women's Health Project Team

Appendix T: Recruitment Card

Front:

Are you a first-year female SU student?
Are you at least 18 years old?

Join the
Women's Health Project!

Participation involves very little time,
and you can earn \$160

Back:

To sign up or get more information,

Email us at whp@chb.syr.edu

Visit our website:
<http://chb.syr.edu/projects/women>

Or call us at 315-443-9942

Appendix U: Recruitment Flyer



Are you a first-year female student?
(18 years or older?)

Want to earn \$160

for completing brief on-line surveys over the next year?

To learn more:

Call 315-443-9942, email whp@chb.syr.edu, or log on to
<http://www.chb.syr.edu/projects/women/>

You can help improve women's health services!

Women's Health Project
Call Robyn or Annelise
at 315-443-9942 or
email whp@chb.syr.edu

Women's Health Project
Call Robyn or Annelise
at 315-443-9942 or
email whp@chb.syr.edu

Women's Health Project
Call Robyn or Annelise
at 315-443-9942 or
email whp@chb.syr.edu

Women's Health Project
Call Robyn or Annelise
at 315-443-9942 or
email whp@chb.syr.edu

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Call Robyn or Annelise
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email whp@chb.syr.edu

Women's Health Project
Call Robyn or Annelise
at 315-443-9942 or
email whp@chb.syr.edu

Appendix V: Study Description for Sona

You are invited to take part in a study designed to investigate young women's health behaviors during the first year of college. Come to a 20-minute info session to hear more about the study and decide if you want to participate. If you decide to join, you will complete a 20-minute survey on the computer. The survey asks about your personality, relationships, health behaviors (such as sleep, physical activity, sexual behavior, alcohol use, and smoking), and moods. The survey is confidential, and your name will not be associated with your survey responses. By completing the initial survey you become eligible to continue in a year-long study, for which you will be paid. The results of this study will be used to improve health care and prevention services for college women.

If you have previously attended an information session for the Women's Health Project, you are already enrolled and should not sign up for the study again through Sona. We appreciate your interest and you remain enrolled for the rest of the study. If you have **not** yet attended an information session, you may sign up here.

Appendix W: Script for Orientation Sessions

Welcome everyone, and thank you so much for coming in today! We appreciate your making time to learn about the Women's Health Project. As a token of our appreciation, we will give you all a little gift bag just for showing up.

My name is Robyn Fielder, and I'm the Project Coordinator for the Women's Health Project. This is <Name>, who is one of our research assistants.

Is everyone at least 18 years old?

Please silence your cell phones for the duration of the info session. Also, please do not eat or drink in here since this is a computer lab.

We are going to accomplish 3 things today:

First, we'll overview the project, including its purpose, what it would involve for you, risks and benefits. This will take 5-10 minutes. Next, we'll complete the consent process. This will take 5 minutes. Finally, you'll complete a survey on the computer. This will take about 20 minutes.

So, together, these 3 things will take about 45 minutes. OK, let's get started!

First, we'll discuss what you need to know about the Women's Health Project. The Women's Health Project is unique to Syracuse University and has been designed to understand lifestyles, relationships, and women's health over the transition from high school to college.

That's where *you* come in! Only first-year women like you are eligible and only you can tell us about your experiences over the first year of college. Everyone is welcome and needed to increase the representativeness of our research. By involving a large group of 600 young women, the WHP will provide valuable information to improve women's health and prevention services on this campus and others.

So, what will you be asked to do? The Project has 3 main parts. The first part is today, when you complete a survey on the computer. The survey asks about you, your health behaviors, relationships, and personality. Some questions on the survey are about sensitive issues, such as alcohol and drug use or sexual behavior. We know that some of you will engage in some behaviors but not others. That's what we expect. It is really important that we involve all women, even if you do not do all of the behaviors. You won't have to answer any question that you don't want to answer, and in a moment I'll tell you about all steps we have taken to protect your privacy. Today's survey will take about 20 minutes to complete, and you will receive \$20 cash for your time.

The second part of the project involves monthly surveys that you can complete online in about 10-15 minutes. These will be much briefer than today's survey. We will send you

an email at the end of each month through next August 2010. For each monthly survey that you complete on time, you will be paid \$10. You will be mailed a check after you complete each survey.

You will also be entered into a drawing for that month's raffle. We will give away two \$50 cash prizes each month. If you complete the survey within 1 day (*24 hours*) of receiving the reminder email, your name will be entered into the drawing 3 times. If you complete it between 1 and 2 days (24 and 48 hours), your name will be entered twice. If you complete the survey within a week of the email, your name will be entered once. So you can maximize your chances to win extra money if you complete the survey within a day of getting the email!

The third part of the study happens in April, when we will ask you to come in to a campus office to provide a urine sample. This will involve going into a private bathroom, just like you may already have done at the doctor's office. This will allow a lab to test for chlamydia and gonorrhea, 2 diseases that affect many young women. We will ask *all* participants to do this regardless of whether you think you are personally at risk. To protect your privacy, the sample will not be labeled with your name -- we will use a made-up code. You could choose not to participate in STD testing, and you could still participate in the online surveys. However, since there is no cost to you, you would get free treatment if necessary, and your confidentiality will be protected, we hope you will participate in this aspect of the study. If you participate in testing, you will be paid \$20, in addition to \$10 for April's follow-up survey.

OK, that's what you will be asked to do. Next, I want to describe both the risks and benefits.

There are 2 potential risks. The first risk involves the fact that you will be disclosing private information to our team. However, all members of our team have been trained to protect your confidentiality. Your responses to our surveys will not be connected to your name. Moreover, there is no way for your parents or anyone else to access the information you provide to us. In fact, we have taken an extra step and obtained a Federal Certificate of Confidentiality, which means that even law enforcement officials cannot get access to your survey responses.

The second risk is that a few of you *may* feel uncomfortable answering some of the questions. If that happens, you can choose not to answer any question that you don't want to answer. You could also talk to me or another research assistant about your discomfort if it should arise today or during any of the monthly surveys.

There are 5 benefits of participating in the study. First, you can make an important contribution to our efforts to understand and improve college women's health. Second, you will have a chance to reflect on your health behaviors as you complete our surveys; many people find this to be interesting and helpful. Third, you will receive free STD testing and treatment (if necessary) at the end of the year. Fourth, you will learn about campus resources that you may not know about. And finally, you will be paid for your

time. You will receive \$20 for completing today's survey and \$20 for providing the urine sample for STD testing, plus \$10 for each of 12 monthly surveys that you complete. So if you complete all aspects of the study, you can earn \$160. You will also be entered into the monthly raffle for two \$50 cash prizes for each follow-up survey you complete.

The next step is the Informed Consent Process. You should know that participation is voluntary, meaning you do not have to participate if you don't want to. Also, once you have started the study, you can withdraw at any time without penalty. That said, *we hope that you will join* and stay in the project for the entire year because we are interested not only in the first year of college, but also the first few months back at home after freshman year. That means we will have surveys in June, July, and August of next year. It will be very easy for you to complete the surveys over the summer because they are all done online.

At this time I'd be happy to take any questions you have. We are now going to hand out 2 copies of the consent form. You can keep one copy of the consent form for your records. Everything we've said (and more) is described in detail on this consent form. <hand out consent form>

Please take a couple of minutes to read it now, and ask any questions that come to you. If you want to participate in the study, please sign the consent form and we'll take that from you. We are also giving everyone information on campus health resources just so you know what is available to you.

If anyone chooses to leave:

Thanks for considering the WHP, this is a small thank-you for coming today. <give gift bag>

After collecting signed consent forms:

If you have not yet filled out the contact information sheet we gave you when you first got here, please complete that now. We need to be able to contact you to send you reminders for the monthly surveys. We need your addresses so we can mail you your checks. Please make sure your preferred email address and phone number are correct.

Thanks for joining the Women's Health Project! We're excited to have you on board.

Before we get started with the survey, let me quickly go over a couple things that will make it easier for you to answer the survey questions. You will be asked about various behaviors that you may or may not do. If you have never done a certain behavior or have not done it during the time frame we ask about, please enter 0. For example, if you are asked how many minutes you exercised yesterday, and you did not exercise at all, just write a zero. If you are asked how old you were when you first smoked a cigarette, but you have never smoked before, just write a zero. Also, we ask about your high school GPA on a 4.0 scale. If your GPA is an average, like 82, we can tell you how to convert that to a GPA on the 4.0 scale. Just raise your hand if you need help with that.

<Name> is passing out a list of terms that are used in the survey, so you can have the definitions in front of you in case you need them. <hand out terms sheets>

Now you can all get started on the first survey. Please take your time, and let us know if you have any questions. If you have a question as you are completing the survey, please raise your hand and one of us will come over and help you. Once you are done, just stop at the front desk and we will give you your \$20 and a goodie bag.

Appendix X: Consent Form



SYRACUSE UNIVERSITY
CENTER FOR HEALTH AND BEHAVIOR

Consent Form for the Women's Health Project

Investigators: Drs. Kate Carey and Michael Carey.

Introduction: We invite you to take part in a study designed to investigate young women's interpersonal relationships and health behaviors during the first year of college. If you decide to join the study, you will be asked questions about your health behaviors, including dating, sexual behavior, and alcohol use; you will also be asked about your health and overall adjustment. The information that you and other women provide will increase understanding of young women's health as they transition to college life and greater independence. Taking part in this study is voluntary, so you can choose to accept or decline this invitation. This Consent Form explains what we are asking of you if you join. Please feel free to ask any questions today or at any time. If you should have any questions, you can call us at the telephone numbers provided later in this Consent Form.

Purpose of the Study: This study is being done in order to better understand the nature and effects of interpersonal relationships during the first year of college. Therefore, the surveys ask about relationships and health behaviors, including sexual behavior, and how these behaviors influence the health of young women. We are also interested in other health behaviors, such as alcohol use, smoking, sleep, and stress. The results of this study will be used to improve health care and prevention services for young women at colleges and universities across the country. This study is being supported by a grant from the National Institute of Health, and has undergone careful review at the national and local levels.

Study Procedures: If you agree to participate, you will be asked to sign this Consent Form. By signing, you agree that (a) your questions have been answered, and (b) you understand what you are being asked to do. You should ask any questions before signing.

The study will last one year, during which you will be asked to do the following:

1. **Today:** You will be asked to complete a computerized survey. The survey includes questions about sensitive topics, such as your attitudes and beliefs, background, health behaviors (alcohol use, drug use, sexual behavior), and health status. Most people can complete the survey in 30 minutes. The survey is confidential, and your name will not be associated with your survey. We are ethically bound to protect your privacy, and have taken extensive steps to assure your confidentiality. It is important to the integrity of our research that we collect high quality information, and we have set up conditions to optimize your candid responding. The steps have been approved by a University committee for the protection of research participants.

2. **Once every month for the next year:** At the end of each month, starting in September 2009, you will be emailed a link to a secure online survey. As with today's survey, these online surveys include questions about relationships, health behaviors, stress, and health. We ask that you complete the surveys within 24 hours of receiving the emails. The surveys are brief and will take 10 minutes to complete. Three of the surveys (December 2009, April and August 2010) will be slightly more detailed and will require 20 minutes each. The surveys are strictly confidential, and your name will not be associated with your survey answers. Your privacy will be protected.
3. **In April 2010:** Visit the Syracuse University Health Center and provide a urine sample to be tested for chlamydia and gonorrhea at no cost to you. We will have a private bathroom for your use. To protect your privacy, the sample will be labeled with an identification code, rather than your name. In the event that you test positive for chlamydia or gonorrhea, you will be contacted by the SU Health Center, so that you can receive treatment from a nurse. Both infections can be treated with a single dose of an antibiotic, which will be available at no cost to you.

Number of Participants: We plan to enroll 600 first-year college women in this study.

Benefits of Participation: There are two benefits you can expect. First, you may benefit from the opportunity to reflect on your health behaviors and relationships as you complete the surveys. Second, in April 2010, you will be tested for chlamydia and gonorrhea at no cost to you. If the testing finds an infection, you will be provided with treatment at no cost to you.

Risks of Participation: There are two risks associated with this study. First, you may feel uncomfortable answering some of the questions. If this occurs, you may choose not to answer any question. If you wish, the research assistant can talk with you about your concerns. When you take the online surveys, you may call Dr. Kate Carey (443-2706) or Dr. Michael Carey (443-2755) if discomfort arises while completing those surveys. The second risk involves the risk of disclosing private information to our research team. However, all information that you disclose to our team is confidential, and we are obligated to protect your privacy.

Confidentiality of Records: Your name will appear on this Consent Form, on receipts, and on a form that we use to call you to schedule a return visit in April 2010. Your name will also appear on a list that is used to link your urine specimen for the STD test to you. However, these forms are stored separately from all other research records. Thus, your name will not be associated with the answers you provide to our surveys. Instead, we will use a made-up identification code to protect your privacy. All research records will be kept in a locked cabinet in a locked office, and only the research team will have access to them. All electronic survey data will be stored in password-protected files on password-protected computers, and only the research team will have access to them.

Certificate of Confidentiality: To help us protect your privacy, we have obtained a Certificate of Confidentiality from the National Institutes of Health. With this Certificate, we cannot be forced to disclose information that may identify you, even by a court subpoena, in any federal, state, or local civil, criminal, administrative, legislative, or other proceedings. We will use the Certificate to resist any demands for information that would identify you, except as explained below.

The Certificate cannot be used to resist a demand for information from personnel of the United States Government that is used for auditing or evaluation of Federally funded projects.

You should understand that a Certificate of Confidentiality does not prevent you or a member of your family from voluntarily releasing information about yourself or your involvement in this research. If an insurer, employer, or other person obtains your written consent to receive research information, then the researchers may not use the Certificate to withhold that information.

There are two circumstances where we might be legally obligated to share information that you have provided to us with others.

1. If you told us that you intend to harm yourself or to harm another person, or if you report child abuse or neglect, we would act to protect you, the other person, or the child.
2. If you are diagnosed with either chlamydia or gonorrhea, we will set up an appointment for you at the SU Health Center. Because these two infections are communicable diseases, they must be reported by the medical staff to the Department of Health. In addition, the medical staff may ask you for the names of your sexual partners, so that those partners may be notified of their potential exposure to a sexually transmitted infection. However, partner notification is anonymous; this means that health professionals contact your sexual partners and state that they may have been exposed to an infection, but your name would not be revealed. You have the choice not to provide partner names, but it is in the best interest of the public health if you do this.

Results of this research may be presented at research meetings or in publications. If we do this, we will present results averaged across all participants. Your name will never be used.

HIPAA Authorization: The federal Health Insurance Portability and Accountability Act (HIPAA) requires that we get your permission to use health information about you as part of the research. Your permission is also called an authorization. We will use information that you provide directly to us on online surveys as well as from laboratory tests.

We will use your health information to assess the relationship between certain types of interpersonal relationships, health, unwanted sexual experiences, and sexually transmitted infections. The health information that we obtain will be used to report the results of our research to sponsors and federal regulators. Our records may be audited to make sure we are following regulations, policies, and study plans. You should know that university policies let you see and copy health information once the study is completed.

Syracuse University provides oversight of Dr. Carey and his research team in order to protect your rights and to assure that this research is being conducted properly. If there is a concern about this research, Dr. Carey may be required to share a copy of this consent form and receipts with the University's Office of Research Integrity and Protections.

If you decide to participate, your authorization will not expire unless you cancel it. The information collected during your participation (identified only by ID and not by name) will be stored for 3-7 years after the study ends, at which time it will be destroyed. You can cancel your authorization by writing to Dr. Michael Carey at the Center for Health and Behavior, Syracuse University. If you cancel your authorization, you will be removed from the study. Canceling your authorization only affects the use of information collected after Dr. Michael Carey or a member of the research team gets your written request. Information gathered before then may be still be used.

You may refuse to sign this authorization and decline to join the study. You can also tell us you want to leave the study at any time without canceling the authorization.

Payment: We will compensate you for your time. If you complete the survey today, you will be paid \$20. For each of the 12 online surveys you complete, you will receive \$10. For the Health Center visit in April, you will receive \$20. Thus, if you complete all aspects of the study, you can earn \$160. In addition, for each survey you complete, you will be entered in to a drawing for one of two \$50 cash prizes that will be awarded each month from September 2009 to August 2010. If you do not complete any survey or if you withdraw from the study, you will receive payment prorated based on your progress completing the survey. For example, if you withdraw halfway through a survey, you will receive half of the scheduled payment.

Contact: For more information or if you have questions, concerns, or complaints about the research, contact Dr. Michael Carey at (315) 443-2755 or mpcarey@syr.edu, or Dr. Kate Carey at (315) 443-2706 or kbcarey@syr.edu.

If you have any questions about your rights as a research participant; if you have questions, concerns, or complaints you wish to address to someone other than the investigators; or if you cannot reach the investigators, you may contact the Institutional Review Board at Syracuse University at (315) 443-3013 or orip@syr.edu. It is the job of the Institutional Review Board to make sure that your rights are protected.

Voluntary Participation: Participation in this study is voluntary. You are free to choose not to take part, and to withdraw from the study at any time without penalty. You may choose not to answer any questions, and not to provide a urine specimen for testing. Your status at Syracuse University will not be affected in any way by your decision to continue or not with this study.

Signatures/Dates:

I have read the contents of this consent form and have been invited to ask questions. I have received answers to my questions. I give my consent to take part in the study. I have been given a copy of this consent form to keep.

Name (print) _____

Signature _____

Today's date _____ My current age is _____ years old.

Person Obtaining Consent:

The participant has read this form. An explanation of the research was given and she was invited to ask any questions she may have; these questions were answered to her satisfaction. In my judgment, she has demonstrated comprehension of the information.

Name (print) _____

Title _____

Signature _____

Date _____

Appendix Y: Consent Form for PSY205 Students



SYRACUSE UNIVERSITY
CENTER FOR HEALTH AND BEHAVIOR

***Consent Form for the Women's Health Project
for PSY 205 Students***

Investigators: Drs. Kate Carey and Michael Carey.

Introduction: We invite you to take part in a study designed to investigate young women's interpersonal relationships and health behaviors during the first year of college. If you decide to join the study, you will be asked questions about your health behaviors, including dating, sexual behavior, and alcohol use; you will also be asked about your health and overall adjustment. The information that you and other women provide will increase understanding of young women's health as they transition to college life and greater independence. Taking part in this study is voluntary, so you can choose to accept or decline this invitation. This Consent Form explains what we are asking of you if you join. Please feel free to ask any questions today or at any time. If you should have any questions, you can call us at the telephone numbers provided later in this Consent Form.

Purpose of the Study: This study is being done in order to better understand the nature and effects of interpersonal relationships during the first year of college. Therefore, the surveys ask about relationships and health behaviors, including sexual behavior, and how these behaviors influence the health of young women. We are also interested in other health behaviors, such as alcohol use, smoking, sleep, and stress. The results of this study will be used to improve health care and prevention services for young women at colleges and universities across the country. This study is being supported by a grant from the National Institute of Health, and has undergone careful review at the national and local levels.

Study Procedures: If you agree to participate, you will be asked to sign this Consent Form. By signing, you agree that (a) your questions have been answered, and (b) you understand what you are being asked to do. You should ask any questions before signing.

The study will last one year, during which you will be asked to do the following:

1. **Today:** You will be asked to complete a computerized survey. The survey includes questions about sensitive topics, such as your attitudes and beliefs, background, health behaviors (alcohol use, drug use, sexual behavior), and health status. Most people can complete the survey in 30 minutes. The survey is confidential, and your name will not be associated with your survey. We are ethically bound to protect your privacy, and have taken extensive steps to assure your confidentiality. It is important to the integrity of our research that we collect high quality information, and we have set up conditions to optimize

your candid responding. The steps have been approved by a University committee for the protection of research participants.

2. **Once every month for the next year:** At the end of each month, starting in September 2009, you will be emailed a link to a secure online survey. As with today's survey, these online surveys include questions about relationships, health behaviors, stress, and health. We ask that you complete the surveys within 24 hours of receiving the emails. The surveys are brief and will take 10 minutes to complete. Three of the surveys (December 2009, April and August 2010) will be slightly more detailed and will require 20 minutes each. The surveys are strictly confidential, and your name will not be associated with your survey answers. Your privacy will be protected.
3. **In April 2010:** Visit the Syracuse University Health Center and provide a urine sample to be tested for chlamydia and gonorrhea at no cost to you. We will have a private bathroom for your use. To protect your privacy, the sample will be labeled with an identification code, rather than your name. In the event that you test positive for chlamydia or gonorrhea, you will be contacted by the SU Health Center, so that you can receive treatment from a nurse. Both infections can be treated with a single dose of an antibiotic, which will be available at no cost to you.

Number of Participants: We plan to enroll 600 first-year college women in this study.

Benefits of Participation: There are two benefits you can expect. First, you may benefit from the opportunity to reflect on your health behaviors and relationships as you complete the surveys. Second, in April 2010, you will be tested for chlamydia and gonorrhea at no cost to you. If the testing finds an infection, you will be provided with treatment at no cost to you.

Risks of Participation: There are two risks associated with this study. First, you may feel uncomfortable answering some of the questions. If this occurs, you may choose not to answer any question. If you wish, the research assistant can talk with you about your concerns. When you take the online surveys, you may call Dr. Kate Carey (443-2706) or Dr. Michael Carey (443-2755) if discomfort arises while completing those surveys. The second risk involves the risk of disclosing private information to our research team. However, all information that you disclose to our team is confidential, and we are obligated to protect your privacy.

Confidentiality of Records: Your name will appear on this Consent Form, on receipts, and on a form that we use to call you to schedule a return visit in April 2010. Your name will also appear on a list that is used to link your urine specimen for the STD test to you. However, these forms are stored separately from all other research records. Thus, your name will not be associated with the answers you provide to our surveys. Instead, we will use a made-up identification code to protect your privacy. All research records will be kept in a locked cabinet in a locked office, and only the research team will have access to them. All electronic survey data will be stored in password-protected files on password-protected computers, and only the research team will have access to them.

Certificate of Confidentiality: To help us protect your privacy, we have obtained a Certificate of Confidentiality from the National Institutes of Health. With this Certificate, we cannot be forced to disclose information that may identify you, even by a court subpoena, in any federal, state, or local civil, criminal, administrative, legislative, or other proceedings. We will use the Certificate to resist any demands for information that would identify you, except as explained below.

The Certificate cannot be used to resist a demand for information from personnel of the United States Government that is used for auditing or evaluation of Federally funded projects.

You should understand that a Certificate of Confidentiality does not prevent you or a member of your family from voluntarily releasing information about yourself or your involvement in this research. If an insurer, employer, or other person obtains your written consent to receive research information, then the researchers may not use the Certificate to withhold that information.

There are two circumstances where we might be legally obligated to share information that you have provided to us with others.

1. If you told us that you intend to harm yourself or to harm another person, or if you report child abuse or neglect, we would act to protect you, the other person, or the child.
2. If you are diagnosed with either chlamydia or gonorrhea, we will set up an appointment for you at the SU Health Center. Because these two infections are communicable diseases, they must be reported by the medical staff to the Department of Health. In addition, the medical staff may ask you for the names of your sexual partners, so that those partners may be notified of their potential exposure to a sexually transmitted infection. However, partner notification is anonymous; this means that health professionals contact your sexual partners and state that they may have been exposed to an infection, but your name would not be revealed. You have the choice not to provide partner names, but it is in the best interest of the public health if you do this.

Results of this research may be presented at research meetings or in publications. If we do this, we will present results averaged across all participants. Your name will never be used.

HIPAA Authorization: The federal Health Insurance Portability and Accountability Act (HIPAA) requires that we get your permission to use health information about you as part of the research. Your permission is also called an authorization. We will use information that you provide directly to us on online surveys as well as from laboratory tests.

We will use your health information to assess the relationship between certain types of interpersonal relationships, health, unwanted sexual experiences, and sexually transmitted infections. The health information that we obtain will be used to report the results of our research to sponsors and federal regulators. Our records may be audited to make sure we are following regulations, policies, and study plans. You should know that university policies let you see and copy health information once the study is completed.

Syracuse University provides oversight of Dr. Carey and his research team in order to protect your rights and to assure that this research is being conducted properly. If there is a concern about this research, Dr. Carey may be required to share a copy of this consent form and receipts with the University's Office of Research Integrity and Protections.

If you decide to participate, your authorization will not expire unless you cancel it. The information collected during your participation (identified only by ID and not by name) will be stored for 3-7 years after the study ends, at which time it will be destroyed. You can cancel your authorization by writing to Dr. Michael Carey at the Center for Health and Behavior, Syracuse University. If you cancel your authorization, you will be removed from the study. Canceling your authorization only affects the use of information collected after Dr. Michael Carey or a member of the research team gets your written request. Information gathered before then may still be used.

You may refuse to sign this authorization and decline to join the study. You can also tell us you want to leave the study at any time without canceling the authorization.

Compensation: We will compensate you for your time. If you complete the survey today, you will receive 1 hour of credit toward your PSY 205 class research requirement. If you choose to withdraw from the study prior to completing the first survey, your participation credit will be prorated to reflect the amount of time spent participating in the study, rounded up to the nearest half hour (e.g., < 30 minutes of participation = ½ hour of credit). For each of the 12 online surveys you complete, you will receive \$10. For the Health Center visit in April, you will receive \$20. Thus, if you complete all aspects of the study, you can earn 1 hour of PSY 205 research credit and \$140. In addition, for each follow-up survey you complete, you will be entered in to a drawing for one of two \$50 cash prizes that will be awarded each month from September 2009 to August 2010. If you do not complete any survey or if you withdraw from the study, you will receive payment pro-rated based on your progress completing the survey. For example, if you withdraw halfway through a survey, you will receive half of the scheduled payment.

Contact: For more information or if you have questions, concerns, or complaints about the research, contact Dr. Michael Carey at (315) 443-2755 or mpcarey@syr.edu, or Dr. Kate Carey at (315) 443-2706 or kbcarey@syr.edu.

If you have any questions about your rights as a research participant; if you have questions, concerns, or complaints you wish to address to someone other than the investigators; or if you cannot reach the investigators, you may contact the Institutional Review Board at Syracuse University at (315) 443-3013 or orip@syr.edu. It is the job of the Institutional Review Board to make sure that your rights are protected.

Voluntary Participation: Participation in this study is voluntary. You are free to choose not to take part, and to withdraw from the study at any time without penalty. You may choose not to answer any questions, and not to provide a urine specimen for testing. Your status at Syracuse University will not be affected in any way by your decision to continue or not with this study.

You do not need to participate in this study to fulfill your PSY 205 requirement. Other studies besides this one are available through the Department of Psychology, or you may choose another way to fulfill your research requirement (as outlined by your PSY 205 instructor).

Signatures/Dates:

I have read the contents of this consent form and have been invited to ask questions. I have received answers to my questions. I give my consent to take part in the study. I have been given a copy of this consent form to keep.

Name (print) _____

Signature _____

Today's date _____ My current age is _____ years old.

Person Obtaining Consent:

The participant has read this form. An explanation of the research was given and she was invited to ask any questions she may have; these questions were answered to her satisfaction. In my judgment, she has demonstrated comprehension of the information.

Name (print) _____

Title _____

Signature _____

Date _____

Appendix Z: Campus Health Resources

Campus Health Resources for Students

Health Services

- Services: ambulatory care, women's health (breast & pelvic exams, Pap smears, contraceptive management, pregnancy testing, emergency contraception), HIV testing (one free test per year), STD testing, allergy shots, immunizations, lab tests, pharmacy, nutrition counseling, and x-rays
- Open 8:30am–7:00pm Monday & Tuesday; 8:30am–5:00pm Wednesday, Thursday, & Friday; 10:00am–4:00pm Saturday
- Office visits, allergy services, nutrition counseling, and ambulance services are included in the health fee; additional fees apply for lab tests, x-rays, and pharmacy services
- Location: 111 Waverly Avenue
- Phone: (315) 443-9005
- Website: <http://students.syr.edu/health/>
- Email: healthservices@students.syr.edu

Counseling Center

- Short-term counseling for issues such as depression, anxiety, feeling homesick or lonely, family concerns, and relationship issues
- Services: individual counseling, group counseling, psychiatric consultation, referrals, and emergency consultation
- Open 8:30am–5:00pm Monday-Friday; emergency consultation is available 24/7
- All services are completely confidential and free to full-time SU students
- Location: 200 Walnut Place
- Phone: (315) 443-4715
- Website: <http://counselingcenter.syr.edu/>

Psychological Services Center

- Short-term and long-term psychotherapy for mood disorders (e.g., depression), anxiety disorders (e.g., phobias), eating disorders, relationship problems, work stress, and academic difficulties
- Services: individual psychotherapy, ADHD assessments
- Open 9:00am–5:00pm Monday-Friday
- All services are completely confidential
- Initial assessment is free, then \$15 per session for SU students
- Location: 804 University Avenue, Room 201
- Phone: (315) 443-3595
- Website: <http://psychweb.syr.edu/PsyServiceCenter.htm>
- Email: psc@psych.syr.edu

The R.A.P.E Center (Rape: Advocacy, Prevention, & Education)

- Support for survivors of rape, sexual assault, and sexual abuse
- Services: discuss medical, counseling, legal, and judicial options; accompany survivors to medical and judicial appointments; facilitate referrals for follow-up health care, counseling, and academic assistance
- Support and assistance is available 24/7, year-round
- All services are sensitive, confidential, and free to SU students
- Location: 111 Waverly Avenue, lower level
- Phone: (315) 443-7273
- Website: <http://students.syr.edu/rapecenter/>
- Email: espteinj@syr.edu

Appendix AA: Contact Information Form

Women's Health Project
Confidential Contact Information Sheet

First name:	
Middle initial:	
Last name:	
Date of Birth:	
syr.edu email address:	
Preferred email address:	
Cell phone number:	
Campus address:	
Permanent (home) address:	

What is the best way to contact you? (check one)

Email Phone

In the event that we lose contact with you, please provide contact information of someone who always knows how to contact you. We will contact this individual **only if** we cannot get in touch with you via email, phone, and/or campus mail. If we contact this person, we will only ask them to pass along a message to you to call or email us.

Name:	
Email address:	
Phone number:	

SURVEY TOKEN

XXXX

Appendix BB: List of Survey Terms

Women's Health Project Terms

Below are definitions of terms we use in the survey.

Please refer to this page if you forget what we mean by any of these terms.

Confidential kept private by not connecting your name to your responses and by guarding access to your information

Exercise

Moderate exercise walking briskly, biking slower than 10 mph, water aerobics, doubles tennis, ballroom dancing

Vigorous exercise step aerobics, jogging, running, singles tennis, jumping rope, race walking, hiking uphill

Alcohol Use

Standard drink a 12-ounce can or bottle of beer, or a 5-ounce glass of wine, or a shot of liquor either straight or in a mixed drink

Sexual Behavior

Physical intimacy closeness with a partner that might include kissing, sexual touching, or any type of sexual behavior

Oral sex when either partner puts their mouth on the other partner's genitals

Vaginal sex when a man puts his penis in a woman's vagina

Romantic partner someone whom you were dating or in a romantic relationship with at the time of the sexual interaction

Casual partner someone whom you were NOT dating or in a romantic relationship with at the time of the sexual interaction, and there was no mutual expectation of a romantic commitment

Appendix CC: Email with Link to Survey

Example: Initial Email for Wave 3 Survey

(Subject) Women's Health Project Monthly Follow-up Survey

Dear First_Name,

It's now time for you to complete the October survey for the Women's Health Project. It is important that you complete the survey as soon as possible so that your responses are current.

This online survey will take 10-15 minutes.

Payment: After you complete this survey, you will receive a check for \$10 by campus mail.

Raffle: Each month we have a raffle for two \$50 prizes.

If you complete the survey within	your name will be entered in the raffle
24 hours	3 times
24-48 hours	2 times
1 week	1 time

You maximize your chances to win the raffle by completing the survey today. Raffle winners will be emailed by Nov. 12. (Congratulations to First_Name1 and First_Name2, who won last month's raffle prizes!)

HERE is your TOKEN for the survey: XXXX

Here is the link to the survey: LINK

Click on the link and enter your token to get started. Please complete the survey in one sitting because you will NOT be able to save your answers.

We thank you for your participation and your contributions to this important project.

Robyn Fielder, M.S.
Project Coordinator
Women's Health Project

Appendix DD: Script for Phone Call Reminder

Example: Phone call reminder for Wave 5 survey

WHP: Hi, may I speak to <Name>?

Participant: This is <Name>.

WHP: Hi NAME, this is <Name> calling from the Women's Health Project. I am just calling to make sure you received our recent email with the link to December's survey.

Scenario 1

Participant: No I haven't checked my email recently.

WHP: No problem. We just didn't want you to miss the chance to take the survey. The email with the survey link is in your inbox, and you have until Friday to take this month's survey. So as soon as you get a chance to complete it that would be great. Your \$10 check will be delivered to your campus mailbox on the first day of classes.

Participant: Ok sure. I'll try to do it soon.

WHP: Thanks, NAME. Enjoy the rest of your break! Bye.

-----OR-----

Scenario 2

Participant: Yes, I saw it. I just haven't had a chance to take it yet.

WHP: No problem. We know that people's email habits are different over break. So, just as a reminder, you have until Friday to complete this survey, and then your \$10 check will be delivered to your campus mailbox on the first day of classes.

Participant: Ok sounds good.

WHP: Thanks NAME. Enjoy the rest of your break. Bye!

-----OR-----

Scenario 3

Participant: Yes I got it, but I don't want to be in the study. I haven't done any of the surveys since the first time I came in.

WHP: We'd just like you to know that girls who miss one or more surveys can rejoin by taking this survey and the ones that follow; even if you missed some previously, we'd still like you to be part of the study. Would it be ok if we continued to send you reminders for the monthly surveys? Or would you prefer that we stopped sending you emails from the WHP?

Scenario 4

Voicemail: Hi, this is <Name> calling from the Women's Health Project. I am just calling to make sure you received our recent email with the link to December's survey. You have until Friday to take this month's survey, so as soon as you get a chance to complete it that would be great. Your \$10 check will be delivered to your campus mailbox on the first day of classes. Thanks, and enjoy the rest of your break.

Appendix EE: Script for Text Message Reminder

Example: Text message reminder for Wave 11 survey

Please check your email to complete the June Women's Health Project survey by July 7 to get your \$10 check! Thanks for your help!

Appendix FF: Confirmation Email

Example: Confirmation email for Wave 7

(Subject) Women's Health Project Check Delivery

Dear <First Name>,

Thank you for completing the February survey for the Women's Health Project!

You have earned \$10. We have sent a check for \$10 to your campus mailbox. Please check your mailbox this afternoon (Tuesday) or Friday. (Mail is delivered to dorms on Tuesdays and Fridays only.)

You will receive an email with a link to the next survey at the end of March.

If you have any questions about the WHP, call us at 315-443-9942 or email us at whp@chb.syr.edu

Thank you for your contributions to the Women's Health Project! Have a wonderful spring break!

Robyn Fielder, M.S.
Project Coordinator
Women's Health Project

Appendix GG: STD Testing Signup Email

(Subject) Women's Health Project Update

Dear <First_Name>,

We hope you had a great spring break!

It is time for the next phase of the Women's Health Project. As we explained in August, you now have the opportunity to receive free, confidential sexually transmitted disease (STD) testing. For study purposes, everyone is asked to participate in testing regardless of your risk.

To be tested, you need to come to the SU Health Center on a Saturday for a brief appointment. We begin this Saturday (March 27) and continue in April. Your appointment will take only 20 minutes, and you will be paid \$20 for participating.

To increase the benefits of testing, we have modified the collection method. It is now possible to test for three STDs (chlamydia, gonorrhea, and trichomoniasis) using a single self-collected vaginal swab. The swab is easy to use and entirely self-controlled; it can be used any day of the month. Research shows that women prefer the self-swabs to other methods. We will have clear instructions for you, and we will answer any questions you have at your appointment. And, there is no cost to you for this health service.

***To schedule your appointment, please reply to this email with your preferred day and your top 3 time slots.

Days (all are Saturdays): March 27, April 3, April 10

Timeslots: 10:00am, 10:30am, 11:00am, 11:30am, 12:00pm, 12:30pm, 1:00pm, 1:30pm, 2:00pm, 2:30pm, 3:00pm, 3:30pm

We appreciate your participation and look forward to seeing you soon.

Please email us at whp@chb.syr.edu or call us at 315-443-9942 with any questions.

Sincerely,
Robyn Fielder, MS
Project Coordinator
Women's Health Project

Appendix HH: Script for STD Testing Overview

Thank you all for coming in today. We truly appreciate your participation in the study. Your participation is essential to the success of the Women's Health Project – so, thank you!

Today's appointment should only take about 15-20 minutes.

First I will explain the specimen collection method and remind you what will happen if you test positive for an infection. Then we will pass out consent forms for you to read and sign. Ask any questions that you may have. We are happy to answer them.

As we mentioned in the email, after consulting with experts in the field, we have changed the specimen collection method from urine to vaginal swabs. We made this change for 2 reasons. First, testing with swabs is easier for you and provides more accurate results. Second, swab collection allows us to test for not only chlamydia and gonorrhea, but also trichomoniasis. The swab collection method is the latest most up to date testing method.

You will have a private room or bathroom to use while you collect your specimen. Swab collection is quick and does not hurt. The swab is like a long q-tip. You will insert the swab about 2 inches into your vagina, just like you would insert a tampon, and then rotate it for 15-30 seconds. Then you place the swab back in its plastic container and you are done. You can provide a specimen even if you are on your period right now. We'll make sure to get you a bathroom to use, and we have tampons and pads if anyone needs one.

As always, protecting your privacy is of utmost importance to us. Therefore, we will label the swab with an identification code rather than your name.

The specimens will be sent to a lab at Emory University for testing. If your tests all come back negative, you will not hear from us. However, if one of your tests comes back positive, I will call you to discuss the next steps.

Briefly, for some girls this testing may identify infections they didn't know they had. The good news is that all 3 of these infections are treated with one dose of antibiotic, which you can pick up at the SU Pharmacy at no charge to you. In order to receive this free treatment, we will need to give a copy of your test result to SU Health Services. Your medical records at Health Services are confidential. You should also know that chlamydia and gonorrhea must be reported confidentially to the health department. A health department professional may contact you to be sure you received treatment and to assist you with notifying your sexual partners of their need to get tested. Partner notification is anonymous, which means your name would not be used. If this turns out to be necessary, I will explain all the details at that time.

Now we will describe the risks and benefits of testing. There are two very minor risks. First, collecting the specimen may feel awkward. However, it will not hurt. As we said

before, this method has been used extensively and is often preferred to urine testing. We will have easy instructions for you to follow, and we will answer any questions you have.

The second risk is that you are disclosing private information to our research team. As you know, everything involved with the Women's Health Project is confidential, and we are ethically obligated to protect your privacy. Protecting your confidentiality is something we take very seriously.

The benefits are that you will be tested for chlamydia, gonorrhea, and trichomoniasis at no cost to you, and if the testing finds an infection, you will be provided with free treatment. For providing the specimen today, you will receive \$20 cash for your time.

Before you leave today, we would also like to measure your height and weight. This will take only a few extra seconds and will provide important information for the study.

As always, participation in all aspects of the study is voluntary. We encourage everyone to get tested but you may choose not to continue with any or all parts of the study. We respect your decision, and very much appreciate your contribution. This study will provide scientifically reliable information to improve women's health services here at Syracuse and across the country. We thank you again for your participation.

Does anyone have any questions that we can address?

Appendix II: Consent Form for STD Testing

**SYRACUSE UNIVERSITY
CENTER FOR HEALTH AND BEHAVIOR*****Consent
STD Testing Phase of the
Women's Health Project***

Investigators: Dr. Kate Carey and Dr. Michael Carey.

Purpose of the Study: This research project is being done to better understand the effects of interpersonal relationships, health behaviors, and sexual behaviors among women during the first year of college. This study is supported by a grant from the National Institute of Health. All study procedures have undergone careful review at the national and local levels.

Testing Procedures: This form explains updated procedures for sexually transmitted disease (STD) testing as part of the Women's Health Project. If you agree to this free STD testing, you will be asked to provide a biological sample that will be tested for chlamydia, gonorrhea, and trichomoniasis. This sampling will be done at the Syracuse University Health Services (SUHS), where you will have access to a private room or bathroom. You will be provided with a self-collection vaginal swab as well as detailed instructions for how to collect the sample. To protect your privacy, the sample will be labeled with an identification code instead of your name. In the event that you are infected with chlamydia, gonorrhea, or trichomoniasis, you will be contacted by Robyn Fielder, the Project Coordinator, who will explain how to receive treatment for the infection. All three infections can be treated with a single dose of an antibiotic, which will be made available at no cost to you at the Syracuse University Pharmacy.

Number of Participants: 483 first-year college women are enrolled in this study.

Benefits of Participation: There are two benefits. First, you will be tested for chlamydia, gonorrhea, and trichomoniasis at no cost to you. Second, if the testing finds an infection, you will be provided with treatment at no cost to you.

Risks of Participation: There are two risks. First, collecting the sample may feel a little awkward. However, the procedure is not physically uncomfortable, it has been used extensively, and most women prefer this procedure to other sampling approaches. We will provide easy instructions to follow. The research assistants will be available to talk with you if you have questions. The second risk involves the risk of disclosing private information to our research team. However, all information that you disclose to our team is confidential, and we are obligated to protect your privacy.

Confidentiality of Records: Your name will appear on this Consent Form, on receipts, and on a form that we use to contact you in the event that you test positive for an infection. Your name will also appear on a list that is used to link your sample for the STD test to you. However, these forms are stored separately from all other research records. These lists will be kept in a locked cabinet in a locked office, and only the research team will have access to them. Once all data have been collected, the data will be completely de-identified. Results of this research may be presented at research meetings or in publications. If we do this, we will present results averaged across all participants. Your name will never be used.

Certificate of Confidentiality: To further protect your privacy, we have a Certificate of Confidentiality from the National Institutes of Health. With this Certificate, we cannot be forced to disclose information that may identify you, even by a court subpoena, in any federal, state, or local civil, criminal, administrative, legislative, or other proceedings. We will use the Certificate to resist any demands for information that would identify you. However, the Certificate cannot be used to resist a demand for information from personnel of the United States Government that is used for auditing or evaluation of Federally funded projects.

You should understand that a Certificate of Confidentiality does not prevent you or a member of your family from voluntarily releasing information about yourself or your involvement in this research. If an insurer, employer, or other person obtains your written consent to receive research information, then the researchers may not use the Certificate to withhold that information.

Limits to Confidentiality: There are special circumstances where we might be legally required to share information that you have provided to us with others.

1. If you told us that you intend to harm yourself or to harm another person, or if you report child abuse or neglect, we would act to protect you, the other person, or the child.
2. If you are diagnosed with chlamydia or gonorrhea, we are required to report these infections and your contact information to the Onondaga County Health Department. This information is confidential. The Health Department may contact you to ask you for the names of your sexual partners, so that those partners may be notified of their potential exposure to a sexually transmitted infection. Such partner notification is anonymous. This means that health professionals contact your sexual partners and state that they may have been exposed to an infection; your name would not be revealed. You have the choice whether or not to provide partner names but it is in the best interest of the public health if you do this.

HIPAA Authorization: The federal Health Insurance Portability and Accountability Act (HIPAA) requires that we get your permission to use health information about you as part of the research. Your permission is also called an authorization. We will use information that you provide directly to us on online surveys as well as from laboratory tests.

We will use your health information to assess the relationship between certain types of interpersonal relationships, health, unwanted sexual experiences, and sexually transmitted infections. The health information that we obtain will be used to report the results of our research to sponsors and federal regulators. Our records may be audited to make sure we are following regulations, policies, and study plans. University policies let you see and copy health information once the study is completed.

If you are diagnosed with chlamydia, gonorrhea, or trichomoniasis and you would like to receive free treatment at Syracuse University Health Services (SUHS) and Pharmacy, paid for by the Women's Health Project, we will need to share documentation of your positive test result(s) with SUHS. Medical professionals must have documentation of the diagnosis in order to provide treatment. The diagnosis would be noted in your confidential medical record. The Project Coordinator and/or SUHS staff will contact you to ask about drug allergies, following standard clinical practice. You will receive a prescription for the appropriate antibiotic to treat the infection from a medical provider at SUHS; the prescription will be sent directly to the Syracuse University Pharmacy, where you can pick it up. There will be no charge to you for the prescription(s). Provision of treatment would also be noted in your medical record, following standard clinical practice.

Syracuse University Health Services is a HIPAA-covered entity, and your medical records at SUHS are confidential. Thus, your medical records at SUHS are protected under the Federal HIPAA law and cannot be disclosed without your written consent except as otherwise specifically provided by law.

If you decide to participate, your authorization will not expire unless you cancel it. The information collected during your participation (identified only by ID and not by name) will be stored for 3 years after the study ends, at which time it will be destroyed. You can cancel your authorization by writing to Dr. Michael Carey at the Center for Health and Behavior, Syracuse University. If you cancel your authorization, you will be removed from the study. Canceling your authorization only affects the use of information collected after Dr. Michael Carey or a member of the research team gets your written request. Information gathered before then may still be used.

You may refuse to sign this authorization and continue with the survey portion of the study. You can also tell us you want to leave the study at any time without canceling the authorization.

Syracuse University provides oversight of Drs. Kate and Michael Carey and their research team in order to protect your rights and to assure that this research is being conducted properly. If there is a concern about this research, Dr. Michael Carey may be required to share a copy of this consent form and receipts with the University's Office of Research Integrity and Protections.

Payment: For visiting SUHS and providing a sample for STD testing, you will receive \$20.

Contact: For more information or if you have questions, concerns, or complaints about the research, contact Dr. Michael Carey at (315) 443-2755 or mpcarey@syr.edu, or Dr. Kate Carey at (315) 443-2706 or kbcarey@syr.edu. If you have any questions about your rights as a research participant; if you have questions, concerns, or complaints you wish to address to someone other than the investigators; or if you cannot reach the investigators, you may contact the Institutional Review Board at Syracuse University at (315) 443-3013 or orip@syr.edu. It is the job of the Institutional Review Board to make sure that your rights are protected.

Voluntary Participation: Participation in the STD testing is voluntary. You are free to choose not to take part, and to withdraw from the study or STD testing at any time without penalty. Your status at Syracuse University will not be affected in any way by your decision regarding STD testing.

Authorization for Release of Test Results: Please initial next to one of the following two options to indicate whether or not you wish to have the results of this STD testing provided to the Syracuse University Health Services.

_____ If I should test positive for chlamydia, gonorrhea, or trichomoniasis, then I authorize the Women’s Health Project to provide the results of my testing to Syracuse University Health Services. I understand that this is necessary for me to receive free treatment for this infection through the Women’s Health Project.

_____ I do NOT authorize the staff of the Women’s Health Project to provide the results of my testing for sexually transmitted diseases to Syracuse University Health Services. This means that if I test positive for chlamydia, gonorrhea, or trichomoniasis, I will not be eligible to receive free treatment through the Women’s Health Project and that I will need to seek treatment through the Onondaga County Health Department or through my own health care provider at my own expense.

Participant Consent: Please sign below if you wish to participate in the STD testing phase of the Women’s Health Project.

By signing below, I indicate that I have read the contents of this consent form and have been invited to ask questions. I have received answers to my questions. I give my consent to take part in the study. I have been given a copy of this consent form to keep.

Name (print) _____

Signature _____

Today’s date _____ My current age is _____ years old.

* * * * *

Person Obtaining Consent: The participant has read this form. An explanation of the research was given and she was invited to ask any questions she may have; these questions were answered to her satisfaction. In my judgment, she has demonstrated comprehension of the information.

Name (print) _____

Title _____

Signature _____

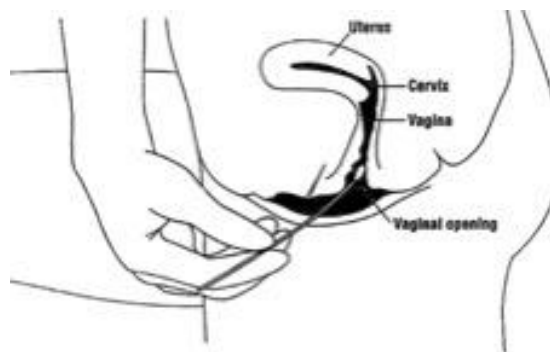
Date _____

Appendix JJ: Instructions for STD Testing

Women's Health Project

Instructions for Self-Collected Vaginal Swab

1. Wash your hands with soap and water before and after collecting your swab.
2. Decide which position (standing, squatting, or sitting) is most comfortable for you. Pull down your pants/underwear.
3. Remove the swab from the plastic sleeve by grasping the pink cap. Do not set the swab or sleeve down on anything while performing the collection.
4. Insert the swab about 2 inches into your vaginal canal. This is similar to the way you would insert a tampon. There should be no discomfort.
5. Rotate the swab for 15-30 seconds.
6. Carefully withdraw the swab from your vagina.
7. Immediately place the swab back in the plastic sleeve. Push the pink cap in to make sure the swab is securely inside the plastic sleeve.
8. Place the swab kit (swab and sleeve) in the brown privacy bag.
9. Return the bag to WHP staff.



Appendix KK: Follow-up Email for STD Testing

(Subject) Thank you for participating

Dear <First_Name>,

Thank you for attending the STD testing session on Saturday. The results will take 1-2 weeks to come in.

Remember, you will NOT hear from us if all of your tests are negative (if you do not have an infection). If any of your tests are positive (indicating an infection), I will call you to discuss how to obtain treatment.

If you have any questions, please call us at 315-443-9942 or email us at whp@chb.syr.edu.

We appreciate your participation in all aspects of the study.

Sincerely,
Robyn Fielder, MS
Project Coordinator
Women's Health Project

Appendix LL: Script for Notification of Positive STD Test Results

Scenario 1

If participant does not answer, if voicemail type message that seems private, leave message:

Hi, this message is for <name>. This is Robyn Fielder calling from the Women's Health Project. Please give me a call back at your earliest convenience. Thanks.

Scenario 2

If participant does not answer, if it sounds like an answering machine that could be public or is another person answering the phone, do not leave message. Try again later. To protect participants' privacy, do not leave a message identifying myself (e.g., in case two participants are roommates and the other roommate might hear the message and infer why I was calling her roommate).

Scenario 3

If participant answers, proceed as below:

Hi <name>, this is Robyn Fielder calling from the Women's Health Project. Is now a good time to talk?

If participant says no:

Okay, I'd be happy to call you back at a more convenient time. What is a better time for you?

If participant says yes, proceed as below:

I'm calling with the results from the STD testing you came in for on DATE. As you know, you provided a vaginal swab that was tested for 3 common STDs, chlamydia, gonorrhea, and trichomoniasis. Unfortunately, your test showed that you had _____. This/these infection(s) is/are sexually transmitted. The good news is that _____ is easily treatable.

You may not have any symptoms. It is common for individuals with _____ to not have any symptoms. Or you may have mild symptoms, such as vaginal itching or pain, vaginal discharge, or pain or burning during urination. _____ can lead to symptoms even if you do not have them now. [omit for trichomoniasis] If this is not treated, it could cause pelvic inflammatory disease, which may cause abdominal or pelvic pain and cause infertility.

Have you experienced any symptoms?

If no:

Proceed to treatment.

If yes:

You may want to make a women's health appointment at SU Health Services, so a medical provider can assess your symptoms and make sure everything is okay. Medical care at Health Services is free for full-time students. (Part-time students pay a \$25 fee per

visit.) If laboratory tests were necessary, there would be a fee for those unless your insurance covered them. Let me tell you about how to receive treatment for this infection. If participant consented to UHS record release:

As I explained at the testing session, we will need to give a copy of your test result to SU Health Services. This is required so that you can receive treatment. Your medical record at SU Health Services is confidential and protected under the federal HIPAA privacy law. Not even your parents can access your medical records without your express written consent.

If participant did not consent to UHS record release:

You did not consent to our sharing your test results with SU Health Services, which is required for you to receive free treatment through the Women's Health Project. There are two options you could pursue for treatment. We can provide you with a copy of your test result, and you could go to your physician. Your physician can write you a prescription, and you can pay for the prescription at your own expense. Insurance may cover most or all of the cost. Or you can take a copy of your test results to the Onondaga County Health Department's STD Clinic. The health department provides free treatment. The clinic is held Mondays, Tuesdays, Thursdays, and Fridays in the basement of the John H. Mulroy Civic Center downtown. The phone number for the clinic is 315-435-3240.

It is very important to get the appropriate treatment for this infection. The treatment for ____ is a single dose of an antibiotic. Through the Women's Health Project, you will receive free treatment. A physician at SU Health Services will write a prescription for you. You can pick up the prescription at the SU Pharmacy, which is located in Health Services, at your convenience.

Do you have any drug allergies?

If no:

Okay, we like to check to make sure.

If yes:

Okay, I will let the physician know, and she can make sure you get an appropriate prescription.

The prescription will be ready for you by _____. So you can stop by the SU Pharmacy that day or the next day to pick up your prescription. It is important to get your treatment soon. The pharmacy is open from 9-7 on Monday and Tuesday, 9-5 on Wednesday, Thursday, and Friday, and 10-4 on Saturday.

Do you have any questions about how to receive your treatment?

Would you like a copy of your test results?

If no:

Okay.

If yes:

I will mail a copy of your results in a sealed envelope to your campus mailbox, or you can pick it up in person if you prefer. Which do you prefer?

You may want to make an appointment at SU Health Services or the Health Department to be tested for additional STDs. STDs sometimes occur together.

You should not have any sexual contact until you are treated for this infection.

You should inform your current and past sexual partners that you have this infection. They need to be tested for _____. If they also have the infection, they need to be treated--both for their sake and so you will not be re-infected.

[omit for trichomoniasis only]

As I explained at the testing session, _____ is a reportable infection. This means that your infection and contact information must be reported confidentially to the Onondaga County Health Department. You may or may not be contacted by a health department professional. They want to make sure that everyone who has _____ receives appropriate treatment. They may also ask you for the names of your sexual partners, so they can assist you with partner notification. Partner notification is anonymous, which means a health department professional may contact your partners and state that they may have been exposed to _____. But your name would not be revealed, so your privacy will be protected. You have the choice whether or not to provide your partners' names, but it is in the best interest of public health if you do.

Do you have any questions about our report to the health department?

If participant asks what information we are reporting:

We are required to report your name, infection, test date, address, race, date of birth, phone number, and the name and dosage of which medication you are prescribed for this infection.

You should know that after you are treated, it is possible to get re-infected with _____. Therefore, the Centers for Disease Control and Prevention, the CDC, recommends that people use condoms during all sexual acts in order to decrease the likelihood of becoming re-infected.

So to summarize, you should stop by the SU Pharmacy on _____ to pick up your prescription, which you should take as directed. You should not have sexual contact until you have been treated. You should also inform your sexual partners of your infection and encourage them to get tested.

Do you have any questions I can answer?

If you think of any questions, don't hesitate to contact me. You can call me at 315-443-9942 or email me at whp@chb.syr.edu.

Table 1

Timeline of Study Measures

Construct Wave	1	2	3	4	5	6	7	8	9	10	11	12	13
<i>Demographics</i>													
Age, race/ethnicity, Hispanic origin, sexual orientation, religiosity	•												
Relationship status	•	•	•	•	•	•	•	•	•	•	•	•	•
Sorority membership							•						
SES, US citizenship, attended high school in US								•					
Alcohol use	•												
<i>Sexual Behavior</i>													
Hookups	•	•	•	•	•	•	•	•	•	•	•	•	•
Romantic encounters	•	•	•	•	•	•	•	•	•	•	•	•	•
<i>Outcomes</i>													
Depression	•	•	•	•	•	•	•	•	•	•	•	•	•
Anxiety	•	•	•	•	•	•	•	•	•	•	•	•	•
Negative affect	•	•	•	•	•	•	•	•	•	•	•	•	•
Positive affect	•	•	•	•	•	•	•	•	•	•	•	•	•
Positive affect	•	•	•	•	•	•	•	•	•	•	•	•	•
Life satisfaction	•				•				•				•
Self-esteem	•				•				•				•
Sexual victimization	•				•				•				•
Self-report STD diagnosis	•				•				•				•
Laboratory-confirmed STD diagnosis									•				

Note. SES = socioeconomic status; US = United States; STD = sexually transmitted disease.

Table 2

Constructs, Measures, Variables Yielded, and Data Analytic Approach

Construct	Measure	Waves Measured	Variable(s) Yielded	Role in Analysis	Type of Analysis
Demographics	Demographic questions	1	Age	GMH/SV covariates	Descriptive (Depended on variables: chi-square, ANOVA, LR, regression, between samples <i>t</i> -tests)
		1	Race		
		1	Hispanic ethnicity		
		1	Sexual orientation		
		8	SES		
		7	Greek membership		
		1	Relationship status at baseline		
		8	US citizen		
		8	High school in US		
1	Religiosity				
Alcohol use	Daily drinking questionnaire	1	Baseline typical drinks per week in past month	SV covariate	LR
		S	Baseline alcohol use (y/n) in past month	SV covariate	LR

Table 2 Continues

Table 2 Continued

Construct	Measure	Waves Measured	Variable(s) Yielded	Analysis	Data Analyses
<i>Hookup Behavior</i>					
Oral sex (performed) with casual partner	Lifetime hookup questions	1	Pre-college number of events		Descriptive
		1	Pre-college number of partners		Descriptive
		S	Pre-college hookup behavior (y/n)		Descriptive
Oral sex (performed) with casual partner	Monthly hookup questions	2-13	Number of events in past month		
		2-13	Number of partners in past month		
		S	Hookup behavior (y/n) in past month	GMH predictor	LGCM
		S	Hookup behavior (y/n) during study	GMH/Dep/SV predictor	LGCM /LR/LR
		S	Number of events during study	Dep/SV/ STD predictor	LR
Oral sex (received) with casual partner	Lifetime hookup questions	1	Pre-college number of events		Descriptive
		1	Pre-college number of partners		Descriptive
		S	Pre-college hookup behavior (y/n)		Descriptive
Oral sex (received) with casual partner	Monthly hookup questions	2-13	Number of events in past month		
		2-13	Number of partners in past month		
		S	Hookup behavior (y/n) in past month	GMH predictor	LGCM
		S	Hookup behavior (y/n) during study	GMH/Dep/SV predictor	LGCM /LR/LR
		S	Number of events during study	Dep/SV/ STD predictor	LR
Vaginal sex with casual partner	Lifetime hookup questions	1	Pre-college number of events		
		1	Pre-college number of partners		
		S	Pre-college hookup behavior (y/n)		
Vaginal sex with casual partner	Monthly hookup questions	2-13	Number of events in past month		
		2-13	Number of partners in past month		
		S	Hookup behavior (y/n) in past month	GMH predictor	LGCM
		S	Hookup behavior (y/n) during study	GMH/Dep/SV predictor	LGCM /LR/LR
		S	Number of events during study	Dep/SV/ STD predictor	LR

Table 2 Continues

Table 2 Continued

Construct	Measure	Waves Measured	Variable(s) Yielded	Analysis	Data Analyses
Any sex (oral or vaginal) with casual partner	Monthly hookup questions	S	Any hookup behavior (y/n) during study	Dep/STD predictor	Chi-square, LR
		S	Lifetime hookup behavior (y/n)	STD predictor	Chi-square, LR
		S	Sexual behavior pattern during study	STD predictor	Chi-square, LR
		S	Lifetime sexual behavior pattern	STD predictor	Chi-square, LR
<i>Romantic Behavior</i>					
Oral sex (performed) with romantic partner	Lifetime romantic questions	1	Pre-college number of events		Descriptive
		1	Pre-college number of partners		Descriptive
		S	Pre-college romantic behavior (y/n)		Descriptive
Oral sex (performed) with romantic partner	Monthly romantic questions	2-13	Number of events in past month		
		2-13	Number of partners in past month		
		S	Romantic behavior (y/n) in past month	GMH covariate	LGCM
		S	Romantic behavior (y/n) during study	GMH/Dep/SV covariate	LGCM /LR/LR
		S	Number of events during study	SV/Dep/STD covariate	LR
Oral sex (received) with romantic partner	Lifetime romantic questions	1	Pre-college number of events		Descriptive
		1	Pre-college number of partners		Descriptive
		S	Pre-college romantic behavior (y/n)		Descriptive
Oral sex (received) with romantic partner	Monthly romantic questions	2-13	Number of events in past month		
		2-13	Number of partners in past month		
		S	Romantic behavior (y/n) in past month	GMH covariate	LGCM
		S	Romantic behavior (y/n) during study	GMH/Dep/SV covariate	LGCM /LR/LR
		S	Number of events during study	SV/Dep/STD covariate	LR
Vaginal sex with romantic partner	Lifetime romantic questions	1	Pre-college number of events		Descriptive
		1	Pre-college number of partners		Descriptive
		S	Pre-college romantic behavior (y/n)		Descriptive

Table 2 Continues

Table 2 Continued

Construct	Measure	Waves Measured	Variable(s) Yielded	Analysis	Data Analyses
Vaginal sex with romantic partner	Monthly romantic questions	2-13	Number of events in past month		
		2-13	Number of partners in past month		
		S	Romantic behavior (y/n) in past month	GMH covariate	LGCM
		S	Romantic behavior (y/n) during study	GMH/Dep/SV covariate	LGCM /LR/LR
		S	Number of events during study	SV/Dep/STD covariate	LR
Any sex (oral or vaginal) with romantic partner	Monthly romantic questions	S	Any romantic behavior (y/n) during study	Dep/STD covariate	LR
		S	Lifetime romantic behavior (y/n)	STD covariate	LR
<i>Mental Health</i>					
Anxiety	GAD-7	1-13	Summary score for anxiety symptoms	GMH outcome	LGCM
Depression	PHQ-9	1-13	Summary score for depressive symptoms	GMH outcome	LGCM
		1	Baseline depression diagnosis (y/n)	Dep covariate	LR
		S	Depression diagnosis (y/n) in past month		Descriptive
		S	Depression diagnosis (y/n) during study	Dep outcome	LR
	1 question	3	Pre-college depression diagnosis (y/n)	Dep covariate	LR
Negative affect	I-PANAS-SF	1-13	Summary score for negative affect	GMH outcome	LGCM
Perceived stress	PSS-4	1-13	Summary score for perceived stress	GMH outcome	LGCM
Positive affect	I-PANAS-SF	1-13	Summary score for positive affect	GMH outcome	LGCM
Life satisfaction	SWLS	1, 5, 9, 13	Summary score for life satisfaction	GMH outcome	LGCM
Self-esteem	RSES	1, 5, 9, 13	Summary score for self-esteem	GMH outcome	LGCM

Table 2 Continues

Table 2 Continued

Construct	Measure	Waves Measured	Variable(s) Yielded	Analysis	Data Analyses
<i>Sexual Victimization</i>					
Oral sex SV	Adapted SES	1	Pre-college number of oral sex SV events	SV covariate	LR
		S	Pre-college oral sex SV (y/n)	SV covariate	LR
		5, 9, 13	Number of oral sex SV events in past 4 months		
		S	Number of oral sex SV events during study		Descriptive
		S	Oral sex SV (y/n) during study	SV outcome	LR
Attempted vaginal rape	Adapted SES	1	Pre-college number of attempted rape events	SV covariate	LR
		S	Pre-college attempted rape (y/n)	SV covariate	LR
		5, 9, 13	Number of attempted rape events in past 4 months		
		S	Number of attempted rape events during study		Descriptive
		S	Attempted rape (y/n) during study	SV outcome	LR
Completed vaginal rape	Adapted SES	1	Pre-college number of completed rape events	SV covariate	LR
		S	Pre-college completed rape (y/n)	SV covariate	LR
		5, 9, 13	Number of completed rape events in past 4 months		
		S	Number of completed rape events during study		Descriptive
		S	Completed rape (y/n) during study	SV outcome	LR
Any SV	Adapted SES	1	Pre-college number of any SV events	Used to determine	ANOVA,
		S	Pre-college any SV (y/n)	SV covariates	regression

Table 2 Continues

Table 2 Continued

Construct	Measure	Waves Measured	Variable(s) Yielded	Analysis	Data Analyses
<i>Sexually Transmitted Diseases</i>					
STD testing history	STD testing questions	1	Pre-college STD testing (y/n)		Descriptive
		5, 9, 13	STD testing in past 4 months (y/n)		Descriptive
		9	Participated in WHP STD testing (y/n)		Descriptive
		S	Lifetime STD testing (y/n)		Descriptive
STD diagnosis	STD diagnosis questions	1	Pre-college STD diagnosis (y/n)		Descriptive
		5, 9, 13	Self-reported STD diagnosis (y/n) in past 4 months		Descriptive
		9	Biologically-confirmed STD diagnosis (y/n)		Descriptive
		S	STD diagnosis (y/n) during study	STD outcome	Chi-square, LR
		S	Lifetime STD diagnosis (y/n)	STD outcome	Chi-square, LR

Note. SES = socioeconomic status; US = United States; GMH = general mental health; SV = sexual victimization; ANOVA = analysis of variance; LR = logistic regression; S = summary variable calculated from other variables; y/n = dichotomous variable; LGCM = latent growth curve modeling; Dep = depression diagnosis analysis; STD = sexually transmitted diseases.

Table 3

Context of Study Timeline

Wave	Start Date	Context
1	Last day of August 2009	Participants recently moved to campus
2	Last day of September 2009	
3	Last day of October 2009	
4	Last day of November 2009	
5	Last day of December 2009	Participants at home for winter break
6	Last day of January 2010	
7	Last day of February 2010	
8	Last day of March 2010	
9	Last day of April 2010	Participants preparing for final exams
10	Last day of May 2010	Participants at home for summer break
11	Last day of June 2010	Participants at home for summer break
12	Last day of July 2010	Participants at home for summer break
13	Last day of August 2010	Participants back on campus for less than 1 week

Table 4

Descriptive Statistics and Psychometric Properties for Anxiety

Wave	<i>n</i>	<i>M</i> (<i>SD</i>)	Median	Range		α	Skew	Kurtosis
				Potential	Observed			
1	483	6.07 (4.32)	5	0-21	0-20	.86	1.01	0.71
2	467	5.89 (4.76)	5	0-21	0-21	.90	1.14	1.01
3	459	5.63 (4.88)	4	0-21	0-21	.91	1.13	0.92
4	457	5.92 (4.89)	5	0-21	0-21	.91	1.11	1.09
5	438	4.65 (4.54)	3	0-21	0-19	.91	1.12	0.80
6	440	4.46 (4.23)	3.25	0-21	0-18	.90	1.20	1.06
7	444	5.51 (4.89)	5	0-21	0-21	.91	1.08	0.82
8	426	5.34 (4.50)	4	0-21	0-20	.90	1.05	0.73
9	412	5.69 (4.85)	5	0-21	0-21	.91	1.02	0.66
10	403	3.92 (4.39)	3	0-21	0-18	.91	1.33	1.14
11	392	4.08 (4.18)	3	0-21	0-18	.89	1.30	1.30
12	402	4.16 (4.17)	3	0-21	0-18	.90	1.24	1.09
13	423	4.77 (4.72)	3	0-21	0-20	.91	1.21	1.00

Table 5

Descriptive Statistics and Psychometric Properties for Depression

Wave	<i>n</i>	<i>M</i> (<i>SD</i>)	Median	Range		α	Skew	Kurtosis
				Potential	Observed			
1	483	5.44 (4.10)	5	0-27	0-19	.81	1.18	1.31
2	467	5.95 (4.59)	5	0-27	0-21	.85	1.03	0.74
3	459	5.89 (5.04)	5	0-27	0-22	.87	1.18	1.10
4	457	6.12 (5.15)	5	0-27	0-23	.87	1.11	1.02
5	438	4.99 (4.78)	3	0-27	0-21	.89	1.22	1.10
6	440	4.86 (4.73)	3	0-27	0-20	.89	1.29	1.11
7	444	5.60 (4.79)	5	0-27	0-21	.86	1.05	0.70
8	426	5.48 (4.73)	4.5	0-27	0-20	.89	1.12	0.92
9	412	5.76 (4.99)	4.5	0-27	0-22	.88	1.12	0.84
10	403	3.90 (4.39)	2	0-27	0-18	.88	1.44	1.59
11	392	3.99 (4.46)	3	0-27	0-19	.89	1.58	2.15
12	402	4.42 (4.56)	3	0-27	0-19	.88	1.33	1.25
13	423	4.21 (4.58)	3	0-27	0-19	.89	1.36	1.28

Table 6

Descriptive Statistics and Psychometric Properties for Negative Affect

Wave	<i>n</i>	<i>M</i> (<i>SD</i>)	Median	Range		α	Skew	Kurtosis
				Potential	Observed			
1	483	12.59 (3.52)	12	5-25	6-24	.68	0.40	-0.27
2	468	11.39 (3.78)	11	5-25	5-23	.76	0.79	0.42
3	458	10.55 (3.70)	10	5-25	5-22	.76	0.76	0.32
4	457	10.69 (4.12)	10	5-25	5-24	.83	0.85	0.29
5	438	10.84 (4.14)	10	5-25	5-23	.82	0.83	0.11
6	439	9.71 (3.93)	9	5-25	5-22	.83	1.08	0.73
7	444	10.53 (4.19)	10	5-25	5-24	.84	0.86	0.25
8	427	10.66 (3.90)	10	5-25	5-23	.82	0.76	0.12
9	412	10.95 (4.06)	10	5-25	5-24	.81	0.69	-0.03
10	401	9.26 (3.99)	8	5-25	5-22	.86	1.18	0.96
11	392	9.21 (3.98)	8	5-25	5-22	.85	1.15	0.74
12	402	9.48 (3.91)	9	5-25	5-22	.84	1.07	0.73
13	423	10.37 (4.23)	9	5-25	5-23	.84	0.79	-0.17

Table 7

Descriptive Statistics and Psychometric Properties for Perceived Stress

Wave	<i>n</i>	<i>M</i> (<i>SD</i>)	Median	Range		α	Skew	Kurtosis
				Potential	Observed			
1	483	6.23 (2.64)	6	0-16	0-14	.69	0.11	-0.03
2	468	6.14 (3.02)	6	0-16	0-15	.73	0.26	-0.24
3	458	6.18 (3.13)	6	0-16	0-15	.76	0.15	-0.18
4	457	6.06 (3.22)	6	0-16	0-16	.76	0.10	-0.47
5	438	5.72 (3.32)	6	0-16	0-16	.80	0.39	-0.15
6	440	5.29 (3.26)	5	0-16	0-16	.76	0.36	-0.17
7	444	5.86 (3.53)	6	0-16	0-16	.80	0.30	-0.37
8	426	5.69 (3.23)	6	0-16	0-16	.78	0.10	-0.52
9	412	5.95 (3.29)	6	0-16	0-16	.76	0.19	-0.29
10	403	4.99 (3.23)	5	0-16	0-15	.73	0.28	-0.35
11	391	4.87 (3.42)	5	0-16	0-15	.78	0.56	-0.10
12	402	4.92 (3.43)	4	0-16	0-16	.79	0.56	0.01
13	423	5.51 (3.42)	5	0-16	0-15	.80	0.32	-0.28

Table 8

Descriptive Statistics and Psychometric Properties for Positive Affect

Wave	<i>n</i>	<i>M</i> (<i>SD</i>)	Median	Range		α	Skew	Kurtosis
				Potential	Observed			
1	483	18.45 (3.48)	19	5-25	9-25	.77	-0.36	-0.29
2	468	17.46 (3.68)	18	5-25	6-25	.78	-0.31	0.02
3	458	15.89 (4.07)	16	5-25	5-25	.81	-0.09	-0.50
4	457	15.94 (4.12)	16	5-25	5-25	.82	-0.13	-0.19
5	438	15.88 (4.40)	16	5-25	5-25	.83	-0.17	-0.40
6	439	15.91 (4.37)	16	5-25	5-25	.85	-0.18	-0.23
7	444	15.48 (4.56)	15	5-25	5-25	.85	-0.02	-0.55
8	427	16.12 (4.20)	16	5-25	5-25	.83	-0.04	-0.45
9	412	15.72 (4.54)	16	5-25	5-25	.86	-0.10	-0.50
10	401	14.80 (4.78)	15	5-25	5-25	.86	0.01	-0.56
11	392	14.94 (4.72)	15	5-25	5-25	.84	-0.03	-0.59
12	402	15.12 (4.49)	15	5-25	5-25	.83	0.09	-0.38
13	423	16.04 (4.47)	16	5-25	5-25	.85	-0.12	-0.48

Table 9

Descriptive Statistics and Psychometric Properties for Life Satisfaction

Wave	<i>n</i>	<i>M</i> (<i>SD</i>)	Median	Range		α	Skew	Kurtosis
				Potential	Observed			
1	483	25.26 (6.56)	26	5-35	5-35	.89	-0.71	-0.01
5	437	24.62 (7.05)	25	5-35	5-35	.92	-0.68	-0.02
9	411	24.91 (6.86)	26	5-35	5-35	.92	-0.59	-0.20
13	422	25.33 (6.91)	27	5-35	5-35	.93	-0.79	0.18

Table 10

Descriptive Statistics and Psychometric Properties for Self-Esteem

Wave	<i>n</i>	<i>M</i> (<i>SD</i>)	Median	Range		α	Skew	Kurtosis
				Potential	Observed			
1	483	32.77 (5.50)	34	10-40	15-40	.90	-0.69	-0.14
5	438	32.00 (6.27)	33	10-40	13-40	.93	-0.56	-0.37
9	411	31.87 (6.19)	33	10-40	13-40	.92	-0.46	-0.61
13	423	32.55 (5.70)	33	10-40	15-40	.90	-0.53	-0.40

Table 11

Correlations among Mental Health Outcomes at Baseline

Variable	Anxiety	Depression	Negative affect	Perceived stress	Positive affect	Life satisfaction	Self-esteem
Anxiety	–	.65**	.61**	.55**	-.12*	-.36**	-.42**
Depression		–	.46**	.56**	-.20**	-.47**	-.55**
Negative affect			–	.54**	-.00	-.37**	-.44**
Perceived stress				–	-.27**	-.59**	-.60**
Positive affect					–	.30**	.33**
Life satisfaction						–	.64**
Self-esteem							–

Note. $N = 483$.

* $p < .01$. ** $p < .001$.

Table 12

Demographic Characteristics

	<i>N</i>	<i>n</i>	%
Race/ethnicity	483		
Asian		55	11
Black		46	10
White		318	66
Other/multiple races		64	13
Hispanic/Latina	482		
Yes		45	9
No		437	91
Sexual orientation	480		
Heterosexual		460	96
Other		20	4
Relationship status at baseline	481		
Single		341	71
In a relationship		140	29
Sorority member	445		
Yes		101	23
No		344	77
United States citizen	428		
Yes		382	89
No		46	11
Attended high school in USA	428		
Yes		418	98
No		10	2

Note. *N* for variable is the number of participants who completed that wave's survey and did not leave the question blank.

Table 13

Total Number of Surveys Completed

Total	<i>n</i>	%
1	5	1
2	3	1
3	7	2
4	3	1
5	5	1
6	8	2
7	12	3
8	7	2
9	14	3
10	17	4
11	31	6
12	62	13
13	309	64

Note. $N = 483$ participants who completed baseline surveys. Percentage total exceeds 100 due to rounding.

Table 14

Survey Completion Rates and Descriptive Statistics for Completion Times

Wave	Completion Rates				Completion Times		
	Number of Completers	% of T1 N	Number of Non-Completers	% of T1 N Lost to Attrition	Mean (SD)	Median	Range
1	483	100	0	0	--	--	--
2	468	97	15	3	17.7 (12.3)	15.0	5-162
3	459	95	24	5	17.4 (22.5)	13.0	4-387
4	458	95	25	5	13.9 (14.1)	10.5	2-169
5	439	91	44	9	26.4 (38.3)	17.0	6-524
6	442	92	41	8	18.3 (24.8)	13.0	4-428
7	444	92	39	8	15.2 (24.3)	10.0	2-366
8	429	89	54	11	25.8 (54.5)	15.0	2-808
9	412	85	71	15	25.5 (75.8)	15.0	4-1138
10	403	83	80	17	23.4 (80.6)	12.0	4-1080
11	392	81	91	19	23.4 (85.7)	13.0	5-1434
12	402	83	81	17	21.2 (71.2)	11.0	4-1039
13	424	88	59	12	39.9 (120.1)	21.0	6-1345

Note. Completion times are in minutes. Completion time was not captured at wave one.

Table 15

Proportion Engaging in Oral Sex (Performed) Hookup Behavior by Wave

Wave	N	Yes		No	
		n	%	n	%
2	465	48	10	417	90
3	459	55	12	404	88
4	457	44	10	413	90
5	436	44	10	392	90
6	441	41	9	400	91
7	443	39	9	404	91
8	427	44	10	383	90
9	412	43	10	369	90
10	402	51	13	351	87
11	392	19	5	373	95
12	401	36	9	365	91
13	424	43	10	381	90

Note. Proportion of participants who did and did not engage in oral sex (performed) hookup behavior in the last month at each wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 16

Number of Oral Sex (Performed) Hookup Events and Partners by Wave

Wave	All participants					Participants with hookups			
	<i>N</i>	Mean	<i>SD</i>	Median	Range	<i>n</i>	Mean	<i>SD</i>	Median
Number of Events									
2	465	0.2	0.6	0	0-3	48	1.7	0.8	1
3	459	0.2	0.7	0	0-3	55	1.9	0.9	2
4	457	0.1	0.4	0	0-2	44	1.4	0.5	1
5	436	0.2	0.5	0	0-3	44	1.5	0.7	1
6	441	0.2	0.6	0	0-3	41	1.8	0.9	2
7	443	0.2	0.6	0	0-4	39	1.8	1.0	2
8	427	0.2	0.9	0	0-6	44	2.3	1.6	2
9	412	0.3	1.0	0	0-5	43	2.7	1.4	3
10	402	0.3	0.9	0	0-5	51	2.2	1.5	1
11	392	0.1	0.3	0	0-2	19	1.4	0.3	2
12	401	0.2	0.7	0	0-4	36	2.0	1.2	1
13	424	0.2	0.5	0	0-3	43	1.5	0.7	1
Number of Partners									
2	466	0.1	0.4	0	0-2	48	1.1	0.3	1
3	459	0.1	0.4	0	0-2	55	1.2	0.3	1
4	457	0.1	0.3	0	0-1	44	1.0	0.1	1
5	436	0.1	0.3	0	0-1	44	1.1	0.1	1
6	441	0.1	0.4	0	0-2	41	1.2	0.3	1
7	443	0.1	0.3	0	0-1	39	1.1	0.1	1
8	427	0.1	0.3	0	0-1	44	1.1	0.1	1
9	412	0.1	0.4	0	0-2	43	1.2	0.3	1
10	402	0.1	0.4	0	0-2	51	1.1	0.3	1
11	392	0.0	0.2	0	0-1	19	1.0	0.0	1
12	401	0.1	0.3	0	0-1	36	1.0	0.1	1
13	424	0.1	0.3	0	0-1	42	1.0	0.0	1

Note. Number of oral sex (performed) events with a casual partner and number of partners in the last month by wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 17

Proportion Engaging in Oral Sex (Received) Hookup Behavior by Wave

Wave	N	Yes		No	
		n	%	n	%
2	466	26	6	440	94
3	457	41	9	416	91
4	455	30	7	425	93
5	436	22	5	414	95
6	440	25	6	415	94
7	443	20	5	423	95
8	427	24	6	403	94
9	412	39	10	373	90
10	402	42	10	360	90
11	392	14	4	378	96
12	400	30	8	370	92
13	424	32	8	392	92

Note. Proportion of participants who did and did not engage in oral sex (received) hookup behavior in the last month at each wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 18

Number of Oral Sex (Received) Hookup Events and Partners by Wave

Wave	All participants					Participants with hookups			
	<i>N</i>	Mean	<i>SD</i>	Median	Range	<i>n</i>	Mean	<i>SD</i>	Median
Number of Events									
2	466	0.1	0.3	0	0-1	26	1.1	0.1	1
3	457	0.1	0.5	0	0-3	41	1.5	0.7	1
4	455	0.1	0.3	0	0-1	30	1.1	0.1	1
5	436	0.1	0.2	0	0-1	22	1.1	0.1	1
6	440	0.1	0.3	0	0-1	25	1.1	0.1	1
7	443	0.1	0.4	0	0-3	20	1.5	0.8	1
8	427	0.1	0.6	0	0-4	24	2.1	1.2	2
9	412	0.1	0.5	0	0-2	39	1.5	0.5	1
10	402	0.2	0.6	0	0-4	42	1.7	1.0	1
11	392	0.0	0.2	0	0-1	14	1.1	0.2	1
12	400	0.1	0.5	0	0-4	30	1.7	0.9	1
13	424	0.1	0.4	0	0-2	32	1.4	0.5	1
Number of Partners									
2	466	0.1	0.2	0	0-1	26	1.0	0.0	1
3	456	0.1	0.3	0	0-1	40	1.1	0.1	1
4	455	0.1	0.2	0	0-1	30	1.0	0.0	1
5	436	0.1	0.2	0	0-1	22	1.0	0.0	1
6	439	0.1	0.2	0	0-1	25	1.0	0.0	1
7	443	0.0	0.1	0	0-1	20	1.0	0.0	1
8	427	0.1	0.2	0	0-1	24	1.0	0.0	1
9	412	0.1	0.3	0	0-1	39	1.1	0.1	1
10	401	0.1	0.3	0	0-1	41	1.0	0.1	1
11	392	0.0	0.2	0	0-1	14	1.0	0.0	1
12	400	0.1	0.3	0	0-1	30	1.0	0.0	1
13	424	0.1	0.3	0	0-1	32	1.0	0.0	1

Note. Number of oral sex (received) events with a casual partner and number of partners in the last month by wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 19

Proportion Engaging in Vaginal Sex Hookup Behavior by Wave

Wave	N	Yes		No	
		n	%	n	%
2	465	42	9	423	91
3	459	60	13	399	87
4	457	45	10	412	90
5	435	43	10	392	90
6	441	40	9	401	91
7	442	32	7	410	93
8	426	39	9	387	91
9	412	47	11	365	89
10	400	45	11	355	89
11	392	22	6	370	94
12	401	36	9	365	91
13	424	41	10	383	90

Note. Proportion of participants who did and did not engage in vaginal sex hookup behavior in the last month at each wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 20

Number of Vaginal Sex Hookup Events and Partners by Wave

Wave	All participants					Participants with hookups			
	<i>N</i>	Mean	<i>SD</i>	Median	Range	<i>n</i>	Mean	<i>SD</i>	Median
Number of Events									
2	465	0.1	0.5	0	0-3	42	1.5	0.6	1
3	459	0.2	0.7	0	0-3	60	1.8	0.9	1
4	457	0.2	0.6	0	0-3	45	1.7	0.8	1
5	435	0.2	0.6	0	0-4	43	1.9	1.0	1
6	441	0.2	0.6	0	0-4	40	1.9	1.1	1
7	442	0.2	0.7	0	0-5	32	2.2	1.2	2
8	426	0.3	1.0	0	0-6	39	2.8	2.0	2
9	412	0.3	0.9	0	0-4	47	2.6	1.4	2
10	400	0.3	0.8	0	0-5	45	2.2	1.4	2
11	392	0.1	0.5	0	0-4	22	2.0	1.2	1.5
12	401	0.2	0.8	0	0-4	36	2.3	1.3	2
13	424	0.2	0.8	0	0-5	41	2.3	1.4	2
Number of Partners									
2	466	0.1	0.3	0	0-1	42	1.1	0.1	1
3	459	0.2	0.5	0	0-2	60	1.3	0.4	1
4	457	0.1	0.3	0	0-1	45	1.1	0.1	1
5	436	0.1	0.3	0	0-1	43	1.1	0.1	1
6	441	0.1	0.3	0	0-1	40	1.0	0.1	1
7	442	0.1	0.3	0	0-1	32	1.1	0.1	1
8	427	0.1	0.3	0	0-1	39	1.1	0.1	1
9	412	0.1	0.4	0	0-2	47	1.2	0.3	1
10	402	0.1	0.4	0	0-2	45	1.2	0.3	1
11	392	0.1	0.2	0	0-1	22	1.0	0.0	1
12	401	0.1	0.3	0	0-1	36	1.1	0.1	1
13	424	0.1	0.3	0	0-1	41	1.1	0.1	1

Note. Number of vaginal sex events with a casual partner and number of partners in the last month by wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 21

Proportion Engaging in Oral Sex (Performed) Romantic Behavior by Wave

Wave	N	Yes		No	
		n	%	n	%
2	464	102	22	362	78
3	457	97	21	360	79
4	455	127	28	328	72
5	436	119	27	317	73
6	438	121	28	317	72
7	441	110	25	331	75
8	426	115	27	311	73
9	411	106	26	305	74
10	401	122	30	279	70
11	392	104	27	288	73
12	401	111	28	290	72
13	421	134	32	287	68

Note. Proportion of participants who did and did not engage in oral sex (performed) romantic behavior in the last month at each wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 22

Number of Oral Sex (Performed) Romantic Events and Partners by Wave

Wave	All participants					Participants with romantic events			
	<i>N</i>	Mean	<i>SD</i>	Median	Range	<i>n</i>	Mean	<i>SD</i>	Median
Number of Events									
2	464	0.9	2.3	0	0-13	102	4.0	3.3	3
3	457	0.9	2.3	0	0-10	97	4.3	3.4	3
4	455	1.2	2.6	0	0-12	127	4.3	3.5	3
5	436	1.3	2.7	0	0-11	119	4.6	3.4	3
6	438	1.3	2.9	0	0-13	121	4.7	3.8	3
7	441	1.2	2.8	0	0-13	110	4.9	3.8	3.5
8	426	1.3	3.0	0	0-13	115	5.0	3.8	4
9	411	1.2	2.7	0	0-12	106	4.5	3.6	3
10	401	1.4	2.8	0	0-12	122	4.6	3.2	4
11	392	1.4	3.1	0	0-13	104	5.4	3.9	4
12	401	1.4	3.1	0	0-13	111	5.1	4.0	3
13	421	1.6	3.2	0	0-13	134	5.1	3.7	4
Number of Partners									
2	465	0.2	0.4	0	0-1	101	1.0	0.1	1
3	459	0.2	0.4	0	0-2	97	1.0	0.1	1
4	457	0.3	0.5	0	0-2	126	1.0	0.1	1
5	437	0.3	0.5	0	0-2	118	1.0	0.1	1
6	440	0.3	0.5	0	0-2	121	1.0	0.2	1
7	443	0.3	0.4	0	0-1	110	1.0	0.0	1
8	427	0.3	0.5	0	0-2	115	1.0	0.1	1
9	411	0.3	0.4	0	0-2	106	1.0	0.0	1
10	403	0.3	0.5	0	0-2	122	1.0	0.1	1
11	392	0.3	0.4	0	0-2	104	1.0	0.1	1
12	402	0.3	0.4	0	0-1	111	1.0	0.0	1
13	423	0.3	0.5	0	0-2	134	1.0	0.1	1

Note. Number of oral sex (performed) events with a romantic partner and number of partners in the last month by wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 23

Proportion Engaging in Oral Sex (Received) Romantic Behavior by Wave

Wave	N	Yes		No	
		n	%	n	%
2	464	98	21	366	79
3	457	86	19	371	81
4	453	115	25	338	75
5	436	113	26	323	74
6	437	107	25	330	75
7	441	96	22	345	78
8	426	98	23	328	77
9	411	87	21	324	79
10	401	107	27	294	73
11	392	96	25	296	75
12	401	99	25	302	75
13	421	125	30	296	70

Note. Proportion of participants who did and did not engage in oral sex (received) romantic behavior in the last month at each wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 24

Number of Oral Sex (Received) Romantic Events and Partners by Wave

Wave	All participants					Participants with romantic events			
	<i>N</i>	Mean	<i>SD</i>	Median	Range	<i>n</i>	Mean	<i>SD</i>	Median
Number of Events									
2	464	0.9	2.3	0	0-13	98	4.2	3.4	3
3	457	0.7	1.8	0	0-8	86	3.7	2.4	3
4	453	1.0	2.5	0	0-15	115	3.9	3.7	3
5	436	1.0	2.2	0	0-10	113	3.7	2.9	3
6	437	1.0	2.6	0	0-12	107	4.2	3.7	3
7	441	1.0	2.4	0	0-12	96	4.5	3.4	3
8	426	1.0	2.4	0	0-10	98	4.4	3.1	3.5
9	411	0.9	2.3	0	0-10	87	4.2	3.2	3
10	401	1.2	2.7	0	0-12	107	4.6	3.4	4
11	392	1.1	2.7	0	0-12	96	4.7	3.7	3
12	401	1.1	2.6	0	0-13	99	4.5	3.6	3
13	421	1.2	2.7	0	0-12	125	4.2	3.6	3
Number of Partners									
2	465	0.2	0.4	0	0-1	97	1.0	0.1	1
3	459	0.2	0.4	0	0-2	86	1.0	0.1	1
4	455	0.3	0.4	0	0-2	113	1.0	0.1	1
5	435	0.3	0.4	0	0-2	110	1.0	0.0	1
6	439	0.3	0.5	0	0-2	106	1.0	0.2	1
7	443	0.2	0.4	0	0-1	96	1.0	0.0	1
8	426	0.2	0.4	0	0-1	97	1.0	0.0	1
9	411	0.2	0.4	0	0-1	87	1.0	0.1	1
10	402	0.3	0.5	0	0-2	107	1.0	0.1	1
11	392	0.2	0.4	0	0-1	96	1.0	0.0	1
12	402	0.3	0.4	0	0-2	99	1.0	0.1	1
13	422	0.3	0.5	0	0-1	124	1.0	0.0	1

Note. Number of oral sex (received) events with a romantic partner and number of partners in the last month by wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 25

Proportion Engaging in Vaginal Sex Romantic Behavior by Wave

Wave	N	Yes		No	
		n	%	n	%
2	464	111	24	353	76
3	456	99	22	357	78
4	456	130	29	326	71
5	433	124	29	309	71
6	437	124	28	313	72
7	442	109	25	333	75
8	423	115	27	308	73
9	411	112	27	299	73
10	400	128	32	272	68
11	391	108	28	283	72
12	402	125	31	277	69
13	422	140	33	282	67

Note. Proportion of participants who did and did not engage in vaginal sex romantic behavior in the last month at each wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 26

Number of Vaginal Sex Romantic Events and Partners by Wave

Wave	All participants					Participants with romantic events				
	<i>N</i>	Mean	<i>SD</i>	Median	Range	<i>n</i>	Mean	<i>SD</i>	Median	
Number of Events										
2	464	1.7	4.2	0	0-20	111	7.1	6.0	5	
3	456	1.6	3.9	0	0-16	99	7.1	5.4	5	
4	456	2.0	4.5	0	0-18	130	7.1	5.8	5	
5	433	2.0	4.3	0	0-18	124	7.1	5.4	6	
6	437	2.0	4.5	0	0-19	124	7.2	5.9	5	
7	442	2.0	4.5	0	0-18	109	8.2	5.6	6	
8	423	2.3	4.9	0	0-20	115	8.4	6.2	8	
9	411	2.1	4.8	0	0-22	112	7.8	6.5	5	
10	400	2.5	5.2	0	0-22	128	7.9	6.4	6	
11	391	2.6	5.6	0	0-26	108	9.3	7.2	7	
12	402	2.5	5.4	0	0-25	125	8.1	7.0	6	
13	422	2.5	4.9	0	0-21	140	7.6	5.8	6	
Number of Partners										
2	465	0.3	0.5	0	0-2	111	1.1	0.2	1	
3	459	0.2	0.4	0	0-1	99	1.0	0.1	1	
4	457	0.3	0.5	0	0-2	130	1.0	0.2	1	
5	437	0.3	0.5	0	0-2	124	1.0	0.1	1	
6	439	0.3	0.5	0	0-2	124	1.0	0.2	1	
7	442	0.3	0.4	0	0-2	109	1.0	0.1	1	
8	426	0.3	0.5	0	0-2	115	1.0	0.1	1	
9	411	0.3	0.5	0	0-2	112	1.0	0.1	1	
10	403	0.3	0.5	0	0-2	128	1.0	0.1	1	
11	392	0.3	0.5	0	0-2	108	1.0	0.1	1	
12	402	0.3	0.5	0	0-2	125	1.0	0.1	1	
13	423	0.3	0.5	0	0-2	140	1.0	0.2	1	

Note. Number of vaginal sex events with a romantic partner and number of partners in the last month by wave. *N* for each wave is the number of participants who completed that wave's survey and did not leave the number of events question blank.

Table 27

Model Comparisons for Latent Trajectory of Oral Sex (Performed) Hookup Behavior (Waves 2-9)

#	Description of model	Test of model fit LR χ^2 (df), <i>p</i>	Model comparison $\Delta\chi^2$ (df)	AIC	BIC	Intercept		Linear Slope	
						Mean	Variance	Mean	Variance
1	No growth model	203.50 (246), .98	--	1771	1780	0.00	7.87***	--	--
2	Linear growth model	170.30 (242), .99	1 & 2 χ^2 (4) = 33.20***	1750	1771	0.00	12.14***	0.00	0.16**
3	Quadratic growth model	160.63 (239), 1.0	2 & 3 χ^2 (3) = 9.67*	1744	1782	0.00	9.85**	-0.25	0.90†
4	Quadratic growth model, variance of quadratic slope term fixed to zero	169.50 (241), .99	2 & 4 χ^2 (1) = 0.80	1752	1777	0.00	12.30***	0.08	0.17**

Note. LR = likelihood ratio; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion. *N* = 477 participants who completed at least one survey between waves 2-9.

† *p* < .10. * *p* < .05. ** *p* < .01. *** *p* < .001.

Table 28

Model Comparisons for Latent Trajectory of Oral Sex (Received) Hookup Behavior (Waves 2-9)

#	Description of model	Test of model fit LR χ^2 (df), <i>p</i>	Model comparison $\Delta\chi^2$ (df)	AIC	BIC	Intercept		Linear Slope	
						Mean	Variance	Mean	Variance
1	No growth model	168.43 (244), 1.0	--	1491	1500	0.00	3.88***	--	--
2	Linear growth model	149.40 (243), 1.0	1 & 2 χ^2 (1) = 19.03***	1472	1492	0.00	10.38***	0.25*	0.17**
3	Quadratic growth model	131.25 (238), 1.0	2 & 3 χ^2 (5) = 18.15**	1465	1503	0.00	7.28*	-0.15	0.71
4	Quadratic growth model, variance of quadratic slope term fixed to zero	149.34 (242), 1.0	2 & 4 χ^2 (1) = 0.06	1473	1498	0.00	10.17***	0.19	0.16*

Note. LR = likelihood ratio; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion. *N* = 477 participants who completed at least one survey between waves 2-9.

* *p* < .05. ** *p* < .01. *** *p* < .001.

Table 29

Model Comparisons for Latent Trajectory of Vaginal Sex Hookup Behavior (Waves 2-9)

#	Description of model	Test of model fit LR χ^2 (df), <i>p</i>	Model comparison $\Delta\chi^2$ (df)	AIC	BIC	Intercept		Linear Slope	
						Mean	Variance	Mean	Variance
1	No growth model	237.06 (245), .63	--	1796	1804	0.00	7.09***	--	--
2	Linear growth model	202.40 (243), .97	1 & 2 χ^2 (2) = 34.66***	1765	1785	0.00	14.54***	0.13	0.19**
3	Quadratic growth model	180.65 (236), 1.0	2 & 3 χ^2 (7) = 21.75**	1757	1794	0.00	9.36**	-0.41	0.77†
4	Quadratic growth model, variance of quadratic slope term fixed to zero	199.38 (241), .98	2 & 4 χ^2 (2) = 3.02	1766	1791	0.00	14.74***	0.21	0.20**

Note. LR = likelihood ratio; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion. *N* = 477 participants who completed at least one survey between waves 2-9.

† *p* < .10. * *p* < .05. ** *p* < .01. *** *p* < .001.

Table 30

Model Comparisons for Latent Trajectory of Oral Sex (Performed) Romantic Behavior (Waves 2-9)

#	Description of model	Test of model fit LR χ^2 (df), <i>p</i>	Model comparison $\Delta\chi^2$ (df)	AIC	BIC	Intercept		Linear Slope	
						Mean	Variance	Mean	Variance
1	No growth model	300.95 (239), .004	--	2549	2557	0.00	16.23***	--	--
2	Linear growth model	251.67 (240), .29	1 & 2 χ^2 (1) = 49.28***	2480	2501	0.00	23.95***	0.05	0.24***
3	Quadratic growth model	185.34 (236), .99	2 & 3 χ^2 (4) = 66.33***	2427	2465	0.00	33.11**	1.01*	2.38*
4	Quadratic growth model, variance of quadratic slope term fixed to zero	230.93 (239), .63	2 & 4 χ^2 (1) = 20.74***	2463	2488	0.00	26.34***	0.54***	0.28***

Note. LR = likelihood ratio; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion. *N* = 477 participants who completed at least one survey between waves 2-9.

* *p* < .05. ** *p* < .01. *** *p* < .001.

Table 31

Model Comparisons for Latent Trajectory of Oral Sex (Received) Romantic Behavior (Waves 2-9)

#	Description of model	Test of model fit LR χ^2 (df), <i>p</i>	Model comparison $\Delta\chi^2$ (df)	AIC	BIC	Intercept		Linear Slope	
						Mean	Variance	Mean	Variance
1	No growth model	284.36 (239), .02	--	2430	2438	0.00	15.19***	--	--
2	Linear growth model	240.89 (240), .47	1 & 2 χ^2 (1) = 43.47***	2387	2408	0.00	23.65***	0.05	0.19***
3	Quadratic growth model	202.04 (235), .94	2 & 3 χ^2 (5) = 38.85***	2356	2394	0.00	33.61**	0.94*	1.76*
4	Quadratic growth model, variance of quadratic slope term fixed to zero	209.71 (237), .90	2 & 4 χ^2 (3) = 31.18***	2367	2392	0.00	26.52***	0.60***	0.26***

Note. LR = likelihood ratio; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion. *N* = 477 participants who completed at least one survey between waves 2-9.

* *p* < .05. ** *p* < .01. *** *p* < .001.

Table 32

Model Comparisons for Latent Trajectory of Vaginal Sex Romantic Behavior (Waves 2-9)

#	Description of model	Test of model fit LR χ^2 (df), <i>p</i>	Model comparison $\Delta\chi^2$ (df)	AIC	BIC	Intercept		Linear Slope	
						Mean	Variance	Mean	Variance
1	No growth model	323.86 (242), .0003	--	2497	2505	0.00	18.97**	--	--
2	Linear growth model	249.66 (247), .44	1 & 2 χ^2 (5) = 74.20**	2402	2423	0.00	40.03**	0.16†	0.37*
3	Quadratic growth model	205.70 (240), .95	2 & 3 χ^2 (7) = 43.96**	2367	2405	0.00	48.37*	0.67†	2.15*
4	Quadratic growth model, variance of quadratic slope term fixed to zero	230.32 (245), .74	2 & 4 χ^2 (2) = 19.34*	2389	2414	0.00	43.72**	0.65**	0.43**

Note. LR = likelihood ratio; AIC = Akaike Information Criterion; BIC = Bayesian Information Criterion. *N* = 477 participants who completed at least one survey between waves 2-9.

† *p* < .10. * *p* < .01. ** *p* < .001.

Table 33

Model Comparisons for Latent Trajectory of Anxiety (Waves 2-9)

#	Description of Model	Test of Model Fit LR χ^2 , <i>df</i> , <i>p</i>	CFI	RMSEA, 90% CI	SRMR
1	No growth	313.72, 34, 0	.875	.131, .118-.145	.078
2	Linear growth	222.94, 31, 0	.914	.114, .100-.128	.063
3	Linear growth, residual variances equal	266.56, 38, 0	.898	.112, .100-.125	.085
4	Linear growth, serial correlations	150.67, 24, 0	.943	.105, .089-.122	.049
5	Linear growth, serial correlations equal	161.82, 30, 0	.941	.096, .082-.111	.057
6	Linear growth, residual variances equal, serial correlations equal	196.48, 37, 0	.929	.095, .082-.108	.075
7	Quadratic growth	156.29, 27, 0	.942	.100, .085-.116	.045
8	Quadratic growth, residual variances equal	197.09, 34, 0	.927	.100, .087-.114	.061
9	Quadratic growth, serial correlations, variance of quadratic slope fixed to 0	106.82, 23, 0	.962	.087, .071-.104	.037
10	Quadratic growth, serial correlations equal, variance of quadratic slope fixed to 0	115.41, 29, 0	.961	.079, .064-.094	.042
11	Quadratic growth, residual variances equal, serial correlations equal, variance of quadratic slope fixed to 0	147.43, 36, 0	.950	.081, .067-.094	.058

Note. LR = likelihood ratio; CFI = Comparative Fit Index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean residual. $N = 477$ participants who completed at least one survey between waves 2-9.

Details for the best-fitting model appear in boldface type.

Table 34

Model Comparisons for Latent Trajectory of Depression (Waves 2-9)

#	Description of Model	Test of Model Fit LR χ^2 , <i>df</i> , <i>p</i>	CFI	RMSEA, 90% CI	SRMR
1	No growth	286.63, 34, 0	.905	.125, .112-.138	.093
2	Linear growth	171.25, 31, 0	.947	.097, .083-.112	.071
3	Linear growth, residual variances equal	195.57, 38, 0	.941	.093, .081-.106	.085
4	Linear growth, serial correlations	131.13, 24, 0	.960	.097, .081-.113	.061
5	Linear growth, serial correlations equal	145.42, 30, 0	.957	.090, .075-.105	.068
6	Linear growth, residual variances equal, serial correlations equal	160.42, 37, 0	.954	.084, .071-.097	.079
7	Quadratic growth	104.13, 27, 0	.971	.077, .062-.093	.037
8	Quadratic growth, residual variances equal	125.75, 34, 0	.966	.075, .061-.090	.052
9	Quadratic growth, serial correlations, variance of quadratic slope fixed to 0	104.46, 23, 0	.969	.086, .070-.103	.048
10	Quadratic growth, serial correlations equal, variance of quadratic slope fixed to 0	115.16, 29, 0	.968	.079, .064-.094	.054
11	Quadratic growth, residual variances equal, serial correlations equal, variance of quadratic slope fixed to 0	125.95, 36, 0	.966	.072, .059-.086	.063

Note. LR = likelihood ratio; CFI = Comparative Fit Index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean residual. $N = 477$ participants who completed at least one survey between waves 2-9.

Details for the best-fitting model appear in boldface type.

Table 35

Model Comparisons for Latent Trajectory of Negative Affect (Waves 2-9)

#	Description of Model	Test of Model Fit LR χ^2 , <i>df</i> , <i>p</i>	CFI	RMSEA, 90% CI	SRMR
1	No growth	265.51, 34, 0	.879	.119, .106-.133	.143
2	Linear growth	187.05, 31, 0	.918	.103, .089-.117	.104
3	Linear growth, residual variances equal	209.76, 38, 0	.910	.097, .085-.110	.148
4	Linear growth, serial correlations	154.08, 24, 0	.932	.107, .091-.123	.091
5	Linear growth, serial correlations equal	156.87, 30, 0	.934	.094, .080-.109	.094
6	Linear growth, residual variances equal, serial correlations equal	173.42, 37, 0	.929	.088, .075-.101	.132
7	Quadratic growth	112.65, 27, 0	.955	.082, .066-.097	.046
8	Quadratic growth, residual variances equal	134.94, 34, 0	.947	.079, .065-.093	.067
9	Quadratic growth, serial correlations, variance of quadratic slope fixed to 0	97.87, 23, 0	.961	.083, .066-.100	.056
10	Quadratic growth, serial correlations equal, variance of quadratic slope fixed to 0	100.16, 29, 0	.963	.072, .057-.087	.059
11	Quadratic growth, residual variances equal, serial correlations equal, variance of quadratic slope fixed to 0	119.13, 36, 0	.957	.070, .056-.084	.102

Note. LR = likelihood ratio; CFI = Comparative Fit Index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean residual. $N = 477$ participants who completed at least one survey between waves 2-9.

Details for the best-fitting model appear in boldface type.

Table 36

Model Comparisons for Latent Trajectory of Perceived Stress (Waves 2-9)

#	Description of Model	Test of Model Fit LR χ^2 , <i>df</i> , <i>p</i>	CFI	RMSEA, 90% CI	SRMR
1	No growth	284.78, 34, 0	.895	.124, .111-.138	.136
2	Linear growth	128.51, 31, 0	.959	.081, .067-.096	.095
3	Linear growth, residual variances equal	146.98, 38, 0	.954	.078, .065-.091	.122
4	Linear growth, serial correlations	85.92, 24, 0	.974	.074, .057-.091	.074
5	Linear growth, serial correlations equal	97.54, 30, 0	.972	.069, .054-.084	.089
6	Linear growth, residual variances equal, serial correlations equal	112.03, 37, 0	.969	.065, .052-.079	.112
7	Quadratic growth	67.10, 27, 0	.983	.056, .039-.073	.030
8	Quadratic growth, residual variances equal	87.08, 34, 0	.978	.057, .042-.072	.049
9	Quadratic growth, serial correlations, variance of quadratic slope fixed to 0	60.90, 23, 0	.984	.059, .041-.077	.057
10	Quadratic growth, serial correlations equal, variance of quadratic slope fixed to 0	74.66, 29, 0	.981	.057, .042-.074	.071
11	Quadratic growth, residual variances equal, serial correlations equal, variance of quadratic slope fixed to 0	88.06, 36, 0	.978	.055, .041-.070	.094

Note. LR = likelihood ratio; CFI = Comparative Fit Index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean residual. $N = 477$ participants who completed at least one survey between waves 2-9.

Details for the best-fitting model appear in boldface type.

Table 37

Model Comparisons for Latent Trajectory of Positive Affect (Waves 2-9)

#	Description of Model	Test of Model Fit LR χ^2 , <i>df</i> , <i>p</i>	CFI	RMSEA, 90% CI	SRMR
1	No growth	296.01, 34, 0	.869	.127, .114-.141	.353
2	Linear growth	169.90, 31, 0	.930	.097, .083-.111	.201
3	Linear growth, residual variances equal	196.56, 38, 0	.921	.094, .081-.107	.266
4	Linear growth, serial correlations	141.44, 24, 0	.941	.101, .086-.118	.152
5	Linear growth, serial correlations equal	156.90, 30, 0	.936	.094, .080-.109	.187
6	Linear growth, residual variances equal, serial correlations equal	177.62, 37, 0	.930	.089, .076-.103	.252
7	Quadratic growth	101.67, 27, 0	.963	.076, .061-.092	.104
8	Quadratic growth, residual variances equal	130.36, 34, 0	.952	.077, .063-.091	.167
9	Quadratic growth, serial correlations, variance of quadratic slope fixed to 0	88.28, 23, 0	.967	.077, .060-.095	.106
10	Quadratic growth, serial correlations equal, variance of quadratic slope fixed to 0	106.17, 29, 0	.961	.075, .060-.090	.137
11	Quadratic growth, residual variances equal, serial correlations equal, variance of quadratic slope fixed to 0	134.47, 36, 0	.951	.076, .062-.090	.230

Note. LR = likelihood ratio; CFI = Comparative Fit Index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean residual. $N = 477$ participants who completed at least one survey between waves 2-9.

Details for the best-fitting model appear in boldface type.

Table 38

Model Comparisons for Latent Trajectory of Self-Esteem (Waves 5, 9, and 13)

#	Description of Model	Test of Model Fit LR χ^2 , <i>df</i> , <i>p</i>	CFI	RMSEA, 90% CI	SRMR
1	No growth	14.13, 4, .01	.986	.074, .035-.118	.045
2	Linear growth	4.41, 1, .04	.995	.086, .018-.174	.017
3	Linear growth, residual variances equal	5.64, 3, .13	.996	.044, .000-.099	.013
4	Linear growth, residual variances equal, serial correlations, variance of linear slope fixed to 0	8.17, 3, .04	.993	.061, .010-.113	.050

Note. LR = likelihood ratio; CFI = Comparative Fit Index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean residual. $N = 463$ participants who completed at least one survey at waves 5, 9, or 13. A linear growth model with serial correlations lacked sufficient degrees of freedom for identification. Details for the best-fitting model appear in boldface type.

Table 39

Model Comparisons for Latent Trajectory of Life Satisfaction (Waves 5, 9, and 13)

#	Description of Model	Test of Model Fit LR χ^2 , <i>df</i> , <i>p</i>	CFI	RMSEA, 90% CI	SRMR
1	No growth	9.88, 4, .04	.990	.056, .010-.102	.046
2	Linear growth	0.21, 1, .65	1.00	.000, .000-.095	.004
3	Linear growth, residual variances equal	1.26, 3, .74	1.00	.000, .000-.055	.024
4	Linear growth, residual variances equal, serial correlations, variance of linear slope fixed to 0	0.28, 3, .96	1.00	.000, .000-.000	.005

Note. LR = likelihood ratio; CFI = Comparative Fit Index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean residual. $N = 463$ participants who completed at least one survey at waves 5, 9, or 13. A linear growth model with serial correlations lacked sufficient degrees of freedom for identification. Details for the best-fitting model appear in boldface type.

Table 40

Model Fit Statistics for Multivariate Latent Growth Curve Models with Sexual Romantic Behavior and Mental Health

Mental Health Outcome	Type of Romantic Behavior	χ^2	<i>df</i>	<i>p</i>
Anxiety	Performed oral sex	230.88	239	.64
	Received oral sex	210.12	237	.90
	Vaginal sex	231.15	245	.73
Depression	Performed oral sex	230.98	239	.63
	Received oral sex	209.95	237	.90
	Vaginal sex	231.19	245	.73
Negative affect	Performed oral sex	230.92	239	.63
	Received oral sex	210.13	237	.89
	Vaginal sex	231.19	245	.73
Perceived stress	Performed oral sex	231.53	239	.62
	Received oral sex	210.15	237	.89
	Vaginal sex	231.09	245	.73
Positive affect	Performed oral sex	231.06	239	.63
	Received oral sex	210.06	237	.90
	Vaginal sex	231.02	245	.73
Self-esteem	Performed oral sex	357.51	4014	1.0
	Received oral sex	360.74	4017	1.0
	Vaginal sex	342.08	4019	1.0
Life satisfaction	Performed oral sex	365.52	4015	1.0
	Received oral sex	360.77	4017	1.0
	Vaginal sex	360.41	4021	1.0

Table 41

Regression Results from Multivariate Latent Growth Curve Models with Sexual Romantic Behavior and Mental Health

Model and Regression	Performed oral sex	Received oral sex	Vaginal sex
Anxiety			
Intercept_anxiety on Intercept_romantic	.024 (.009)*	.022 (.010)*	.021 (.009)*
Intercept_anxiety on Slope_romantic	.193 (.134)	.177 (.167)	.139 (.123)
Slope_anxiety on Intercept_romantic	-.003 (.001)*	-.003 (.001)*	-.003 (.001)*
Slope_anxiety on Slope_romantic	-.020 (.020)	-.018 (.024)	-.021 (.018)
Depression			
Intercept_depression on Intercept_romantic	.012 (.009)	.012 (.010)	.013 (.009)
Intercept_depression on Slope_romantic	.068 (.137)	.164 (.162)	.152 (.127)
Slope_depression on Intercept_romantic	-.001 (.001)	-.002 (.002)	-.002 (.001)
Slope_depression on Slope_romantic	-.016 (.020)	-.046 (.023)†	-.024 (.017)
Negative affect			
Intercept_negaaffect on Intercept_romantic	.012 (.006)*	.012 (.006)†	.014 (.005)*
Intercept_negaaffect on Slope_romantic	.068 (.084)	.098 (.103)	.084 (.076)
Slope_negaaffect on Intercept_romantic	-.001 (.001)	-.001 (.001)	-.001 (.001)
Slope_negaaffect on Slope_romantic	.003 (.013)	.005 (.016)	-.006 (.012)
Perceived stress			
Intercept_stress on Intercept_romantic	.003 (.007)	-.002 (.007)	-.001 (.006)
Intercept_stress on Slope_romantic	-.131 (.096)	-.049 (.113)	-.047 (.086)
Slope_stress on Intercept_romantic	.001 (.001)	.001 (.001)	.001 (.001)
Slope_stress on Slope_romantic	.022 (.015)	.015 (.018)	.011 (.014)
Positive affect			
Intercept_posaaffect on Intercept_romantic	.009 (.005)	.009 (.005)	.006 (.005)
Intercept_posaaffect on Slope_romantic	.112 (.077)	.026 (.090)	.016 (.069)
Slope_posaaffect on Intercept_romantic	-.001 (.001)	-.001 (.001)	-.001 (.001)
Slope_posaaffect on Slope_romantic	-.008 (.012)	-.007 (.014)	-.002 (.010)
Life satisfaction^a			
Intercept_satisfaction on Intercept_romantic	-.017 (.015)	-.025 (.017)	-.014 (.013)
Intercept_satisfaction on Slope_romantic	-.681 (.243)**	-.713 (.311)*	-.403 (.236)
Slope_satisfaction on Intercept_romantic	-.004 (.006)	-.005 (.007)	-.004 (.005)
Slope_satisfaction on Slope_romantic	.080 (.101)	.115 (.124)	.068 (.098)
Self-esteem^a			
Intercept_esteem on Intercept_romantic	-.016 (.014)	-.022 (.015)	-.015 (.013)
Intercept_esteem on Slope_romantic	-.110 (.230)	-.094 (.294)	-.003 (.229)
Slope_esteem on Intercept_romantic	.000 (.005)	-.001 (.006)	-.002 (.005)
Slope_esteem on Slope_romantic	-.012 (.086)	.022 (.107)	-.062 (.085)

Note. $N = 477$ participants who completed at least one survey between waves 2-9. Each mental health construct was tested in a separate model for each sexual behavior.

^a $N = 478$ participants who completed at least one survey between waves 2-13.

† $p = .05$. * $p < .05$. ** $p < .01$.

Table 42

Model Fit Statistics for Multivariate Latent Growth Curve Models with Sexual Hookup Behavior and Mental Health

Mental Health Outcome	Type of Hookup Behavior	χ^2	<i>df</i>	<i>p</i>
Anxiety	Performed oral sex	169.59	241	1.0
	Received oral sex	149.26	242	1.0
	Vaginal sex	199.31	241	.98
Depression	Performed oral sex	169.48	241	1.0
	Received oral sex	149.22	242	1.0
	Vaginal sex	201.83	242	.97
Negative affect	Performed oral sex	169.55	241	1.0
	Received oral sex	149.32	242	1.0
	Vaginal sex	201.83	242	.97
Perceived stress	Performed oral sex	169.56	241	1.0
	Received oral sex	149.58	242	1.0
	Vaginal sex	201.78	242	.97
Positive affect	Performed oral sex	169.63	241	1.0
	Received oral sex	149.25	242	1.0
	Vaginal sex	199.30	241	.98
Self-esteem	Performed oral sex	271.02	4046	1.0
	Received oral sex	226.89	4053	1.0
	Vaginal sex	196.09	4030	1.0
Life satisfaction	Performed oral sex	271.07	4046	1.0
	Received oral sex	235.15	4054	1.0
	Vaginal sex	197.21	4030	1.0

Table 43

Regression Results from Multivariate Latent Growth Curve Models with Sexual Hookup Behavior and Mental Health

Model and Regression	Performed oral sex	Received oral sex	Vaginal sex
Anxiety			
Intercept_anxiety on Intercept_hookup	-.006 (.019)	-.027 (.040)	-.009 (.021)
Intercept_anxiety on Slope_hookup	-.326 (.257)	-.115 (.414)	-.144 (.264)
Slope_anxiety on Intercept_hookup	.003 (.002)	-.001 (.006)	.003 (.003)
Slope_anxiety on Slope_hookup	.027 (.034)	-.040 (.063)	.010 (.035)
Depression			
Intercept_depression on Intercept_hookup	.007 (.018)	.011 (.039)	.012 (.021)
Intercept_depression on Slope_hookup	-.197 (.253)	.111 (.413)	-.067 (.264)
Slope_depression on Intercept_hookup	.006 (.002)*	.005 (.005)	.006 (.003)*
Slope_depression on Slope_hookup	.046 (.034)	.009 (.056)	.050 (.035)
Negative affect			
Intercept_negaaffect on Intercept_hookup	.007 (.011)	.001 (.024)	.008 (.013)
Intercept_negaaffect on Slope_hookup	-.134 (.155)	.044 (.254)	-.117 (.163)
Slope_negaaffect on Intercept_hookup	.000 (.002)	.001 (.004)	.000 (.002)
Slope_negaaffect on Slope_hookup	.005 (.023)	-.005 (.040)	.012 (.024)
Perceived stress			
Intercept_stress on Intercept_hookup	-.008 (.013)	-.024 (.027)	-.016 (.016)
Intercept_stress on Slope_hookup	-.249 (.176)	-.227 (.302)	-.320 (.183)
Slope_stress on Intercept_hookup	.002 (.002)	.003 (.004)	.003 (.003)
Slope_stress on Slope_hookup	.059 (.029)*	.028 (.047)	.061 (.028)*
Positive affect			
Intercept_posaaffect on Intercept_hookup	.016 (.009)	.021 (.020)	.015 (.011)
Intercept_posaaffect on Slope_hookup	.045 (.135)	.049 (.204)	.098 (.140)
Slope_posaaffect on Intercept_hookup	-.003 (.002)*	-.004 (.003)	-.003 (.002)
Slope_posaaffect on Slope_hookup	-.041 (.022)†	-.052 (.035)	-.048 (.024)*
Life satisfaction^a			
Intercept_satisfaction on Intercept_hookup	.036 (.024)	.035 (.037)	.046 (.025)
Intercept_satisfaction on Slope_hookup	.432 (.353)	.413 (.486)	.489 (.380)
Slope_satisfaction on Intercept_hookup	-.009 (.010)	-.015 (.016)	-.007 (.011)
Slope_satisfaction on Slope_hookup	-.044 (.152)	-.173 (.201)	-.020 (.158)
Self-esteem^a			
Intercept_esteem on Intercept_hookup	.014 (.025)	.000 (.038)	.020 (.026)
Intercept_esteem on Slope_hookup	-.219 (.359)	-.045 (.498)	-.145 (.384)
Slope_esteem on Intercept_hookup	.006 (.010)	.006 (.015)	.002 (.010)
Slope_esteem on Slope_hookup	.223 (.140)	.188 (.197)	.209 (.148)

Note. $N = 477$ participants who completed at least one survey between waves 2-9. Each mental health construct was tested in a separate model.

^a $N = 478$ participants who completed at least one survey between waves 2-13.

† $p = .06$. * $p < .05$. ** $p < .01$.

Table 44

Proportion of Participants with Depression Diagnoses by Wave

Wave	Any Depressive Disorder		Other Depressive Disorder		Major Depressive Disorder	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
1	27	10	11	4	16	6
2	33	12	15	5	18	7
3	34	12	11	4	23	8
4	50	18	19	7	31	11
5	33	12	11	4	22	8
6	35	13	15	5	20	7
7	40	15	18	7	22	8
8	37	14	15	5	22	8
9	41	15	17	6	24	9
10	22	8	9	3	13	5
11	27	10	5	2	22	8
12	31	11	9	3	22	8
13	31	11	12	4	19	7

Note. $N = 274$ participants with complete data on all variables used in this analysis.

Diagnoses were based on Patient Health Questionnaire-9 scoring algorithm. Any depressive disorder includes major depressive disorder or other depressive disorder.

Table 45

Oral Sex (Performed) Hookup Behavior as a Predictor of Depression Diagnosis during the Study

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-0.93	0.20	20.94	<.001	--	--
Oral sex (performed) hookup behavior ^a	0.44	0.28	2.56	.11	1.56	[0.91, 2.69]
Baseline depression diagnosis ^b	2.12	0.57	13.84	<.001	8.33	[2.73, 25.45]
Pre-college depression diagnosis ^c	0.75	0.52	2.10	.15	2.12	[0.77, 5.88]
Oral sex (performed) romantic behavior ^d	0.43	0.27	2.65	.10	1.54	[0.92, 2.59]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. *N* = 274 participants with complete data on all variables used in this analysis.

^a Reference group is no oral sex (performed) hookup behavior. ^b Reference group is no baseline depression diagnosis. ^c Reference group is no pre-college depression diagnosis. ^d Reference group is no oral sex (performed) romantic behavior.

Table 46

Oral Sex (Received) Hookup Behavior as a Predictor of Depression Diagnosis during the Study

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-0.86	0.20	18.08	<.001	--	--
Oral sex (received) hookup behavior ^a	0.53	0.28	3.69	.055	1.70	[0.99, 2.94]
Baseline depression diagnosis ^b	2.14	0.57	14.03	<.001	8.47	[2.77, 25.89]
Pre-college depression diagnosis ^c	0.80	0.52	2.38	.12	2.23	[0.81, 6.17]
Oral sex (received) romantic behavior ^d	0.22	0.27	0.69	.41	1.25	[0.74, 2.10]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. *N* = 274 participants with complete data on all variables used in this analysis.

^a Reference group is no oral sex (received) hookup behavior. ^b Reference group is no baseline depression diagnosis. ^c Reference group is no pre-college depression diagnosis. ^d Reference group is no oral sex (received) romantic behavior.

Table 47

Vaginal Sex Hookup Behavior as a Predictor of Depression Diagnosis during the Study

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-0.97	0.20	22.95	<.001	--	--
Vaginal sex hookup behavior ^a	0.87	0.28	9.36	.002	2.38	[1.37, 4.14]
Baseline depression diagnosis ^b	2.06	0.57	12.83	<.001	7.81	[2.54, 24.04]
Pre-college depression diagnosis ^c	0.86	0.52	2.69	.10	2.36	[0.85, 6.61]
Vaginal sex romantic behavior ^d	0.25	0.27	0.87	.35	1.28	[0.76, 2.17]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. *N* = 274 participants with complete data on all variables used in this analysis.

^a Reference group is no vaginal sex hookup behavior. ^b Reference group is no baseline depression diagnosis. ^c Reference group is no pre-college depression diagnosis. ^d Reference group is no vaginal sex romantic behavior.

Table 48

Any Sexual Hookup Behavior as a Predictor of Depression Diagnosis during the Study

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-1.07	0.22	22.84	<.001	--	--
Any sexual hookup behavior ^a	0.73	0.27	7.27	.007	2.07	[1.22, 3.52]
Baseline depression diagnosis ^b	2.11	0.57	13.51	<.001	8.24	[2.68, 25.39]
Pre-college depression diagnosis ^c	0.85	0.52	2.61	.11	2.33	[0.84, 6.49]
Any sexual romantic behavior ^d	0.34	0.27	1.44	.23	1.38	[0.81, 2.36]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. Any sexual hookup behavior includes performing oral sex, receiving oral sex, or having vaginal sex. *N* = 274 participants with complete data on all variables used in this analysis.

^a Reference group is no sexual hookup behavior. ^b Reference group is no baseline depression diagnosis. ^c Reference group is no pre-college depression diagnosis. ^d Reference group is no sexual romantic behavior.

Table 49

Number of Oral Sex (Performed) Hookup Events as a Predictor of Depression Diagnosis during the Study

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-0.57	0.14	17.27	<.001	--	--
Number of oral sex (performed) hookups	0.02	0.03	0.52	.47	1.02	[0.97, 1.07]
Baseline depression diagnosis ^a	2.11	0.57	13.86	<.001	8.21	[2.71, 24.88]
Pre-college depression diagnosis ^b	0.75	0.52	2.10	.15	2.11	[0.77, 5.81]
Number of oral sex (performed) romantic encounters	-0.00	0.00	0.38	.54	1.00	[0.99, 1.01]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. *N* = 274 participants with complete data on all variables used in this analysis. Continuous variables were centered at their means.

^a Reference group is no baseline depression diagnosis. ^b Reference group is no pre-college depression diagnosis.

Table 50

Number of Oral Sex (Received) Hookup Events as a Predictor of Depression Diagnosis during the Study

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-0.57	0.14	17.32	<.001	--	--
Number of oral sex (received) hookups	0.00	0.05	0.00	.98	1.00	[0.92, 1.09]
Baseline depression diagnosis ^a	2.11	0.57	13.78	<.001	8.22	[2.70, 24.98]
Pre-college depression diagnosis ^b	0.76	0.51	2.19	.14	2.14	[0.78, 5.88]
Number of oral sex (received) romantic encounters	-0.00	0.01	0.21	.64	1.00	[0.99, 1.01]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. *N* = 274 participants with complete data on all variables used in this analysis. Continuous variables were centered at their means.

^a Reference group is no baseline depression diagnosis. ^b Reference group is no pre-college depression diagnosis.

Table 51

Number of Vaginal Sex Hookup Events as a Predictor of Depression Diagnosis during the Study

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-0.56	0.14	16.94	<.001	--	--
Number of vaginal sex hookups	0.05	0.03	3.56	.059	1.05	[1.00, 1.11]
Baseline depression diagnosis ^a	2.12	0.57	13.96	<.001	8.33	[2.74, 25.31]
Pre-college depression diagnosis ^b	0.70	0.52	1.80	.18	2.01	[0.72, 5.57]
Number of vaginal sex romantic encounters	-0.00	0.00	0.00	.97	1.00	[0.99, 1.01]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. *N* = 274 participants with complete data on all variables used in this analysis. Continuous variables were centered at their means.

^a Reference group is no baseline depression diagnosis. ^b Reference group is no pre-college depression diagnosis.

Table 52

Any Sexual Hookup Behavior as a Predictor of Depression Diagnosis during the Study among Participants without a History of Pre-College Sexual Hookup Behavior

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-1.01	0.24	17.69	<.001	--	--
Any sexual hookup behavior ^a	0.70	0.32	4.15	.04	2.01	[1.03, 3.94]
Baseline depression diagnosis ^b	2.14	0.67	10.25	.001	8.52	[2.30, 31.63]
Pre-college depression diagnosis ^c	0.87	0.70	1.55	.21	2.39	[0.61, 9.42]
Any sexual romantic behavior ^d	0.42	0.32	1.78	.18	1.54	[0.82, 2.89]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. Any sexual hookup behavior includes performing oral sex, receiving oral sex, or having vaginal sex. *N* = 195 participants with complete data on all variables used in this analysis and no pre-college sexual hookup experience.

^a Reference group is no sexual hookup behavior. ^b Reference group is no baseline depression diagnosis. ^c Reference group is no pre-college depression diagnosis. ^d Reference group is no sexual romantic behavior.

Table 53

Prevalence of Types of Sexual Victimization over Time

Time frame	<i>N</i>	None	Any SV	Unwanted sexual contact	Oral sex	Attempted vaginal rape	Completed vaginal rape	Anal sex or penetration with finger/objects
		<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)	<i>n</i> (%)
Wave 1, Since age 14	477	284 (60)	193 (40)	181 (38)	42 (9)	102 (21)	40 (8)	23 (5)
Wave 5, First semester	430	341 (79)	89 (21)	83 (19)	23 (5)	50 (12)	22 (5)	15 (3)
Wave 9, Second semester	403	338 (84)	65 (16)	58 (14)	21 (5)	30 (7)	19 (5)	17 (4)
Wave 13, Summer	415	356 (86)	59 (14)	52 (13)	18 (4)	26 (6)	21 (5)	10 (2)
Study ^a	464	318 (69)	146 (31)	135 (29)	46 (10)	81 (17)	46 (10)	31 (7)
Lifetime ^a	464	230 (50)	234 (50)	222 (48)	68 (15)	136 (29)	72 (16)	49 (11)

Note. SV = sexual victimization. Separate prevalence rate for each type of SV (i.e., not coded into mutually exclusive categories). SV tactics included were physical force, threats of harm, and incapacitation due to alcohol or drugs. Sample size varies due to differences in number of participants with complete data on types of SV by wave.

^a Includes all participants who completed at least one of the three follow-up surveys that assessed SV (waves 5, 9, and 13).

Table 54

Prevalence of Most Severe Type of Sexual Victimization Experienced over Time

Time frame	N	None	Unwanted sexual contact	Oral sex	Attempted vaginal rape	Completed vaginal rape, anal rape, or other penetration
		n (%)	n (%)	n (%)	n (%)	n (%)
Wave 1, Since age 14	477	284 (60)	75 (16)	4 (1)	63 (13)	51 (11)
Wave 5, First semester	430	341 (79)	34 (8)	0 (0)	29 (7)	26 (6)
Wave 9, Second semester	403	338 (84)	26 (6)	3 (1)	15 (4)	21 (5)
Wave 13, Summer	415	356 (86)	21 (5)	2 (0)	14 (3)	22 (5)
Study ^a	464	318 (69)	50 (11)	3 (1)	42 (9)	51 (11)
Lifetime ^a	464	231 (50)	75 (16)	5 (1)	67 (14)	86 (19)

Note. Sexual victimization coded according to most severe experience using mutually exclusive categories: none, unwanted sexual contact (fondling, kissing, sexual touching), oral sex, attempted vaginal rape, and completed vaginal rape, anal rape, or other penetration (finger or objects). SV tactics included were physical force, threats of harm, and incapacitation due to alcohol or drugs. Sample size varies due to differences in number of participants with complete data on types of SV by wave.

^a Includes all participants who completed at least one of the three follow-up surveys that assessed SV (waves 5, 9, and 13).

Table 55

Oral Sex (Performed) Hookup Behavior as a Predictor of Oral Sex Sexual Victimization

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-3.58	0.51	49.89	<.001	--	--
Pre-college oral sex SV ^a	2.80	0.58	23.53	<.001	16.41	[5.30, 50.84]
Baseline alcohol use ^b	0.03	0.53	0.00	.96	1.03	[0.36, 2.90]
Sorority membership ^c	-0.09	0.51	0.03	.87	0.92	[0.34, 2.50]
Oral sex (performed) romantic behavior ^d	0.47	0.47	1.01	.31	1.60	[0.64, 4.00]
Oral sex (performed) hookup behavior ^e	1.45	0.50	8.38	.004	4.27	[1.60, 11.42]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval; *SV* = sexual victimization. *N* = 289.

^a Reference group is no pre-college oral sex SV. ^b Reference group is no alcohol use in past month at baseline. ^c Reference group is non-sorority members. ^d Reference group is no oral sex (performed) romantic behavior during study. ^e Reference group is no oral sex (performed) hookup behavior during study.

Table 56

Correlations among Variables Used in Oral Sex Sexual Victimization Analyses

Variable	1	2	3	4	5	6	7	8
1. Number of pre-college oral sex SV events	–							
2. Baseline typical number of drinks per week	.10	–						
3. Sorority membership ^a	.17**	.40***	–					
4. Number of romantic oral sex (performed) events	.23***	.13*	.08	–				
5. Number of romantic oral sex (received) events	.14*	.09	.03	.86***	–			
6. Number of oral sex (performed) hookup events	.06	.26***	.12*	.08	.05	–		
7. Number of oral sex (received) hookup events	.04	.28***	.10	.05	.07	.70***	–	
8. Number of oral sex SV events during study	.25***	.05	.09	.02	-.01	.12*	.09	–

Note. SV = sexual victimization. $N = 289$.

^a Coded 0 for non-sorority member, 1 for sorority member.

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

Table 57

Descriptive Statistics for Continuous Predictors of Oral Sex Sexual Victimization

Variable	Mean	SD	Median	Range
Number of pre-college oral sex SV events	0.09	0.37	0	0-2
Baseline drinks per week	4.24	5.39	2	0-21
Number of oral sex (performed) romantic events	16.37	28.10	0	0-121
Number of oral sex (performed) hookup events	2.49	5.30	0	0-23
Number of oral sex (received) romantic events	13.30	25.32	0	0-111
Number of oral sex (received) hookup events	1.37	2.87	0	0-14

Note. SV = sexual victimization. $N = 289$.

Table 58

Number of Oral Sex (Performed) Hookup Events as a Predictor of Oral Sex Sexual Victimization

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-2.46	0.27	86.32	<.001	--	--
Number of pre-college oral sex SV events	1.99	0.44	20.86	<.001	7.33	[3.12, 17.23]
Baseline drinks per week	0.01	0.04	0.03	.86	1.01	[0.93, 1.10]
Sorority membership ^a	-0.10	0.56	0.03	.86	0.91	[0.30, 2.72]
Number of oral sex (performed) romantic events	-0.02	0.01	2.67	.10	0.99	[0.97, 1.00]
Number of oral sex (performed) hookup events	0.08	0.03	5.56	.02	1.08	[1.01, 1.15]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval; *SV* = sexual victimization. *N* = 289.

^a Reference group is non-sorority members.

Table 59

Oral Sex (Received) Hookup Behavior as a Predictor of Oral Sex Sexual Victimization

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-3.75	0.53	49.35	<.001	--	--
Pre-college oral sex SV ^a	2.96	0.60	24.59	<.001	19.36	[6.00, 62.44]
Baseline alcohol use ^b	0.14	0.51	0.07	.79	1.15	[0.42, 3.14]
Sorority membership ^c	-0.16	0.52	0.09	.76	0.85	[0.31, 2.37]
Oral sex (received) romantic behavior ^d	0.62	0.46	1.77	.18	1.86	[0.75, 4.62]
Oral sex (received) hookup behavior ^e	1.52	0.50	9.36	.002	4.59	[1.73, 12.19]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval; *SV* = sexual victimization. *N* = 289.

^a Reference group is no pre-college oral sex SV. ^b Reference group is no alcohol use in past month at baseline. ^c Reference group is non-sorority members. ^d Reference group is no oral sex (received) romantic behavior during study. ^e Reference group is no oral sex (received) hookup behavior during study.

Table 60

Number of Oral Sex (Received) Hookup Events as a Predictor of Oral Sex Sexual Victimization

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-2.46	0.27	83.47	<.001	--	--
Number of pre-college oral sex SV events	1.89	0.41	21.36	<.001	6.59	[2.96, 14.66]
Baseline drinks per week	0.01	0.04	0.01	.90	1.01	[0.92, 1.09]
Sorority membership ^a	-0.02	0.55	0.00	.97	0.98	[0.34, 2.87]
Number of oral sex (received) romantic events	-0.02	0.01	2.29	.13	0.98	[0.96, 1.01]
Number of oral sex (received) hookup events	0.10	0.07	2.48	.12	1.11	[0.98, 1.26]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval; *SV* = sexual victimization. *N* = 289.

^a Reference group is non-sorority members.

Table 61

Numbers of Oral Sex (Performed and Received) Hookup Events as Predictors of Oral Sex Sexual Victimization

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-2.48	0.27	83.73	<.001	--	--
Number of pre-college oral sex SV events	1.97	0.43	20.59	<.001	7.20	[3.07, 16.88]
Baseline drinks per week	0.01	0.04	0.02	.89	1.01	[0.92, 1.10]
Sorority membership ^a	-0.09	0.56	0.03	.87	0.91	[0.30, 2.73]
Number of oral sex (performed) romantic events	-0.01	0.02	0.33	.56	0.99	[0.96, 1.02]
Number of oral sex (received) romantic events	-0.01	0.02	0.21	.64	0.99	[0.95, 1.03]
Number of oral sex (performed) hookup events	0.08	0.04	3.14	.076	1.08	[0.99, 1.17]
Number of oral sex (received) hookup events	0.00	0.09	0.00	.99	1.00	[0.84, 1.20]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval; *SV* = sexual victimization. *N* = 289.

^a Reference group is non-sorority members.

Table 62

Vaginal Sex Hookup Behavior as a Predictor of Attempted Vaginal Rape

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-2.51	0.35	51.30	<.001	--	--
Pre-college attempted vaginal rape ^a	1.71	0.37	20.98	<.001	5.53	[2.66, 11.49]
Baseline alcohol use ^b	0.34	0.41	0.70	.40	1.41	[0.63, 3.12]
Sorority membership ^c	1.05	0.37	7.96	.005	2.87	[1.38, 5.95]
Vaginal sex romantic behavior ^d	-0.27	0.35	0.57	.45	0.77	[0.38, 1.53]
Vaginal sex hookup behavior ^e	0.41	0.36	1.28	.26	1.50	[0.74, 3.04]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. *N* = 282.

^a Reference group is no pre-college attempted vaginal rape. ^b Reference group is no alcohol use in past month at baseline. ^c Reference group is non-sorority members. ^d Reference group is no vaginal sex romantic behavior during study. ^e Reference group is no vaginal sex hookup behavior during study.

Table 63

Correlations among Variables Used in Vaginal Sex Sexual Victimization Analyses

Variable	1	2	3	4	5	6	7	8
1. Number of pre-college attempted vaginal rape events	–							
2. Number of pre-college completed vaginal rape events	.42***	–						
3. Baseline typical number of drinks per week	.41***	.13*	–					
4. Sorority membership ^a	.15*	.05	.40***	–				
5. Number of vaginal sex romantic events	.27***	.14*	.25***	.11	–			
6. Number of vaginal sex hookup events	.18**	.16**	.23***	.16**	.07	–		
7. Number of attempted vaginal rape events during study	.27***	.10	.18**	.24***	.01	.15*	–	
8. Number of completed vaginal rape events during study	.18**	.14*	.10	.15**	.01	.09	.72***	–

Note. Includes only those participants who had complete data for both the attempted and complete vaginal rape analyses. $N = 279$.

^a Coded 0 for non-sorority member, 1 for sorority member.

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

Table 64

Descriptive Statistics for Continuous Predictors of Attempted Vaginal Rape

Variable	Mean	SD	Median	Range
Number of pre-college attempted vaginal rape events	0.36	0.90	0	0-4
Baseline drinks per week	4.30	5.54	2	0-22
Number of vaginal sex romantic events	26.11	44.97	0	0-187
Number of vaginal sex hookup events	2.24	4.82	0	0-22

Note. $N = 282$.

Table 65

Number of Vaginal Sex Hookup Events as a Predictor of Attempted Vaginal Rape

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-2.03	0.22	82.87	<.001		
Number of pre-college attempted vaginal rape events	0.78	0.18	17.96	<.001	2.19	[1.52, 3.15]
Baseline drinks per week	-0.02	0.03	0.21	.65	0.98	[0.92, 1.05]
Sorority membership ^a	1.35	0.39	11.64	<.001	3.84	[1.77, 8.33]
Number of vaginal sex romantic events	-0.01	0.00	2.71	.10	0.99	[0.98, 1.00]
Number of vaginal sex hookup events	0.04	0.03	1.24	.27	1.04	[0.97, 1.10]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. *N* = 282.

^a Reference group is non-sorority members.

Table 66

Vaginal Sex Hookup Behavior as a Predictor of Completed Vaginal Rape

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-3.62	0.51	50.14	<.001	--	--
Pre-college completed vaginal rape ^a	1.53	0.60	6.61	.01	4.63	[1.44, 14.90]
Baseline alcohol use ^b	-0.10	0.48	0.04	.84	0.91	[0.35, 2.33]
Sorority membership ^c	0.36	0.48	0.55	.46	1.43	[0.56, 3.65]
Vaginal sex romantic behavior ^d	1.10	0.47	5.40	.02	3.00	[1.19, 7.56]
Vaginal sex hookup behavior ^e	1.27	0.45	8.09	.005	3.56	[1.48, 8.54]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. *N* = 282.

^a Reference group is no pre-college completed vaginal rape. ^b Reference group is no alcohol use in past month at baseline. ^c Reference group is non-sorority members. ^d

Reference group is no vaginal sex romantic behavior during study. ^e Reference group is no vaginal sex hookup behavior during study.

Table 67

Descriptive Statistics for Continuous Predictors of Completed Vaginal Rape

Variable	Mean	<i>SD</i>	Median	Range
Number of pre-college vaginal rape events	0.10	0.43	0	0-2
Baseline drinks per week	4.29	5.58	2	0-22
Number of vaginal sex romantic events	26.19	45.01	0	0-187
Number of vaginal sex hookup events	2.32	4.97	0	0-22

Note. $N = 282$.

Table 68

Number of Vaginal Sex Hookup Events as a Predictor of Completed Vaginal Rape

Parameter	<i>B</i>	<i>SE</i>	Wald χ^2	<i>p</i>	<i>AOR</i>	95% CI
Intercept	-2.40	0.25	89.66	<.001		
Number of pre-college vaginal rape events	0.71	0.32	5.01	.025	2.03	[1.09, 3.76]
Baseline drinks per week	0.00	0.04	0.01	.94	1.00	[0.93, 1.08]
Sorority membership ^a	0.35	0.50	0.49	.48	1.42	[0.54, 3.74]
Number of vaginal sex romantic events	0.00	0.00	0.10	.75	1.00	[0.99, 1.01]
Number of vaginal sex hookup events	0.08	0.03	6.90	.009	1.09	[1.02, 1.15]

Note. *B* = regression estimate; *SE* = standard error; *AOR* = adjusted odds ratio; *CI* = confidence interval. *N* = 282.

^a Reference group is non-sorority members.

Figure 1. Proportion engaging in sexual hookup and romantic behavior in the last month (waves 2-13).

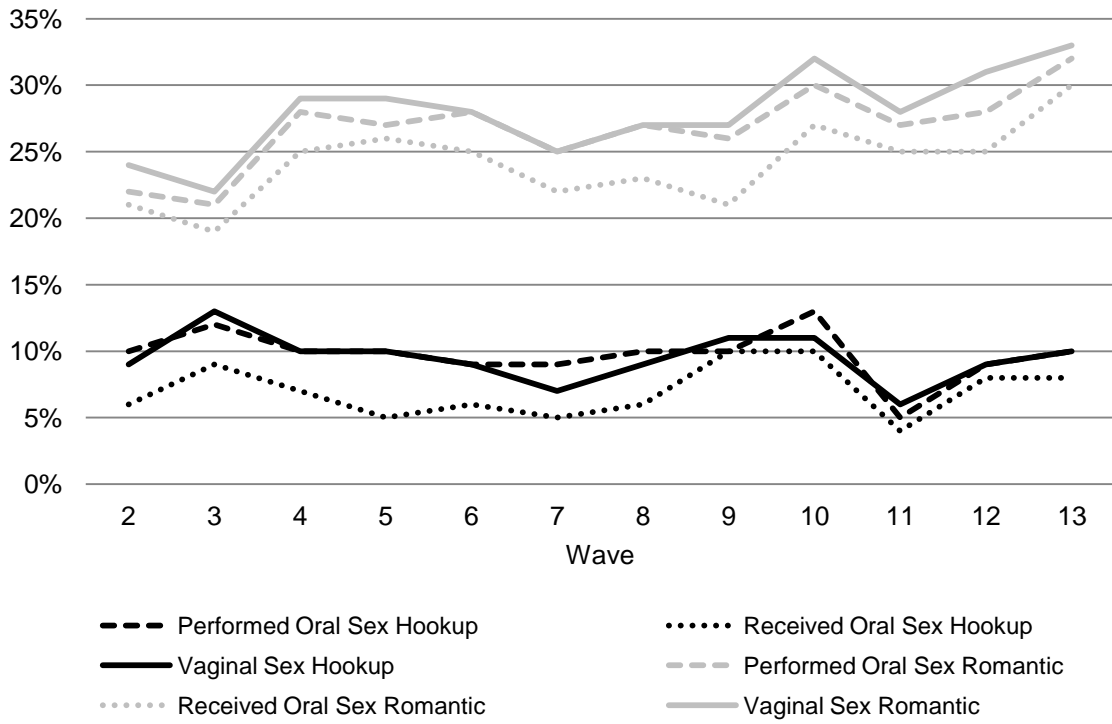


Figure 2. Mean mental health outcomes over time (waves 1-13).

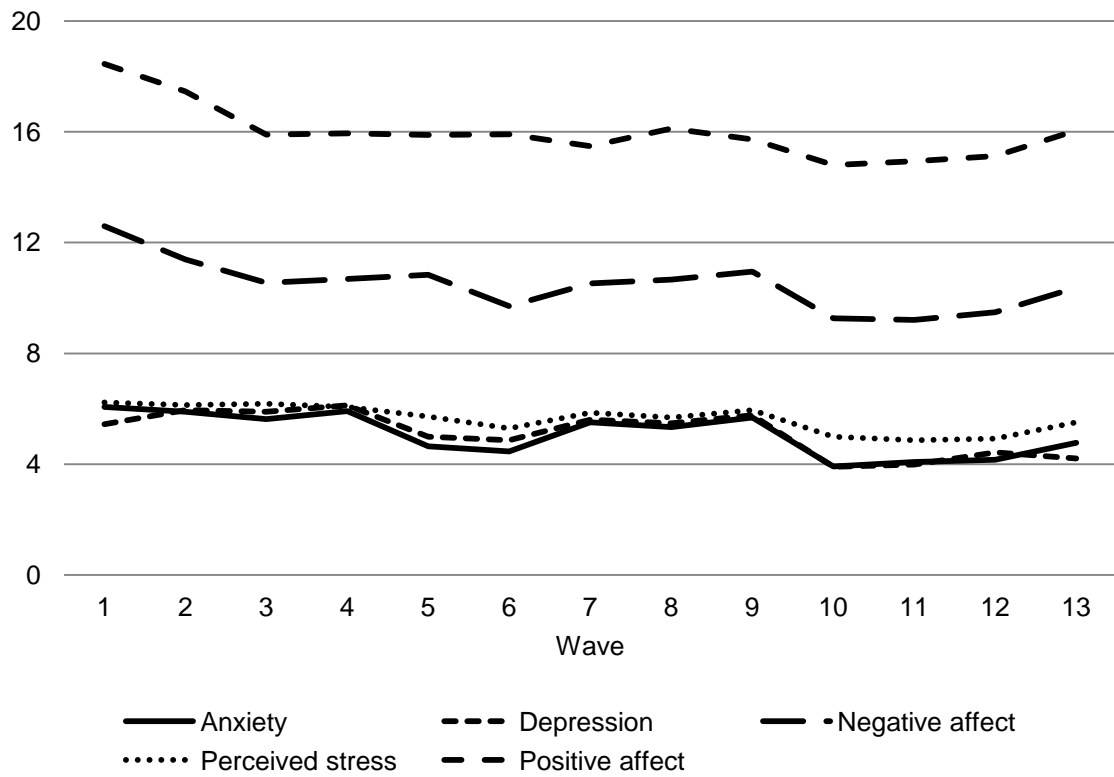


Figure 3. Mean self-esteem and life satisfaction over time (waves 1, 5, 9, and 13).

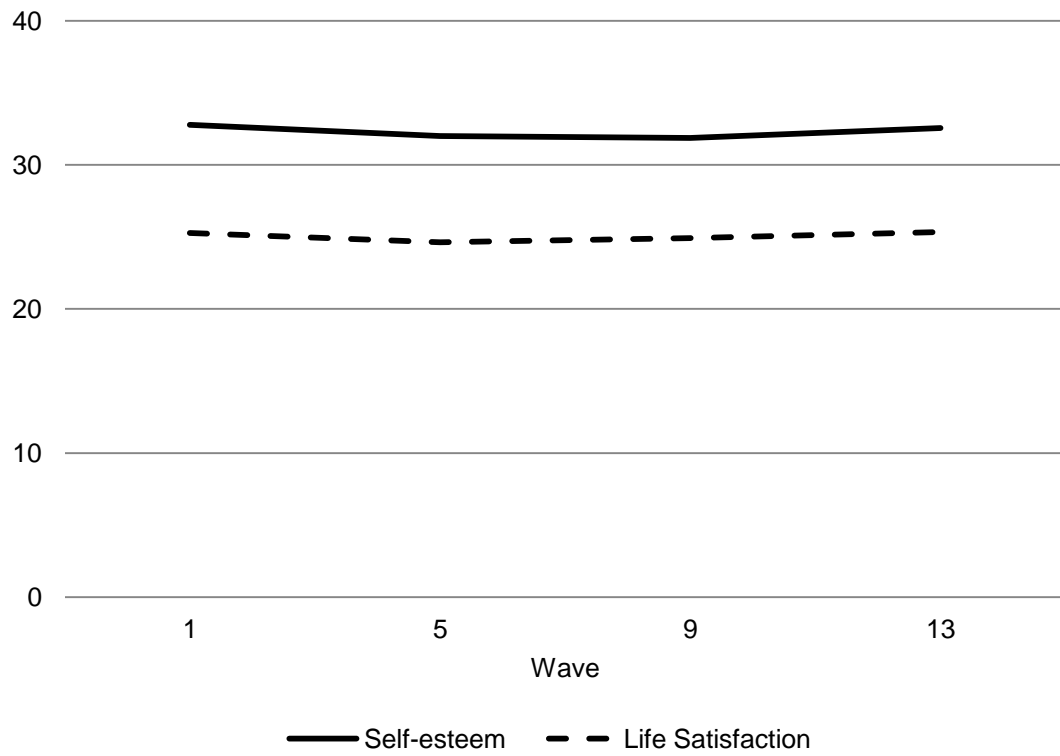


Figure 4. No growth (intercept-only) model for sexual hookup behavior (waves 2-9).

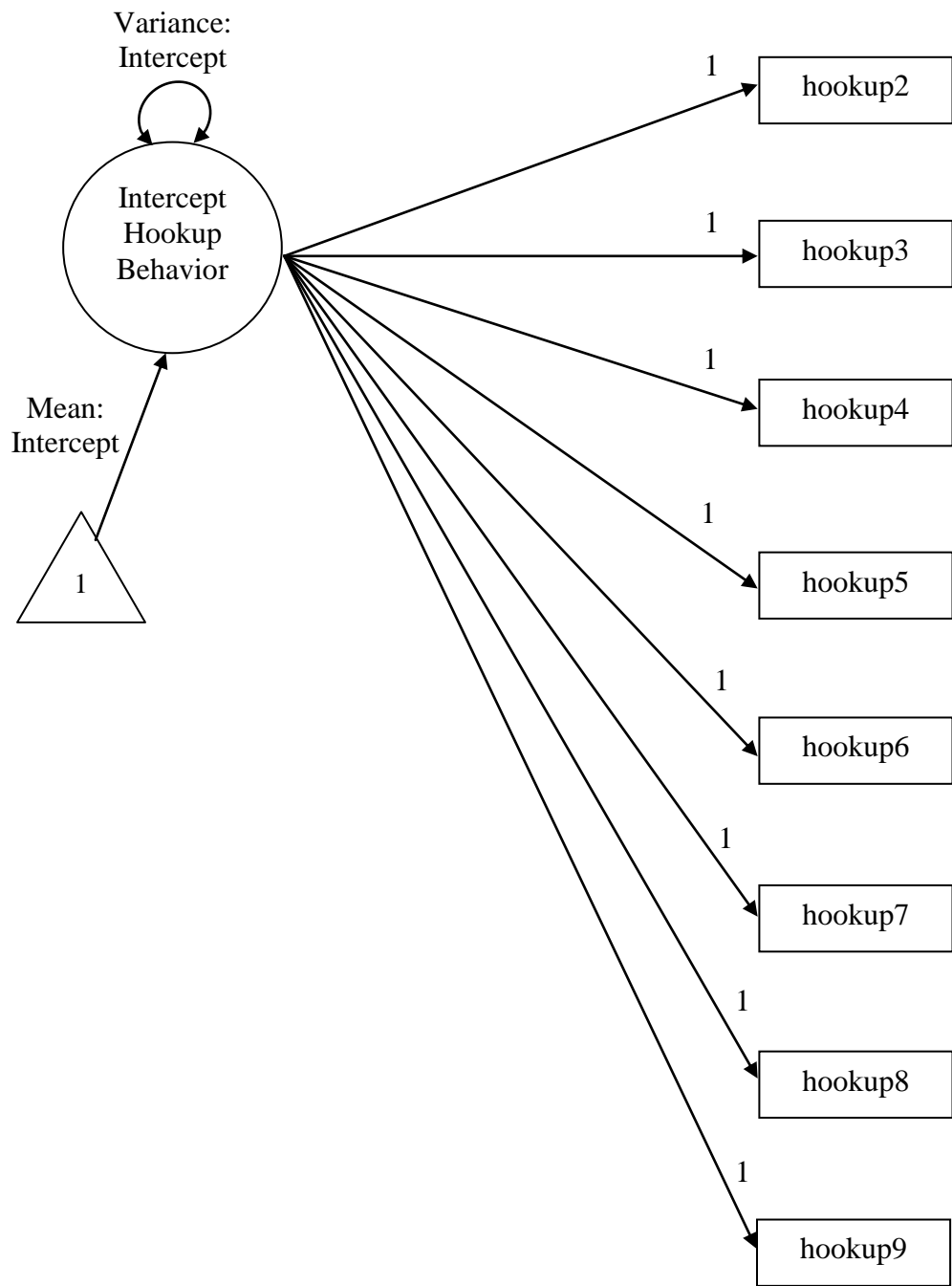


Figure 5. Linear growth model for sexual hookup behavior (waves 2-9). Loadings for the intercept growth factor are in plain black type, and loadings for the slope growth factor appear in grey.

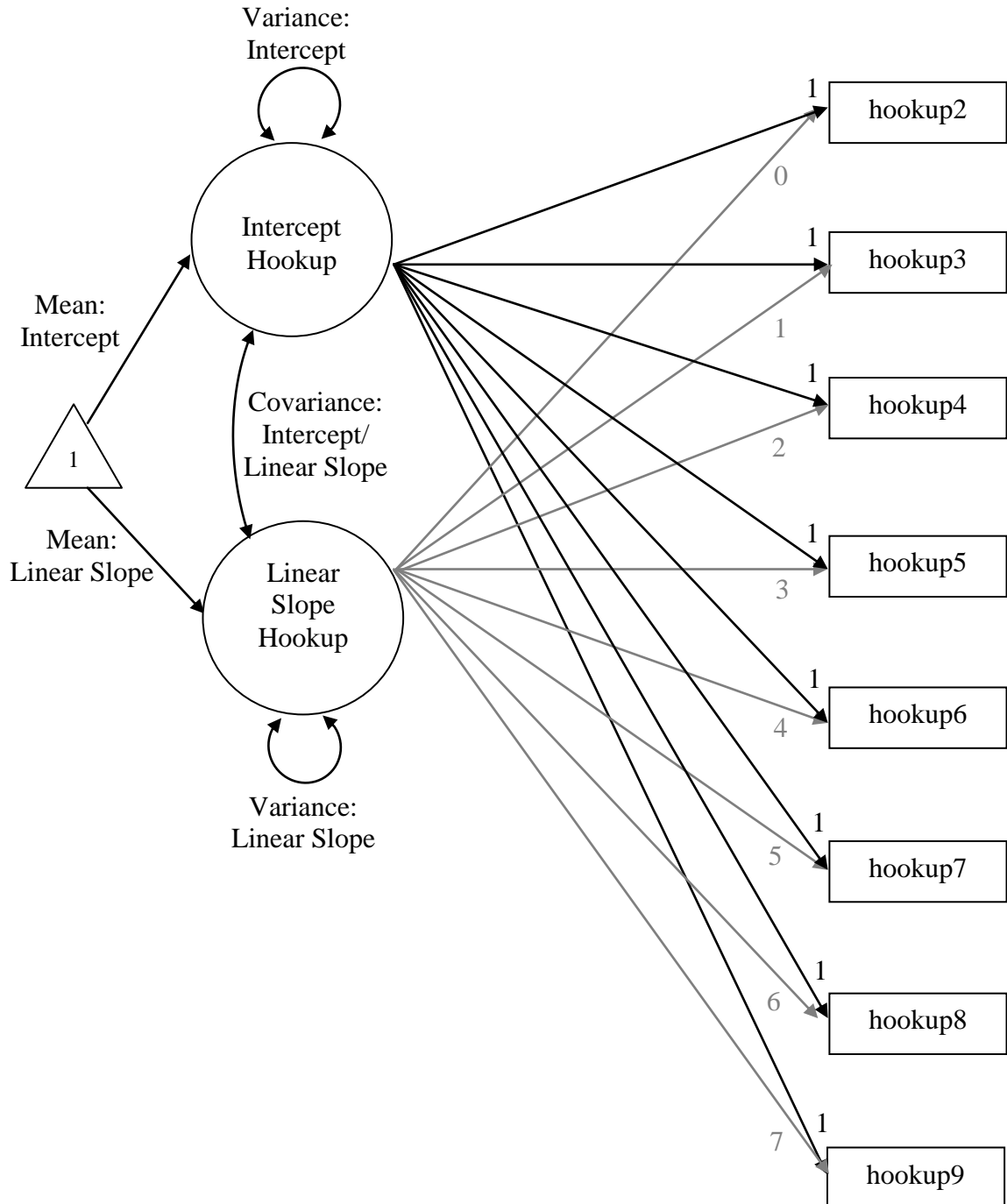


Figure 6. Quadratic growth model for sexual hookup behavior (waves 2-9). Loadings for the intercept growth factor are in plain black type, loadings for the linear slope growth factor appear in grey, and loadings for the quadratic slope growth factor are in italics. I = intercept; LS = linear slope; QS = quadratic slope; Cov = covariance; Var = variance.

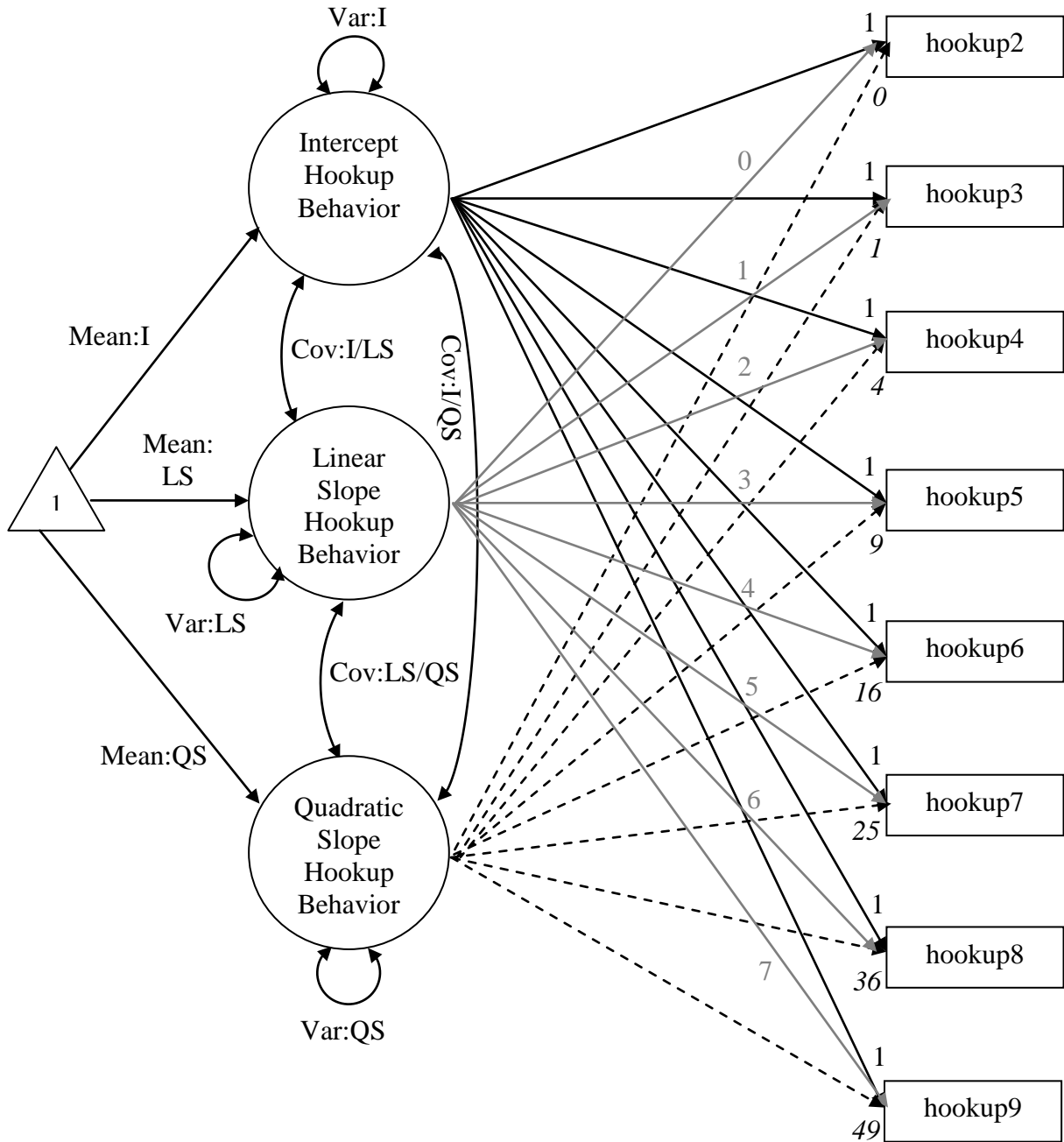


Figure 7. Quadratic growth model for sexual hookup behavior (waves 2-9), with variance of quadratic slope fixed to zero. Loadings for the intercept growth factor are in plain black type, loadings for the linear slope growth factor appear in grey, and loadings for the quadratic slope growth factor are in italics. Because the variance of the quadratic slope is fixed to zero, the covariance between the linear slope and quadratic slope, and the covariance between the intercept and the quadratic slope, are both zero. I = intercept; LS = linear slope; QS = quadratic slope; Cov = covariance; Var = variance.

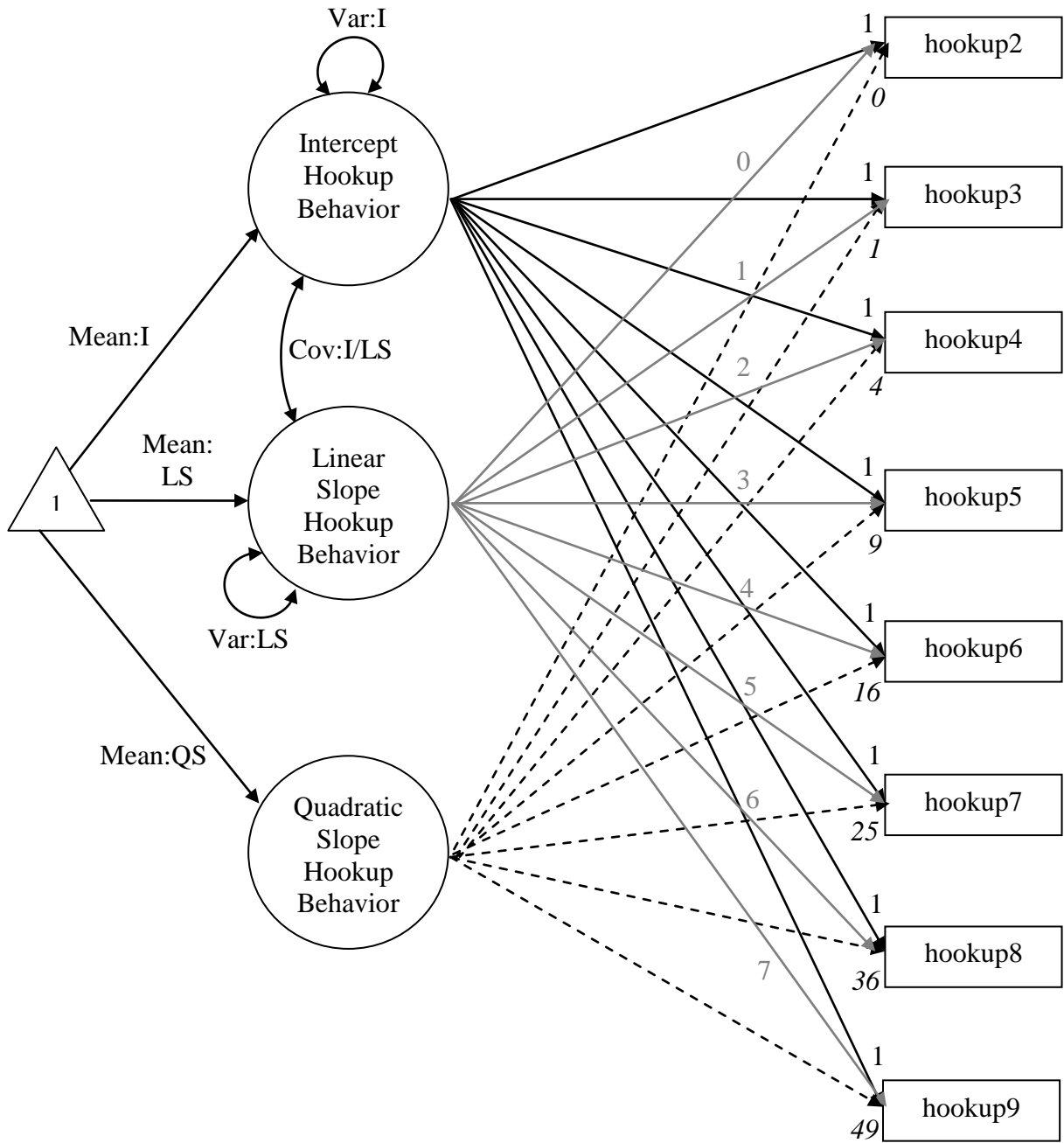


Figure 8. Univariate latent growth curve model for anxiety (waves 2-9), with variance of quadratic slope fixed to zero and serial correlations fixed to be equal over time. Loadings for the intercept growth factor are in plain type, loadings for the linear slope growth factor appear in grey, and loadings for the quadratic slope growth factor are in italics. Because the variance of the quadratic slope is fixed to zero, the covariance between the linear slope and quadratic slope, and the covariance between the intercept and the quadratic slope, are both zero. I = intercept; LS = linear slope; QS = quadratic slope; Cov = covariance; Var = variance; r = serial correlation; e = residual variance.

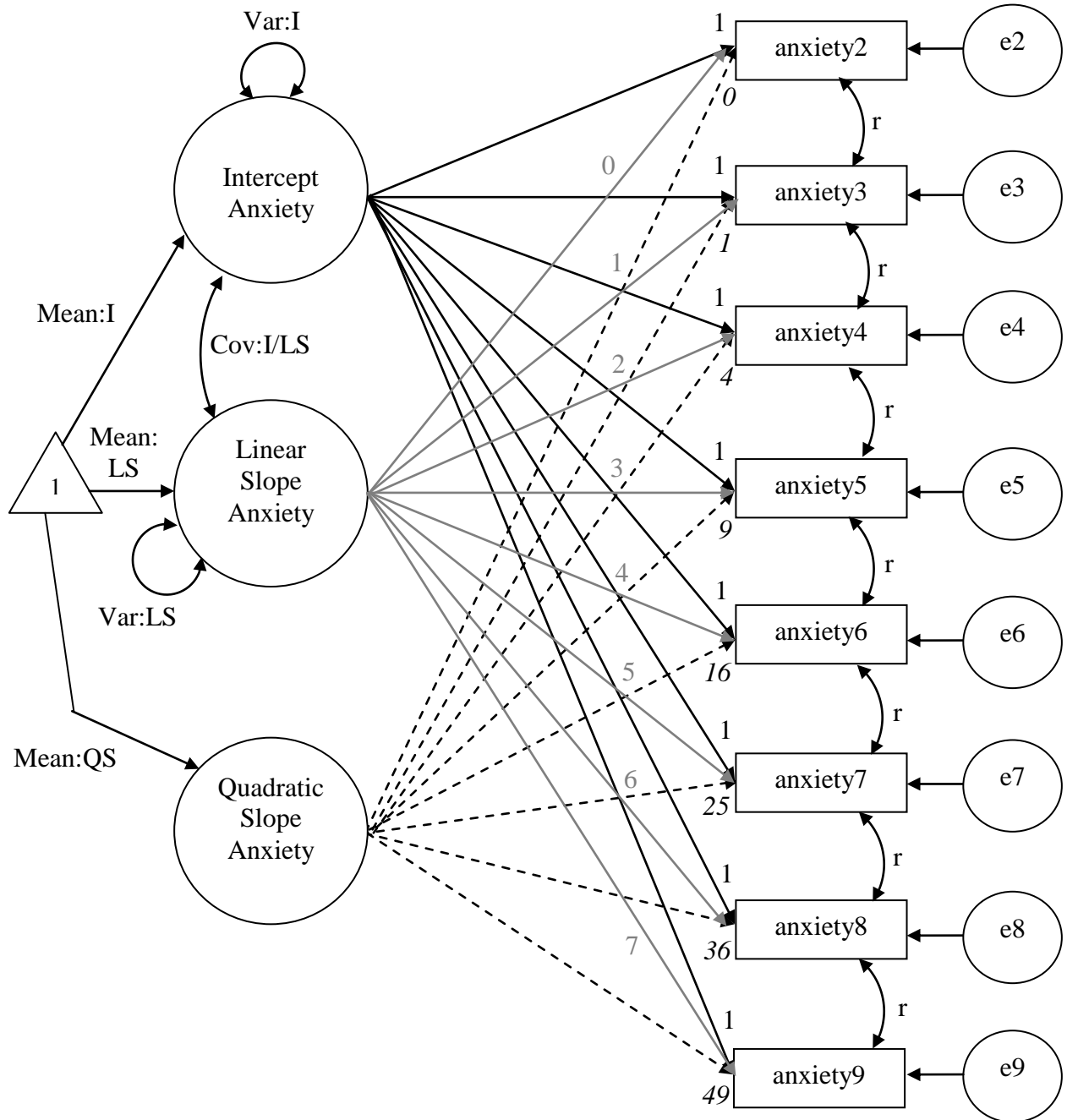


Figure 9. Univariate latent growth curve model for self-esteem (waves 5-13), with residual variances fixed to be equal over time. Loadings for the intercept growth factor are in plain black type, and loadings for the slope growth factor appear in grey. e = residual variance.

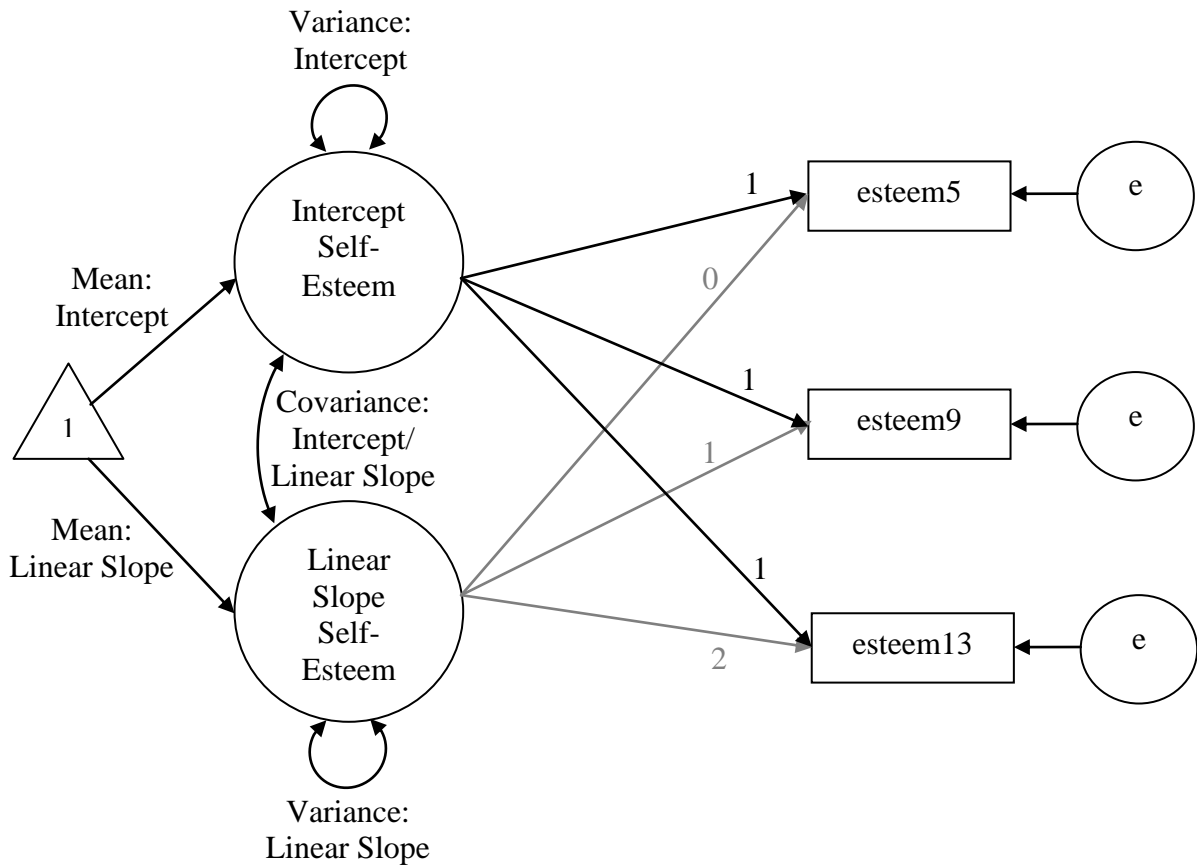
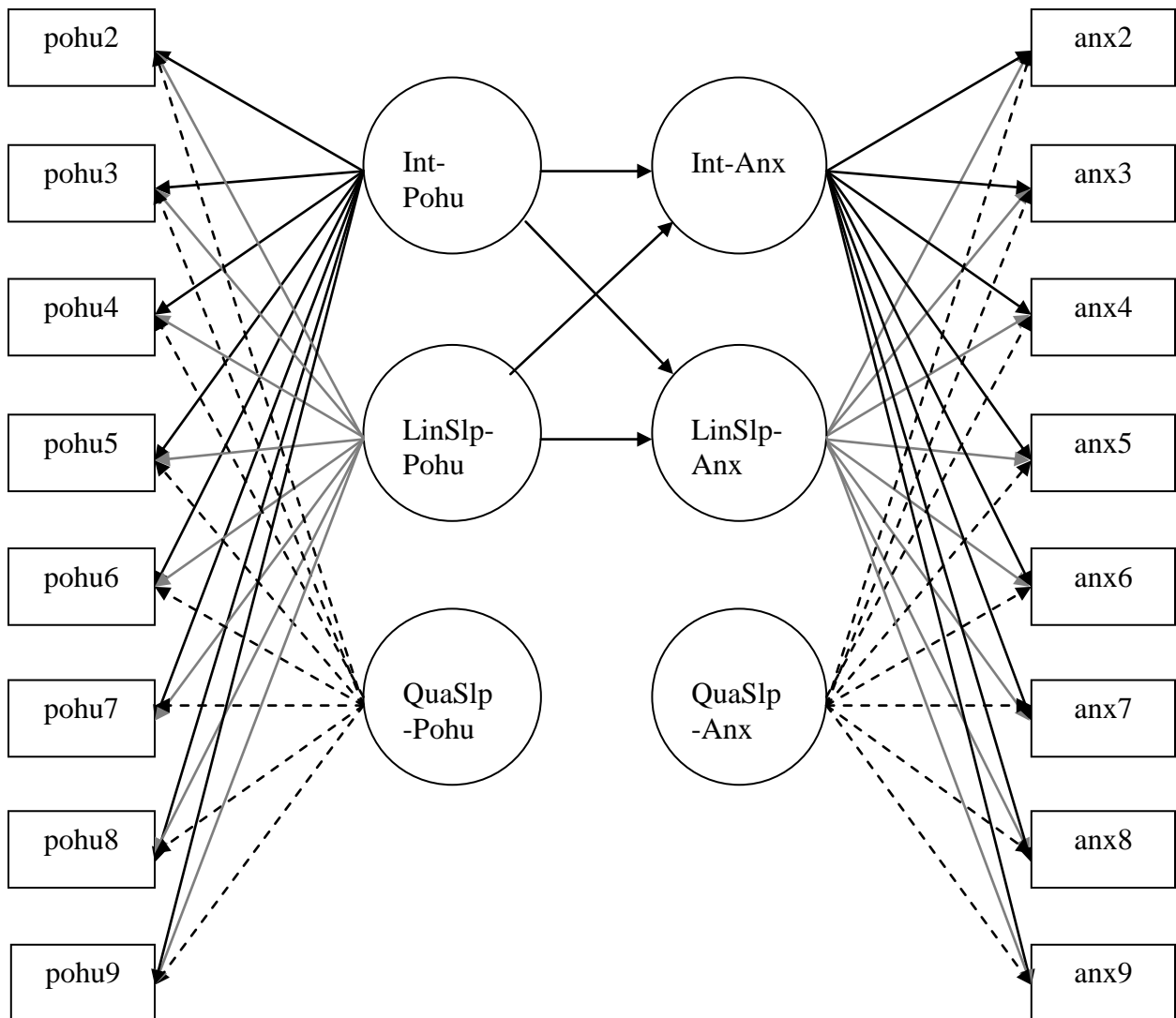


Figure 10. Multivariate latent growth curve model for anxiety and oral sex (performed) hookup behavior (waves 2-9), with variance of quadratic slope fixed to zero for both. The means, variances, covariances, and loadings for the all growth factors as well as the residual variance terms for anxiety are omitted from the figure to reduce clutter. Because the variances of the quadratic slopes are fixed to zero, the covariances between the linear slopes and quadratic slopes, and the covariances between the intercepts and the quadratic slopes, are zero. Arrows between the intercept and linear slope growth factors represent regressions of anxiety growth factors on hookup behavior growth factors. Int = intercept; LinSlp = linear slope; QuaSlp = quadratic slope; pohu = performed oral sex hookup behavior; anx = anxiety.



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Alumni Award for one senior with outstanding scholarship, leadership, and service, University of Mary Washington (2005)

Uzi Selzer Award for Best Applied Undergraduate Paper at the Virginia Psychological Association Annual Conference (2004)

Phi Beta Kappa, University of Mary Washington (2004)

Psi Chi Honor Society, University of Mary Washington (2003)

Seventeen undergraduate scholarships (2001-2005)

PROFESSIONAL EXPERIENCE:

Integrated Behavioral Health Intern, Syracuse University Health Services (2009-2012)

Research Assistant, Department of Psychology, Syracuse University (2009-2011)

Therapist, Psychological Services Center, Syracuse University (2008-2009)

Teaching Assistant, Department of Psychology, Syracuse University (2007-2008)