SEXUAL BEHAVIOR AND MENTAL HEALTH IN LATE ADOLESCENCE

A Dissertation in

Human Development and Family Studies

by

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ABSTRACT

Much of the research on sexual behavior in adolescence has focused on factors that predict whether adolescents engage in sexual behavior or use contraception, with the goal of preventing STIs and pregnancy. However, sexual behavior may be associated with a broader range of health outcomes, and relatively little is known about how sexual behavior impacts mental health. In this dissertation, I extend the literature on associations between sexual behavior and mental health in late adolescence in three papers. In Paper 1 I present a conceptual model of how sexual behavior may be associated with physical, mental and social health in adolescence, and review the relevant literature in these areas. This paper emphasizes how sexual behavior may be associated with different outcomes due to individual and relationship factors, and how individuals’ perceptions of their behavior may affect how sexual behavior is associated with later mental and social health. In Paper 2 I examine how college students’ daily affect may vary depending upon whether they had sex on that day and by situational factors of their sexual experience, using a subsample of students from the University Life Study (ULS) who engaged in vaginal sex at least once during 14 days of daily data collection during their first six semesters in college (N=364; 57.4% female; 29.1% Hispanic/Latino [HL], 25.0% non-HL European American, 17.3% non-HL Asian American, 17.0% non-HL African American, 11.5% non-HL multiracial). Students had more positive affect and less negative affect on days they were sexually active compared to days they were not. In addition, students reported more negative affect on days they had sex with a non-dating, compared to dating partner. They also had more positive affect on days they perceived more positive consequences of sex, and more negative affect on days they perceived more negative consequences of sex. In Paper 3, I examine whether college students’ psychological distress changed after they engaged in first intercourse, whether these changes were temporary or persisted in the long-term, and how such changes differed depending on situational factors of the sexual experience. I used data from a subsample of participants in the ULS who reported first intercourse between their second and sixth semester of college (N=119; 47.1% female; 22.7% Hispanic-Latino [HL], 30.3% non-HL European American, 13.5% non-HL Asian American, 17.6% non-HL African American and 5.9% non-HL multiracial). Students reported less psychological distress after they engaged in first intercourse compared to their pre-sex trajectories, and this effect was not temporary but persisted for several semesters after first intercourse. Participants who had sex with a non-dating partner experienced a greater increase in distress over time, but experienced a greater decrease in distress after first intercourse compared to those who had sex with a dating partner. In addition, students who perceived more positive consequences experienced a smaller decrease in distress after first intercourse. Taken together, these papers suggest that sexual behavior is associated with better mental health in college students. However, associations between sexual behavior and mental health may differ depending on factors such as perceptions of the event and relationship with sexual partner, highlighting the variability in individuals’ sexual experiences and the importance of studying individual, relational and situational factors as moderators.
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Yeah, this is getting long, but I’ve had my literary nonfiction writing bottled up in five years of academic papers, and it is coming out in this acknowledgements sections. And finishing up my dissertation is making me nostalgic.

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also a member of my committee, I want to save the best for last, to use a cliché, and thank my advisor and committee chair, Eva Lefkowitz, for all her support during my time in grad school. I think there is this negative, *PhD Comics* inspired version of advisors, in which they see students as some sort of drone peons useful for getting their busy work done, but not people they want to spend time on or respect as researchers. I was shocked to realize this model is a reality for some people, as this is so far from my experience. Eva truly cares about her students, and takes time to contribute to their professional development. Perhaps most importantly, I never felt pressure to do work that was merely an extension of her own interests, but felt encouraged to develop my own area of expertise and way of thinking. I think this is a model of what a mentor should be: providing support and guidance, but also encouragement to develop as an independent scientist. Graduate school is quite a gamble, in which someone you’ve likely met only once becomes an integral part of your life, and overall I think I was pretty fortunate in this regard.
Overarching Introduction and Contributions

Despite the assertion by researchers that sexuality and mental health are associated and should be studied in tandem, relatively little is known about how sexual behavior in adolescence is associated with mental health (Coleman, 2002; Hafner, 1998; Langfeldt & Porter, 1986; O'Sullivan, McCrudden, & Tolman, 2006). Thus, the aim of this dissertation is to examine how sexual behavior is associated with both positive and negative aspects of mental health in late adolescence through a conceptual/review paper and two empirical studies. First, drawing from research and theory on health risk behavior, healthy sexuality in adolescence and the influence of life events on psychopathology and positive well-being, I provide a framework for the study of how adolescent sexual behavior may be associated with health outcomes, including mental health (Paper 1; Figure 1.1, p. 50). Then I present two empirical papers which utilized the framework laid out in my conceptual model (see Figure 2.1, p. 82; Figure 3.1, p. 113), using data from the University Life Study (ULS), a 3.5 year longitudinal study of alcohol use and sexual behavior in college students. In Paper 2, I use web-based daily data to examine whether college students’ levels of positive and negative affect differ on days they engage in sexual behavior compared to days they do not. In addition, I examine specific situational factors of students’ sexual experiences that may be associated with greater positive or negative affect (the relationship with sexual partner and perceived positive and negative consequences of the sexual experience). In Paper 3, I utilize longitudinal data from a subsample of students in the ULS who transitioned to first intercourse during their first six semesters of college to determine whether students experience a change in mental health after this transition. In addition, I examined how this transition may be associated with different mental health outcomes for female and male students, and how factors like the relationship with first sexual partner and perceived positive
and negative consequences of the sexual experience predict mental health after first intercourse. Across these studies, my primary aim is to examine 1) how sexual behavior is associated with mental health in late adolescence and 2) what factors are associated with more positive or negative outcomes of sexual behavior.

The papers that make up this dissertation contribute to literature on sexual behavior and mental health in several ways. First, providing a conceptual framework elucidating how sexual behavior may be associated with health is important in examining what is known about outcomes of adolescent sexual behavior and framing future research. Currently, no models provide a comprehensive view of sexual behavior and health, as most theory and research has focused on predictors, rather than outcomes, of sexual behavior. Second, these papers examine how sexual behavior is associated with mental health in late adolescence. Much of the research on this topic has focused on early or middle adolescence. By examining psychological effects of later sexual behavior, this research will give us a clearer picture of how sexual behavior is associated with mental health across different developmental periods. Gaining such an understanding also has implications for sexuality education and safe sex programs; many abstinence-only programs suggest that any pre-marital sex is psychologically harmful, although there is relatively little evidence to support (or refute) such an assertion. Thus, this research will provide information on which circumstances may be associated with healthy sexual development and which ones may be problematic.

Third, these studies include repeated measures data. I utilized data from a study with a measurement burst design, which include both short-term (daily) and long-term (semester) longitudinal data. Using this type of data is a strength because it allows me to expand the literature beyond between-persons questions (e.g. differences between students who are sexually
active or abstinent) to examine questions of within-person variability (e.g. differences on days individuals have sex versus days they do not) and longitudinal change (e.g. changes that occur after the transition to first intercourse). These approaches will expand the literature by showing that associations between sex and mental health are not merely a result of selection (e.g. depressed people are more likely to have sex) but may reflect the ways in which sexual behavior influences mental health.

Finally, a related advantage is that this study examines specific factors related to sexual experiences that are associated with positive or negative mental health outcomes. The use of repeated measures allows me to examine how both individual and contextual factors may lead an individual to experience more positive or negative mental health as a result of sexual behavior. In addition, I will examine how individuals’ perceived consequences of their sexual experiences relate to mental health. This focus on evaluations of sexual behavior, such as perceived consequences, is an important contribution, as it provides a potential mechanism by which sexual behavior is associated with mental health.
A Model of Adolescent Sexual Behavior and Physical, Mental and Social Health

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Abstract

No current theoretical model of adolescent sexuality fully explains the ways in which sexual behavior may be associated with multiple facets of health. Drawing from theories of adolescent development, healthy sexuality and cognitive processes of depression and well-being, we provide a conceptual framework for understanding how adolescent sexual behavior may influence physical, mental and social health and review the current literature consistent with this model. Although early sexual behavior may be associated with risks of STIs and pregnancy and negative mental health outcomes in some cases, adolescent sexual behavior can also be associated with many positive outcomes. Thus, in the proposed conceptual model and literature review we emphasize the need for understanding how individuals’ characteristics, attitudes, perceptions and relationships may be associated with inter-individual differences in health outcomes of sexual behavior.
A Model of Adolescent Sexual Behavior and Physical, Mental and Social Health

Much of the research on adolescent sexual behavior has focused on identifying factors that predict whether an adolescent will engage in behaviors, such as intercourse, or use contraception. Implicit in such a focus is the idea that sexual behavior is harmful to adolescent health and well-being and as such should be prevented. This goal is legitimate, given the relatively high incidence of STIs and unwanted pregnancy among American teenagers and young adults (Finer & Henshaw, 2006; Upchurch, Mason, Kusunoki, & Johnson, 2004). However, researchers have suggested that sexual behavior has a broader impact on health (Coleman, 2002; O’Sullivan, McCrudden, & Tolman, 2006; Satcher, 2001). In addition, many abstinence-only sexuality education programs are premised around the idea that all sexual behavior outside of marriage is psychologically harmful (Santelli et al., 2006). Despite the debate about such programs, relatively little research evidence exists to support (or refute) such claims. Thus, in this paper we present a conceptual framework and literature review focused around one primary question: How does adolescent sexual behavior impact health? Understanding that sexual experiences vary across different people and situations, we explore not only whether sex is harmful to adolescents’ well-being, or a largely positive experience, but also what factors predict whether sex is a healthy or unhealthy experience for adolescents.

Although several theories and conceptual frameworks have been applied to understanding sexual behavior, no single perspective adequately captures the complexity of adolescent or emerging adult sexuality (Lefkowitz & Gillen, 2006; Zimmer-Gembeck & Helfand, 2008), and most theoretical perspectives focus on predicting whether sexual behaviors occur, rather than the health impact of such behavior. In line with these questions, we propose a conceptual framework for studying how sexuality in adolescence is associated with a broad range of health
outcomes. This model includes ways by which sexual behavior may impact three broad types of health, and draws from research and theory on health risk behavior, healthy sexuality in adolescence and the influence of life events on psychopathology and positive well-being. As we detail the pathways specified in this model, we review the literature to examine which aspects of the model have already been examined, and which are important areas for future research on understanding associations between adolescent sexual behavior and health.

This review of adolescent sexual behavior and health includes research on individuals who are typically defined as adolescents (e.g. middle school, high school students) and individuals who are classified as being in both adolescence and other stages, such as emerging or young adulthood (e.g. college students). Definitions of adolescence vary; some define adolescence as the second decade of life (Lerner & Steinberg, 2004) or as lasting into the mid-twenties (e.g. Feldman & Elliot, 1990) whereas others define the late teens and early twenties as a distinct stage (e.g. emerging adulthood, Arnett, 2000). Part of the difficulty in designating a specific age range for adolescence may be that the boundaries of the period are not necessarily bounded by age, but by specific experiences that mark the transition to adulthood (Damon, 2004). In the domain of sexual behavior individuals in their late teens and early twenties are, in many ways, more similar to adolescents than adults. The vast majority of traditionally aged colleges students, for example, are unmarried (Jacobs & King, 2002), and the average age of first marriage in the United State is 26 for women and 28 for men (U.S. Census Bureau, 2009). A sizeable minority of individuals do not engage in first intercourse until their late teens or early twenties (Spriggs & Halpern, 2008). For college students and others in this age range, sexual behavior is largely premarital and often exploratory, much like sexual behavior earlier in adolescence. In addition, because there is a paucity of research on sexual behavior and some
aspects of health, studies of older adolescents or emerging adults may be the only source of information on some pathways in our model, and therefore are particularly informative. Thus, in this model we include research that focuses sexual behavior with sample of individuals both in the teens through early twenties. However, we note that it is important to examine how associations between sexual behavior and health may differ for individuals at different stages, an idea that we will explore more fully when discussing future directions for research.

**A model of sexual behavior and health in adolescence**

Figure 1.1 presents a graphic representation of our model showing how sexual behavior may impact adolescent health. Since its inception, the World Health Organization has defined health as encompassing physical, mental and social dimensions (WHO, 1946). Because adolescent sexual behavior has the potential to influence all three of these types of health, we include these three domains as the primary outcomes of interest in the model. The focus of our paper differs from writings on adolescent sexual health, which include varied aspects of sexuality, including values, beliefs, knowledge and behavior (Hafner, 1998). Rather than trying to define healthy sexuality, our focus is on understanding how *sexual behaviors* or specific occurrences of sex are associated with a broad range of health outcomes. As we are focusing on specific instances of sexual behavior, we are able to view such behaviors as a series of large and small life events which may influence health, and draw from a larger literature on the impact of life events on mental health. Specifically, we posit that sexual behavior can directly influence physical health (e.g. STIs, unwanted pregnancy) and indirectly influence mental and social health through cognitive processes by which individuals evaluate their sexual behavior. In their recent review of research on adolescent sexuality, Tolman and McClelland (2011) suggest that future research on adolescent sexuality should seek to integrate risk and normative
developmental perspectives. One way to better understand for whom and under what circumstances sexual behavior is healthy or unhealthy is to examine individuals’ perceptions of their behavior, as different adolescents may have positive and negative perceptions of the same sexual behavior based on their characteristics and beliefs, which could be associated with different mental or social health outcomes. Thus, we review research on both positive (e.g. self-esteem) and negative (e.g. depressive symptoms) outcomes, and emphasize the need for research that examines both types of outcomes.

In subsequent sections we describe this model in greater detail, along with a review of research on the specified pathways. Note that the model does not attempt to include all factors that influence these facets of health, or to identify every potential pathway by which health outcomes are associated with each other. Instead, we focus on specific pathways relevant to understanding how sexual behavior may be associated with health outcomes.

Factors predicting sexual behavior

The first set of pathways in our model focuses on factors that predict sexual behavior. As sexual behavior is a partnered activity, both factors related to individuals and their sexual partner can influence behaviors like whether individuals have sex or whether they use contraception. These individual and relationship factors, including attitudes and beliefs about sexuality, are influenced by broader cultural factors, such as the culture an individual grows up in and their media exposure. Because beliefs about sexual behavior may influence both the behaviors individuals engage in and how they perceive these behaviors, they are integral to adolescents’ health outcomes of sexual behavior. However, as the majority of research on adolescent sexual behavior has been on factors that predict risky sexual behavior, we do not include an exhaustive review of these areas in our paper, but provide a brief summary and refer the reader to several
relevant review articles.

**Cultural factors.** Adolescents’ beliefs about sexuality and romantic relationships are influenced by broader factors, such as culture and media, which can in turn influence their sexual behaviors. Different countries have different attitudes toward adolescent sexuality and contraceptive use, which in turn can influence policies regarding sexuality education and accessibility of contraception and ultimately adolescent sexual behaviors and their outcomes (Forrest, 1990). Within the United States, racial/ethnic groups vary in their attitudes toward sexuality, childbearing and romantic relationships, which may be one reason for racial and ethnic differences in sexual behavior and adolescent pregnancy (East, 1998). In addition to being influenced by the norms of their nation or cultural heritage, adolescents may also receive socialization about sexuality from the media. Media depictions of sexual behavior are generally positive and focused on positive aspects of sex rather than potential risks (Brown & Keller, 2000; Ward, 2003). Adolescents and college students who are heavier users of sexually-oriented media hold, on average, more liberal attitudes toward sexual behavior, less positive attitudes toward sexual abstinence, and more dysfunctional views of relationships; heavy use of sexually-oriented genres is also associated with more sexual experience and a larger number of sexual partners (see Ward, 2003 for review).

**Individual factors.** Much of the research on adolescent sexual behavior has examined how individual factors, such as demographic characteristics, attitudes and motives for sex predict whether an individual engages in sexual behavior. A number of theories (e.g. health theories, social control theory) have explicated how such factors predict behavior (DeLamater, 1981; Maddux & DuCharme, 1997; Strecher, Champion & Rosenstock, 1997), and a considerable amount of research has been devoted to the topic. This research has focused on areas including,
but not limited to intentions, peer norms, family factors, self-efficacy, personality, attitudes toward sex, race/ethnicity, school factors and religiosity (see Buhi, 2007; Hoyle, Fejfar, & Miller, 2000; Zimmer-Gembeck & Helfland, 2008 for review). Because these pathways are relatively well-established, and our primary focus is on health outcomes of sexual behaviors, we will not provide a comprehensive review of how individual factors predict engaging in sexual behavior. However, we will briefly mention several types of individual factors that predict engaging in sexual behavior that we believe may also play an important role in how adolescents perceive their sexual behavior (e.g., may moderate associations between sexual behavior and perceptions), which we will further describe in subsequent sections. Individuals’ thinking about sexuality, including sexual attitudes, religiosity and motives for sex, play a role in predicting their sexual behavior. More permissive sexual attitudes predict a greater likelihood of engaging in intercourse in adolescence (Carvajal et al., 1999; Meier, 2003; Miller, Norton, Fan, & Christopher, 1998; Whitbeck, Yoder, Hoyt, & Conger, 1999). Similarly, adolescents who are more religious are more likely to delay intercourse, although such associations may only exist for girls and differ depending on the aspect of religiosity being studied (Hardy & Rafaelli, 2003; Lefkowitz, Gillen, Shearer, & Boone, 2004; Meier, 2003; Whitbeck et al., 1999). Adolescents’ sexual motives, or reasons for engaging in sexual behavior, predict engaging in intercourse, as well as factors like condom use and number of partners. For example, motives to have sex for pleasure are associated with riskier sexual behaviors, such as earlier age at first intercourse and greater number of sexual partners, whereas motives to have sex to be closer to a partner are associated with less risky behavior (Cooper, Shapiro, & Powers, 1998; Patrick, Maggs, Cooper, & Lee, 2010).

Finally, some research has suggested that adolescents’ mental health influences whether
they become sexually active. For example, depressive symptoms have been linked to greater odds of becoming sexually active (Longmore, Manning, Giordano, & Rudolph, 2004; Smith, 1997). Greater anxiety is associated with delay of sexual intercourse in boys, and lower school-related self-esteem is associated with initiation of first intercourse (Capaldi, Crosby, & Stoolmiller, 1996; Waller & DuBois, 2004). Thus, although our focus in this paper is on mental health outcomes of sexual behavior, it is important to consider the potentially bi-directional nature of associations between mental health and sexual behavior, as well as aspects of mental health that may influence adolescents’ perception of and subsequent health consequences of their sexual behavior (which we describe in subsequent sections).

**Relationship factors.** Individuals’ sexual behavior is influenced not only by their own attitudes and beliefs, but those of others in their lives, including their romantic partners. Although both theoretical models and past research have examined how individual characteristics predict sexual behavior, most have utilized a framework used for other risk behaviors, such as the Health Belief Model or Theory of Planned Behavior (Maddux & DuCharme, 1997; Strecher et al., 1997). Sexual behaviors differ from other health behaviors, however, because they are partnered activities. Although behaviors such as substance use often occur in a peer context, they do not require a partner. However, engaging in intercourse or unprotected sex both requires a partner and is influenced by not only individuals’ own characteristics, but also those of their sexual partner (Lefkowitz, Gillen, & Vasilenko, 2011). Thus, whether an adolescent engages in certain sexual behaviors is a highly relational decision that may be strongly linked with a romantic partner’s characteristics.

Despite the partnered nature of sexual behavior, research on romantic partners’ influence on engaging in sexual behavior has been relatively limited. Although the interrelated nature of
sexual behavior and romantic relationships has been noted by researchers, most research has focused on either relationships or sexual behavior rather than studying the two together (Lefkowitz et al., 2011). For example, in a recent review of 35 longitudinal studies of factors associated with sexual intercourse, only seven examined any sort of dating or romantic relationship features, compared to 22 that examined family structure or processes, and 12 that looked at other peer factors, although dating factors were more consistently associated with sexual behavior than other relationship factors (Zimmer-Gembeck & Helfand, 2008).

A few studies have examined associations between romantic partner characteristics and sexual behavior. On a most basic level, adolescents who are dating or in a romantic relationship are more likely to engage in intercourse than adolescents who are not involved in a relationship (Halpern, Udry, Campbell, & Suchindran, 1999; Longmore et al., 2004; Meier, 2003; Meschke, Zweig, Barber & Eccles, 2000; Miller et al., 1997). Other research suggests feelings about a partner may influence sexual behavior. Adolescent girls are more likely to engage in vaginal intercourse on days that they feel supported by their partner, but also on days they had an argument with their partner (Fortenberry, et al., 2005). However, few studies have looked at how partners’ attitudes, beliefs or other factors play a role in whether a dyad engages in partnered sexual behavior. A few studies have done so using dyadic data, showing that both partners’ characteristics influence whether a couple engages in sexual intercourse or uses contraception (Cleveland, 2003; Widman, Welsh, McNulty, & Little, 2006). However, many questions remain unanswered in this area, and future research could endeavor to examine how partners’ beliefs and attitudes influence individuals’ sexual attitudes and beliefs, to understand how two sets of attitudes and beliefs influence a dyad’s sexual behavior, as well as what occurs when partners’ beliefs or desires do not match.
Sexual behavior

The next component of our model involves understanding adolescent sexual behavior, which we view as a series of life events that can influence health. Sexual behavior can involve a wide range of behaviors, including pre-coital behaviors such as kissing or oral sex in addition to vaginal intercourse. As part of this conceptualization of sexual behavior, we also include whether adolescents engage in risky or protective behaviors, such as whether or not they use a condom. Despite this broad definition of sexual behavior, research has focused on vaginal intercourse, and as such much of the literature in this review focuses on this type of behavior. In this review we are focusing on consensual sexual behaviors. However, it is important to note that sexual experiences are not always voluntary, and decades of research has documented how survivors of sexual assault can experience many negative mental health outcomes (see Koss, Bailey, Yuan, Herrera & Lichter, 2003 for review).

Focusing on the outcomes of specific occasions of sex allows us to view sexual behaviors as life events that can impact functioning, and draw from literature and theory on how events impact health. Some research on life events focuses on transitional events, which are also referred to as turning points, major stressors or large life events. Many studies on the transition to first intercourse follow in the first of these traditions, either implicitly through their focus on a turning point, or by explicitly referring to a related theoretical perspective, such as Life Course Theory. Life Course Theory focuses attention on a series of life transitions, stating that factors of these transitions, such as the historical context and age at which they are experienced, play a role in individuals’ future outcomes (Elder & Shanahan, 2006). For example, experiencing the transition to parenthood at a time that is early relative to peers may be associated with more negative mental health or economic outcomes. Similarly, adolescence has been described as a
series of transitional periods that can involve turning points, or events that have the potential to lead to changes in cognition, behavior or affect (Graber & Brooks-Gunn, 1996; Rutter, 1994). Implicit in studies of the psychological impact of first intercourse is the idea that this event may be a turning point that can lead to changes in adolescent thinking and functioning.

In addition to focusing on transitional events, other research on life events focuses on how the cumulative effect of a series of life events may play a role in health. One basis of such literature is the idea that individuals who experience major negative (often traumatic) life events will be more likely to experience a first episode of major depression (Monroe & McQuaid, 1994). Adolescence may be a crucial period in this regard, as the many developmental changes in this period can be experienced as a series of stressors that put individuals at risk of developing depression, particularly if they do not have the cognitive resources to cope with these changes (Ge, Lorenz, Conger, Elder, & Simons, 1994; Hankin, 2006; Simmons, Burgeson, Carlton-Ford, & Blyth, 1987). Other research examines how positive life events are associated with both the absence of psychological disorders and with well-being more generally (Brickman, Coates, & Janoff-Bulman, 1978; Krause & Sternberg, 1997; Loewenstein & Frederick, 1999; Suh, Diener, & Fujita, 1996). In addition, research has also examined how small life events, or everyday stressful events, contribute to short-term well-being states, such as affect, as well as how the accumulation of stressful daily life events may impact long-term well-being (McCullough, Huebner, & Laughlin, 2000; Zautra, Guarnaccia, & Dohrenwend, 1986). Consistent with these perspectives, first intercourse may be a major life event that can impact mental health, as it has been conceptualized as an important transition by researchers (Carpenter, 2002; Tsu & Nicoladis, 2004). As adolescents continue to engage in sexual behavior and such behavior becomes more commonplace, their sexual behaviors may be akin to small life events, which influence
immediate well-being, or could impact long-term mental health in the aggregate.

**Perceptions of sexual behavior**

Research has examined how demographic factors such as gender, age and race/ethnicity influence health outcomes of sexual behavior. However, it is important to extend this work to examine the process of these associations by examining the meaning of sexual behavior to adolescents (Russell, 2005; Welsh, Rostosky, & Kawaguchi, 2000). In addressing the differing potential outcomes of sexual behavior, we draw from theories of both depression (Abramson, Metalsky, & Alloy, 1989; Beck, 1987; Kovac & Beck, 1979; Oately & Bolton, 1985) and subjective well-being (Diener, Oishi, & Lucas, 2003; Lyubmirsky, 2003; Schwarz & Stack, 1991) which state that positive or negative events by themselves may not be associated with mental health, but that such associations depend on how individuals perceive or evaluate these events. People do not passively experience events, but instead employ cognitive processes in which they evaluate, interpret and make sense of them (Bruner, 1986; Scarr, 1988), and such evaluations can influence well-being (Diener et al., 2003). Thus, the same event may have different mental health outcomes for different individuals, depending on how they perceives an event to impact their life and assessment of themselves (Oately & Bolton, 1985; Schwarz & Stack, 1991). Evaluations may play a particularly important role in associations between sexual behavior and mental health, as such behavior is discouraged in some contexts (e.g. early adolescence) but seen as acceptable and desirable in others (e.g. marriage).

Thus, this model predicts that associations between sexual behavior and mental and social health outcomes are influenced by individuals’ perceptions of their sexual behavior. Research has examined several types of perceptions of sexual behavior, including specific consequences individuals perceive experiencing as a result of sex and overall evaluations of their
sexual behavior. Much of the research on perceptions of sexual behavior focuses on the experience of first intercourse, with other studies examining perceptions of recent sexual behavior in adolescents. Although many studies focus on the negative consequences of first intercourse, particularly for girls, the event is generally perceived as a more positive than negative experience by both male and female adolescents (O’Sullivan & Hearn, 2008; Smiler, Ward, Merriweather, & Carruthers, 2005; Tsui & Nicoladis, 2004). Perceptions of recent intercourse are also generally positive (Darling, Davidson, & Passarello, 1992; Tsui & Nicoladis, 2004; Vasilenko, Leflowitz, & Maggs, 2011; Wight et al., 2008).

However, as discussed in previous sections, these perceptions may differ by individuals’ characteristics and attitudes about sexual behavior. The majority of research in this area has examined gender differences in the experience of first intercourse or most recent sexual behavior. Such research suggests that adolescent girls are more likely to report negative consequences, like guilt, and are less likely to feel satisfied by their first intercourse experience than adolescent boys (Darling et al., 1992; Guggino & Ponzetti, 1997; Sprecher, Barbee & Schwartz, 1995). However, some recent research suggests that although specific perceived negative consequences may be more common in girls than boys, their overall evaluations of first intercourse may be equally positive (O’Sullivan & Hearn, 2008; Smiler et al., 2005; Tsui & Nicoladis, 2004). Gender differences similar to those observed for adolescents’ first intercourse have been found in reports of most recent sexual experience, with girls more likely to report feeling bad or used and less likely to report feeling good or happy than boys (Donald, Lucke, Dunne, & Raphael, 1994). However, this difference may exist only in early or middle adolescents, as other research has found that male and female college students were equally likely to report feeling physically and psychologically satisfied by their most recent intercourse
In addition to characteristics like gender, individuals’ attitudes or beliefs likely play a role in how they perceive their sexual experience. It has been suggested that individuals who are more religious, for example, may experience consequences like guilt, shame and embarrassment if they engage in sexual behaviors (Hardy & Rafaelli, 2003). Aspects of mental health may also influence individuals’ perceptions of their sexual behavior; individuals experiencing cognitive distortions of depression, such as having a negative attributional style, may perceive events such as occurrences of sexual behavior differently than individuals who are less prone to these sorts of cognitive processes (Abramson et al., 1999).

Adolescents’ perceptions of their sexual behavior play an important role in adolescent health outcomes in several ways. First, as we will describe in subsequent sections, individuals’ perceptions of their sexual behavior may influence how such behavior impacts their mental health. Second, individuals’ perceptions of their sexual behavior likely influence their attitudes and motivations, and subsequently their likelihood of engaging in future sexual behaviors (Brady & Halpern-Felsher, 1997; Kelly & Kalichman, 1998). Individuals’ intention to engage in sexual behavior are influenced, in part, by their perceived likelihood of experiencing negative emotional consequences, such as regret, and these perceptions may be influenced by their past experiences of sexual behavior (Sandberg & Conner, 2008; van der Plicht & Richard, 1994). Thus, in the model we predict that perceptions of sexual behavior will impact adolescents’ future attitudes and motives (individual factors) as well as their feeling about their sexual partner (relationship factors), and that these factors subsequently predict future behaviors. However, relatively little research has examined this process. Research on college student alcohol use suggests that experiencing higher than average positive consequences of drinking during a given week is
associated with plans to drink more the following week (Patrick & Maggs, 2008), and similar processes may influence whether adolescents have sex, or engage in risky sexual behaviors.

**Adolescent Health Outcomes**

Consistent with conceptualizations of health as multifaceted (WHO, 1946), we suggest that sexual behavior may be associated with physical, mental and social health. Because of the differing ways in which individuals may perceive their sexual behavior, sexual behavior may be associated with both positive (e.g. self-esteem, closer romantic relationships) and negative (depression, relationship dissolution) mental and social health outcomes. In addition, associations between particular occurrences of sexual behavior and health outcomes may differ depending on the time from the event. A considerable literature on life events and well-being has been framed by adaptation-level theory, which describes how the influence of major life events on health may only be temporary, as individuals adapt to their new circumstances and incorporate them into how they view their lives (Brickman et al., 1978). For example, an individual who wins the lottery may initially be excited and experience an increase in subjective well-being. Eventually, however, the thrill of winning will wear off, and being a millionaire may be incorporated in his or her new baseline level of well-being, causing movement to a level of well-being similar to that experienced before winning the lottery (Brickman et al., 1978). Research on lottery winners, quadriplegics and paraplegics and those who lost family members to death or incarceration provides evidence that people adapt to even major, life-changing events after a relatively short period of time, and show levels of subjective well-being similar to those who have not experienced such events (Brickman et al., 1978; Krause & Sternberg, 1997; Loewenstein & Frederick, 1999). Although such events are not directly analogous to sexual behavior, these studies suggest that researchers interested in the mental and social health
outcomes of sexual behavior should consider how long outcomes of events, like the transition to first intercourse, persist. It is likely that, in general, an event like the transition to sexual intercourse could have an impact in the short, but not long, term. However, as we will describe in more detail in the conclusion, future research should examine how long the impact of events like first intercourse persist.

Based on extant research, it is difficult to precisely define what would be considered short-term and long-term outcomes of sexual behavior. For example, research on major life events more generally has found that the impact of life events on subjective well-being only lasts for 3 months (Suh et al., 1996). However, people do not adapt to all events in such a short time; individuals who were widowed still showed higher than average levels of depression two years later (Stroebe, Stroebe, Abakoumkin, & Schut, 1996). Few studies have examined the timing of the impact of sexual behaviors in this way. Thus, we review research on outcomes of sexual behavior ranging from almost immediately after to several years after an occurrence of sex has taken place, and discuss suggestions for examining the timing of effects in the discussion.

**Physical health.** Much of the research on sexual behavior and health has focused on prevention of risky behavior in order to avoid physical consequences, such as STIs and unwanted pregnancy. Although STIs and unwanted pregnancy may be associated with mental and social health, they are considered aspects of physical health in this model, as they are a direct result of the physical act of sex, rather than indirectly influenced by cognitive, evaluative processes. About 8% of adolescent girls and 6% of emerging adult women experience an unplanned pregnancy each year (Finer & Henshaw, 2006). Seven percent of sexually active adolescents contracted an STI in the past year in one national sample (Upchurch et al., 2004), with about half of new STI cases and 14% of new HIV cases in the United States occurring in individuals under
In addition, a number of studies have examined how adolescent sexual behavior is associated with long-term physical health. For example, earlier age at first intercourse is associated with an increased risk of having an STI in adolescence and early adulthood, likely due to both biological factors and the early establishment of patterns of risky behavior (Kaestle, Halpern, Miller & Ford, 2005). One of the more commonly researched areas is how adolescents who experience short-term physical health consequences, such as pregnancy or STIs, fare in adulthood. Experiencing an STI can be associated with many future physical consequences. Although treatable, several STIs, including HIV/AIDS, herpes and HPV are not curable. AIDS is the sixth leading cause of death among young adults aged 25-44 (Heron, 2007). HPV contributes to nearly all cervical cancer cases, and is also linked to other cancers, such as vulvar, vaginal and penile cancers (Bosch, Lorincz, Muñoz, Meijer, & Shah, 2002). HPV can also be transmitted through oral sex, and is associated with head and neck cancers (Gillison et al., 2008; Scully, 2005). In addition, even STIs that can be cured can lead to long-term complications if not treated promptly. For example, STIs like Chlamydia and gonorrhea are a risk factor for pelvic inflammatory disease, which is associated with infertility, ectopic pregnancy and pelvic pain (Gray-Swain & Peipert, 2006).

**Mental health.** Mental health encompasses not only an absence of symptoms of psychological distress, but includes positive elements, such as self-acceptance (Keyes, 2005; WHO, 2004). However, most research examining the impact of the transition to first intercourse on mental health has focused on some sort of psychological distress, particularly depressive symptoms. Cross-sectional research suggests that sexually active adolescents have greater odds of experiencing depressive symptoms and suicidal ideation than abstinent adolescents (Hallfors
et al., 2004). In addition to between-person (active v. abstinent) comparisons, several studies have examined within-person changes after the transition to first intercourse, and have found more nuanced results. Sabia (2006) found no association between sexual activity (ages 13-18) in adolescence and serious mental health problems, such as self-reported depression or suicidal ideation a year later. However, other research has found that early (before age 16) initiation of sexual intercourse predicts depressive symptoms a year later for adolescent girls, but not adolescent boys (Meier, 2007; Spriggs & Halpern, 2008). On the whole, this research suggests that not all adolescents experience negative psychological outcomes of first intercourse, but increases in depressive symptoms are more likely to occur in girls who engage in sex early relative to their peers.

Research has also examined associations between early adolescent sexual initiation and long-term mental health. Cross-sectional research has shown that early initiation of sexual intercourse is associated with a greater likelihood of psychological disorders like depression, eating disorders, antisocial personality and substance use, although such associations may be the result of a third variable, such as impulsivity (McCue & Iacono, 2005; Ramrakha, Caspi, Dickson, Moffitt, & Paul, 2000). In contrast, several longitudinal studies have found that associations between early sexual behavior and depressive symptoms do not last into early adulthood (Monahan & Lee, 2008; Spriggs & Halpern, 2008) or may be explained by a third variable such as educational prospects (Bogart, Collins, Ellickson, & Klein, 2007).

However, little research has examined how the transition to sex may be associated with more positive aspects of mental health. Research has suggested that sexually active adolescents have lower self-esteem (Young, Donnelly, & Denny, 2004) and girls, but not boys, who have intercourse before age 16 experience decreases in self-esteem (Meier, 2007). However, it is
possible that first intercourse may be a more positive event later in adolescence, when the majority of peers are sexually active. Recent research has shown that male college students’ body image becomes more positive after they transitioned to first intercourse, suggesting the importance of both studying first sex in late adolescence and in studying positive mental health outcomes of sex (Vasilenko, Ram, & Lefkowitz, 2011).

A few studies have examined psychological outcomes of sexual experiences other than first intercourse using diary or ecological momentary assessment methods, and have found these outcomes are generally more positive than those of first intercourse. For example, female adolescents experienced less negative affect on days they had sex compared to other days (Fortenberry et al., 2005), and male and female adolescents reported more positive and less negative affect when reporting on mood after engaging in intercourse than when reporting in response to a random signal in an experience sampling study with multiple measurement occasions per day (Shrier, Shih, Hacker & de Moor, 2007).

Other research has looked beyond merely whether or not an adolescent has had sex to specific characteristics of their sexual experience that may impact their mental health. For example, relationship context plays a role in individuals’ mental health after sexual behavior. Longitudinal research has suggested that first sex with a non-relationship partner is associated with increased depressive symptoms, but first sex with a relationship partner is not although some research suggests differences in depressive symptoms by first sexual partner may be present prior to first sex (Grello, Welsh, Harper, & Dickson, 2003; Monahan & Lee, 2008). Engaging in more intimate sexual behaviors with a romantic partner is associated with fewer depressive symptoms in high school students (Shulman, Walsh, Weisman, & Scheyler, 2009). However, sex outside of a relationship is associated with negative psychological outcomes in
adolescents and college students; male and female college students who engage in non-relationship sex have lower self-esteem than those who do not, and female students who engaged in first sex with a non-relationship partner report more depressive symptoms in female students who are abstinent or engaged in first sex with a relationship partner (Grello, Welsh, & Harper, 2006; Paul, McManus, & Hayes, 2000; Shulman et al., 2009). However, male college students who engage in non-relationship sex have fewer depressive symptoms than students who are abstinent or had sex only with relationship partners (Grello et al., 2006).

**Social health.** Less research has examined how sexual behavior is associated with social health. Whether an adolescent engages in sexual behavior may impact their relationships with parents and peers, but due to the nature of such behaviors they may be especially tied to the relationship with a romantic and sexual partner. A study of adolescent couples found that kissing was associated with higher relationship satisfaction and commitment. Intercourse, on the other hand, was associated with poorer relationship quality for younger adolescents, but better relationship quality for older adolescents (Welsh, Haugen, Widman, Darling, & Grello, 2005). Similarly, non-coital affectionate behaviors like hand-holding and kissing are associated with relationship quality in adolescent couples, and both coital and non-coital sexual behavior predict relationship longevity (Rostosky, Gallagher, Welsh, & Kawaguchi, 2000). Adolescent girls are also more likely to report partner support and arguments with partner on days they engage in sexual intercourse, (Fortenberry et al., 2005). Similarly, engaging in behaviors like oral sex and intercourse in adolescence is associated with higher relationship quality (Wight et al., 2008).

Several studies have examined how adolescent sexual behavior influences attitudes and behaviors related to long-term social health, such as whether they are married or in a relationship in young adulthood. Adolescents and college students who are sexually active have stronger
intentions to both cohabit and marry (Manning, Longmore & Giordano, 2007; Willoughby & Carrol, 2010). However, associations between adolescent sexual activity and young adult romantic behaviors may differ depending on the relationship context of adolescent sexual behavior; sexual behavior in an adolescent romantic relationship is associated with greater odds of both marrying and cohabiting, whereas non-romantic sexual behavior in adolescence predicts cohabiting only (Raley, Crissey, & Muller, 2007).

**Individual and relationship factors, perceptions and mental/social health.** Unlike the direct effect of sexual behavior on physical consequences, changes to mental and social health are not a direct result of the physical act of sex. Instead, based on prior research on depression and mental health (Abramson et al., 1989; Beck, 1987; Diener et al., 2003; Kovac & Beck, 1979; Lyubmirusky, 2003; Oately & Bolton, 1985; Schwarz & Stack, 1991) we posit that such outcomes are the result of the cognitive process of making sense of a sexual experience. Thus, mental and social health outcomes are more directly influenced by individuals’ perceptions of their sexual behavior. Although there has been research on both perceptions of adolescent sexual behavior (Darling et al., 1992; Sprecher et al., 1995; Tsui & Nicoladis, 2004; Vasilenko, Lefkowitz, & Maggs, 2011) and psychological outcomes of such behavior (Meier, 2007; Sabia, 2006; Shrier et al., 2007; Spriggs & Halpern, 2008; Vasilenko, Ram, & Lefkowitz, 2011) little research has examined how perceptions of sexual behavior influence whether adolescents experience changes in mental or social health as a result of sexual behavior. Although it does not assess the temporal ordering of associations, one study of “hooking up” provides an example of this sort of research. College students who had more positive reactions to their hook-ups reported better psychological well-being than those who felt ambivalent or negative about the behavior (Owen, Rhoades, Stanley, & Fincham, 2010).
In addition, our model suggests that perceptions of sexual behavior are shaped by individual and relationship factors that influence how individuals view their sexual behavior, and subsequently, how sexual behaviors influence their mental and social health. Although no research has, to our knowledge, studied the process of perceptions of sexual behavior predicting mental or social health outcomes, some studies have examined how individual and relationship factors influence mental health outcomes of sexual behavior. As discussed previously, research has examined how demographic characteristics, such as age and gender, predict engaging in sexual behavior and moderate associations between sexual behavior and mental and social health outcomes. For example, early sexual behavior is generally associated with decreased mental health for girls, but not boys (Meier, 2007; Spriggs & Halpern, 2008). However, it is likely that differences in associations between sexual behavior and mental health by gender or race may be explained by individuals’ own desires, beliefs and attitudes. It is likely that many of the factors that are protective against sexual behavior, such as religiosity and motivations against sexual behavior may also be associated with psychological distress when an individual engages in sexual behavior. An example of such research suggests that adolescents who are high in self-silencing in relationships were at increased risk of depression when they engaged in sexual behavior, whereas sexually active individuals low in self-silencing were not at risk of increased depressive symptoms (Little, Welsh, Darling, & Holmes, 2010). In addition, adolescents who are more desirous of sex have more positive mental health outcomes of sexual behavior compared to individuals who are less desirous of sex (Burrington, Kreager, & Haynie, 2011). Future research should continue to study beliefs and attitudes about sex that may influence perceptions of sexual behavior and subsequent mental health outcomes of sex.

Conclusions and Future Directions
This review demonstrates that relatively little is known about how sexual behavior is associated with some facets of health. Although we have not presented an exhaustive review of research on predictors of adolescent sexual behavior, it is clear that ways in which individual factors predict engaging in sexual behavior has been the most thoroughly researched of all paths in the model. Less attention, however, has been paid to how relationship factors, and in particular the beliefs and characteristics of one’s romantic or sexual partner, predict sexual behavior. Because sexual behavior (apart from masturbation) is a partnered activity, gaining an understanding of both partners is essential to fully understand their behavior, and to best determine how to prevent risky sexual behavior and negative health outcomes. For example, what happens when adolescents in a romantic relationship have different attitudes toward engaging in sexual behavior or using contraception? How do they make decisions about sexual behavior? Gender socialization and gendered personality traits may play a role in this association; women are more likely to comply with partners’ requests for sex than men (Impett & Peplau, 2003) and gendered attitudes and personality traits predict sexual behavior and condom use (Shearer, Hosterman, Gillen, & Lefkowitz, 2005). Other factors, such as age, power and commitment to the relationship may also play a role, and relatively little research has explored such possibilities. A more complete understanding of these issues may require different types of methodologies. Dyadic data, for example, would allow for reports from both partners, allowing researchers to estimate the impact of both individuals’ characteristics on the dyad’s sexual behavior. In addition, qualitative or observational methods may help to elucidate the process of decision-making that couples employ.

Similarly, little research has examined how individual and relationship factors may influence individuals’ perceptions of their sexual behavior and subsequent mental and social
health. Such factors are particularly important to understand, as sex is not experienced in the same way for all adolescents. Examining how individuals’ characteristics and attitudes shape their perceptions of sexual behavior is important in understanding for whom and under what circumstances sex is beneficial or harmful to adolescents’ mental and social health. For example, individuals who are highly religious, sexually conservative or simply do not want to have sex at a particular point in time may experience guilt and shame if they become sexually active, which could lead to increases in negative outcomes like depressive symptoms. On the other hand, individuals who feel positively about sex, are highly motivated to engage in the behavior, and are part of a committed romantic relationship, may experience sexual behavior positively, and such behavior may be beneficial to their mental and social health. However, these ideas have been unexplored in the literature, and future research should endeavor to uncover which factors are particularly important in determining health outcomes of sexual behavior.

Recent research has paid some attention to the impact that sexual behavior, and in particular the transition to first intercourse, plays in mental health. Consistent with a risk-focused approach to sexual behavior, most research in this area has examined negative outcomes, such as depressive symptoms. However, there is evidence that sexual behavior may be linked to positive outcomes in late adolescence (Shrier et al., 2007; Vasilenko, Ram, & Lefkowitz, 2011), so future research should address both positive and negative outcomes of sexual behavior, as well as individual, relational and situational factors that are associated with each. In addition, relatively little is known about how sexual behavior is associated with social health, although such behaviors have implications for social relationships, particularly the relationship with the sexual partner. Thus, future research should more fully investigate the impact of sexual behavior.
on relationships, as well as how social and mental health outcomes may influence each other.

In addition, it is important to determine not only if sexual behavior is associated with mental and social health outcomes, but to understand the process by which such associations exist. In this model we have approached this task by viewing sexual behavior as a series of life events that may influence health. The influence of sexual behaviors on these mental and social health outcomes is a result of individuals’ evaluations of their sexual behavior, such as what consequences of sex they perceive to have experienced and how positive or negative they felt the experience was. Although a number of studies have examined such perceptions of sexual behavior, research has not attempted to link these perceptions to outcomes like depressive symptoms. Future research should attempt to understand, for example, whether mental health outcomes of first sex are a result of individuals’ perceptions of their sexual experience, or if they reflect a more spurious association, such as breaking up with a sexual partner, as has been suggested by prior research (Meier, 2007).

Although nationally representative studies like Add Health have expanded our knowledge of sexual behavior in racial/ethnic and sexual minority adolescents, future research should continue to examine health outcomes of sexual behavior. For example, research has documented higher rates of sexual risk behaviors and sexually transmitted diseases in African American and Latino American compared to European American adolescents (Finer & Henshaw, 2006; Miller et al., 2004; Upchurch, Levy-Storms, Sucoff & Anehensel, 1998; Upchurch et al., 2004). Similarly, sexual minority adolescents have higher rates of STIs and pregnancy than sexual majority adolescents (Saewyc, Poon, Homma, & Skay, 2008; Saewyc, Skay, Richens, Reis, Poon, & Murphy, 2006). However, little is known about the more proximal predictors which may explain the process by which racial/ethnic or sexual minorities may be more likely to
engage in sexual risk behaviors. In addition, little is known about differences in perceptions of sex and mental and social health outcomes among adolescents with different races, ethnicities and sexual orientations. Although much past research has examined sexual minorities’ mental health (Russell, 2003), research has not focused the implications of sexual minorities’ sexual behavior for their mental health. The process of sexual identity development for sexual minority students may lead to differing perceptions of sexual experiences compared to heterosexual adolescents. For example, first sexual experiences with same-sex partners may be a positive experience because the experience finally feels “right”, or may be negative if it serves as evidence of a sexual orientation they have not yet accepted. Future research should have examine these possibilities.

In addition to focusing on these substantive areas, researchers should attempt to understand the temporal process by which sexual behavior is associated with health outcomes. For example, several studies have linked first sex to increased depressive symptom in girls a year later, but have not found long-term effects (Meier, 2007; Spriggs & Halpern, 2008). However, definitions of short and long-term in most studies are usually determined by the measurement occasions available in extant, large-scale studies (e.g. Add Health). Future studies should endeavor to collect data at measurement occasions specifically designed to capture temporal effects (Collins, 2006). Achieving this goal could include gathering precise information about timing of first intercourse, as well as multiple measurement occasions that can pick up on short-term and long-term effects, to determine how long the impact of sexual behavior may last. Although not directly related to the health outcomes discussed here, our work on changes in religiosity after first intercourse is illustrative of how to determine the timing of the impact of sexual behavior (Vasilenko & Lefkowitz, 2011). Using growth-curve models centered around
each individual’s month of first intercourse, we tested whether individuals’ religiosity differed from an overall developmental trajectory at periods 0-6 months after, 6-12 months after and 12+ months after first intercourse. This research shows that college students’ attendance at religious services declined after first intercourse, but this effect was only temporary. This sort of approach could be applied to help us better understand the impact that sexual behavior has on health. In addition, studies with more frequent measurement occasions (e.g. daily diary, ecological momentary assessment) would allow for an understanding of the more immediate effects of sexual behavior, separate from changes that may come from changes in a relationship with a sexual partner and other factors.

Finally, researchers should make a concerted effort to uncover how sexual behavior may be differentially associated with health during different stages of adolescence. For example, research has shown that intercourse has a negative effect on younger adolescent couples’ relationships, but a positive impact for older adolescent couples (Welsh et al., 2005). Relatively few studies, however, have compared individuals in different stages of adolescence. Although a few studies have examined how groups with different timing of first intercourse may differ on health outcomes (e.g. Bingham & Crockett, 1996), little research has examined how sexual behavior may differentially predict changes or variations in health outcomes at different ages. For example, research has suggested that the transition to first sex is associated with increased depressive symptoms for girls who experience the transition early relative to peers (Meier, 2007). In contrast, the transition may be associated with increasingly more positive body image in men who transition during college (Vasilenko, Ram, & Lefkowitz, 2011). These findings give some indication that the transition has differential effects at different stages; however, extant research has not directly compared the impact of the transition at different ages in the same
study, perhaps due to the difficulty of collecting multiple waves of data across the entire period of adolescence. Such research is crucial in order to fully understand the impact of sexual behavior on health, and under what circumstances such behavior is associated with positive or negative outcomes. Such information could play a crucial role in understanding healthy sexual development, and could provide accurate information through which to frame sexuality education programs.

In conclusion, we turn to the question that started this line of inquiry: is sexual behavior healthy or unhealthy for adolescents? The research reviewed here demonstrates that adolescent sexual behavior can be associated with a number of negative physical health outcomes; however, this risk could be greatly reduced through STI screenings, condoms and other contraceptives, and other preventative measures, such as the Gardasil vaccine. However, the influence of sexual behavior on mental and social health is more complex, prone to variation due to personal and relational factors, and relatively limited in terms of research. Current research suggests that sexual behavior in adolescence is not associated with universally negative effects. There is some evidence that depressive symptoms temporarily increase in girls who engage in intercourse before age 16 (Meier, 2007; Spriggs & Halpern, 2008). However, this association does not exist for more severe depressive symptoms (Sabia, 2006), does not persist into young adulthood (Spriggs & Halpern, 2008), and may be due, in part, to subsequently breaking up with a sexual partner, rather than the experience of sex per se (Meier, 2007). There is no compelling evidence, however, that sex is associated with negative outcomes later in adolescence, and, in fact, sex during this period appears to have some positive outcomes (Shrier et al., 2007; Welsh et al., 2005). However, most research has focused on outcomes of sex for the “average” male or female adolescent, although there is likely interindividual variability in the impact of sexual
behavior due to a number of personal, relational and situational factors. As there is likely no clear “one size fits all” answer to whether sex in adolescence is healthy or unhealthy, future research should endeavor to predict what factors lead to sexual behavior being a healthy, rather than harmful, part of adolescence.
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Individual Factors (e.g. demographic, personality, attitudes, prior mental health)

Social Health (e.g. quality of relationship with sexual partner, relationship dissolution)

Relationship Factors (e.g. type and quality of relationship with partner, parental communication)

Sexual Behaviors (e.g. intercourse, kissing, use of contraceptives)

Perceptions of Sexual Behavior (e.g. evaluation of behavior, perceived consequences)

Mental Health (e.g. affect, depressive symptoms)

Physical Health (e.g. STI, pregnancy)

Cultural Influences (e.g. media messages, cultural values)

Figure 1.1. Conceptual model linking adolescent sexual behavior with well-being.
Sexual Behavior and Daily Affect in Late Adolescence

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Abstract

Although there is some evidence that engaging in early sexual intercourse is associated with negative psychological outcomes, particularly for adolescent girls, little is known about occurrences of sexual behavior after first intercourse and sexual behavior later in adolescence. This paper uses data from a subsample (N=364 participants; mean age=18.4; range 16.9-20.8; 57.4% female; 29.1% Hispanic/Latino [HL], 25.0% non-HL European American, 17.3% non-HL Asian American, 17.0% non-HL African American, 11.5% non-HL multiracial) of a larger, ethnically diverse longitudinal study of college students, including only participants who reported having vaginal intercourse during at least one day during 6 semesters of 14-day daily data collection (N=26,609 total days; N=2,313 vaginal sex days). On each sampled day participants rated their level of positive affect and negative affect, and on days that participants engaged in sexual behavior, they reported their relationship with sexual partner and whether they experienced each of 7 positive and 12 negative consequences of sex. Multi-level models showed that students reported more positive affect and less negative affect on days they had vaginal sex compared to days they did not, but these associations did not extend to the next day. On days they had vaginal sex, students reported more negative affect if they had sex with a non-dating, as opposed to dating, partner. They also reported greater positive affect on days they experienced more positive consequences, and greater negative affect on days they reported more negative consequences. These findings suggest that sex is beneficial to short-term mental health in late adolescence. However, the levels of affect differed according to the relationship with the sexual partner and consequences of sex participants experienced, suggesting the importance of studying situational factors of a sexual experience.
Sexual Behavior and Daily Affect in Late Adolescence

A number of studies have examined associations between adolescent sexual behavior and mental health, often finding that engaging in early (before age 16) sexual intercourse is linked to negative mental health outcomes in adolescent girls (Meier, 2007; Spriggs & Halpern, 2008). However, most studies of this association have focused on early sexual behavior and compared adolescents who are sexually active to those who are abstinent (between-persons). However, because the vast majority of people are sexually active at some point during their lifetime, and because developing a healthy sense of sexuality is a central task of adolescence (Brooks-Gunn & Paikoff, 1993), it is important to better understand how individuals’ mental health varies depending on their sexual behavior (within-person) and to understand the circumstances under which sexual behavior is associated with more positive outcomes. Thus, in this study we examine daily variability in positive and negative affect associated with sexual behavior. Using daily data allows us to understand the immediate impact of sexual behavior, separate from changes that may have occurred due to time or changes in the relationship with that sexual partner (Smiler, Ward, Caruthers, & Merriweather, 2005; Sprecher, Barbee, & Schwartz, 1995). Assessing short-term affective states can be informative, as experiencing multiple instances of events associated with positive affect can contribute to broader mental health (McCullough, Huebner, & Laughlin, 2000) and negative affect and lack of positive affect are associated with psychological distress (Watson, Clark, & Carey, 1988). In addition, this daily approach allows us to examine the impact of engaging in sexual behavior under different circumstances, such as with dating or non-dating partners.

Based on a model of sexual behavior and health that explicates how individual factors, relationship factors and perceptions of sex influence how sexual behavior is associated with
mental health (Vasilenko, Lefkowitz, & Welsh, 2011; see Figure 2.1), this study will use daily diary data to examine late adolescents’ short-term affective states on days they have vaginal sex, as well as the day after they have vaginal sex. In addition, we will examine how gender, relationship with partner and perceived consequences of sexual behavior are associated with more positive and negative affect.

**Sexual behavior and mental health**

Researchers have suggested that sexual behavior has the potential to impact mental health (Coleman, 2002; Hafner, 1998; Langfeldt & Porter, 1986; O'Sullivan, McCrudden, & Tolman, 2006). Many prevention programs focusing on abstinence promote the idea that premarital sexual behavior is psychologically harmful, although there is limited research in this area (Santelli et al., 2006). Most of the research on sexual behavior and mental health in adolescence focuses on between-person differences in depressive symptoms based on whether or not individuals are sexually active or whether adolescents who became sexually active experienced a greater increase in depressive symptoms relative to their abstinent peers. Cross-sectional research demonstrates that sexually active adolescents have increased odds of depressive symptoms and suicidal ideation than abstinent adolescents (Hallfors et al., 2004), although some research has failed to show such associations (Sabia, 2006). Several longitudinal studies suggest that sexual intercourse before age 16 is associated with an increase in depressive symptoms in girls (Meier, 2007; Spriggs & Halpern, 2008). Little research has examined mental health outcomes of first intercourse in late adolescence, although one study found that the transition to first intercourse has a positive impact on male college students’ body image (Vasilenko, Ram, & Lefkowitz, 2011).

In addition to the lack of attention paid to mental health outcomes of sex in late
adolescence, little research has examined how occurrences of sexual behavior after first intercourse are associated with mental health. A few studies have used repeated measures data (ranging from multiple reports per day to monthly assessments) to assess whether engaging in intercourse or other sexual behaviors leads to variability in affect. In a longitudinal study of college students, affect did not differ during months that participants engaged in penetrative sex compared to months they did not, although these associations did differ based on maturity and attitudes toward sexual behavior (Dalton & Galambos, 2008). However, an experience sampling study with multiple measurement occasions per day found that adolescents reported more positive affect after an occurrence of sexual behavior than at other times, suggesting sexual behavior is a largely positive experience (Shrier, Shih, Hacker, & de Moor, 2007). Similarly, on days adolescents engage in sexual behavior, their positive affect peaks around the time they have sex, and begins to return to pre-sex baseline levels within about eight hours after sex (Shrier, Koren, Aneja, & de Moore, 2010).

**Gender.** Although research has shown how sexual behavior is associated with short-term mental health for the average adolescent, sexual behavior may not lead to the same types of outcomes for all individuals. A number of factors may be associated with more positive or negative mental health outcomes of sex. As discussed above, first intercourse may be associated with an increase in depressive symptoms for girls, but not boys (Hallfors, Waller, Bauer, Ford, & Halpern, 2005; Meier, 2007). These differences may be due to sexual double standards, which suggest that sex outside of marriage is more acceptable for men than for women (Crawford & Popp, 2003). However, research suggests there may be fewer gender differences in consequences of recent sexual behavior than first intercourse (Darling, Davidson, & Passarelli, 1992), and some studies of sexual behavior and affect in adolescents have not found gender
differences (Shrier et al., 2007; 2010).

**Relationship with partner.** Whether or not an individual is in a romantic relationship with their sexual partner may also play a role in their mental health outcomes of sex. Individuals who engage in first intercourse with a non-dating partner experience an increase in depressive symptoms, whereas adolescents who have first sex with a dating partner do not (Grello, Welsh, Harper, & Dickson, 2003). Sex with non-dating partners has been linked to regret (Eshbaugh & Gute, 2008) and depressive symptoms in female adolescents and college students, although male college students who engage in non-dating sex report fewer depressive symptoms than those who have never had sex or had only relationship partners (Grello, Welsh & Harper, 2006; Shulman, Walsh, Weisman & Schelyer, 2009).

**Perceived consequences.** Although some research has examined how sexual behavior is associated with affect and other mental health outcomes, little is known about the process by which sexual behavior influences affect. One possibility is that individuals’ perceptions of their sexual behavior serve as a mechanism by which sexual behavior may be associated with positive or negative mental health outcomes (Vasilenko, Lefkowitz, & Welsh, 2011). In general, perceiving events to be more upsetting or likely to have a negative impact is associated with poorer mental health (Abramson, Metalsky, & Alloy, 1989; Beck, 1987; Diener, Oishi, & Lucas, 2003; Lyubmirsky, 2003; Schwarz & Stack, 1991). Thus, individuals’ daily affect may be related to how they perceive the events that happen to them during the day, such as how they perceive their sexual behavior. College students report more positive than negative perceived consequences on days they engage in vaginal sex (Vasilenko, Lefkowitz, & Maggs, 2011). If these perceptions of sexual behavior influence daily affect, it is likely that college students will experience primarily positive affect when they engage in sexual activity. Although it makes
sense that more positive perceptions would be associated with more positive mental health outcomes, research has not directly examined this possibility, and doing so is important for several reasons. First, examining individuals’ differing perceptions of sexual behavior is consistent with the idea that sexual behavior is not a uniform experience, either across individuals or for the same individual on different occasions and documents the diversity of such experiences. Second, understanding links between perceptions of sexual behavior and mental health may help to explicate the process by which sexual behavior and mental health are associated with each other.

In this paper, we will examine whether college students’ levels of positive and negative affect differ on days they have vaginal sex compared to days they do not, and whether this association is different for male and female students. In addition, we will examine whether levels of affect continue to differ on the day after an individual engaged in vaginal sex, and whether perceived positive and negative consequences reported influence level of positive and negative affect. By using daily diary data, we will be able to reduce confounds of the passage of time and changes in relationship with sexual partner to determine short-term affective outcomes of sexual behavior. We will also be able to gain a better understanding of how sexual behavior may lead to positive or negative affect by examining the role of individuals’ perceived consequences of sex. In addition, much of the research on sexual behavior and psychological outcomes has focused on first intercourse in early or middle adolescence, when fewer of an adolescent’s peers are sexually active. Thus, studying older adolescents will provide information about how sexual behavior may be experienced at a time when sex is more normative. Finally, occurrences of sex after first intercourse may be differentially associated with mental health than first intercourse, and studying these later occurrences of sexual behavior will provide
information about the developmental course of sexual behavior and mental health in adolescence.

**Research Aims and Hypotheses**

Our first aim is to examine whether engaging in vaginal sex on a given day is associated with positive and negative affect on that day, and whether changes in affect carry over to the next day. Based on prior research showing positive outcomes of sexual behavior in late adolescence (Shrier et al 2007; 2010; Vasilenko, Lefkowitz, & Maggs, 2011), we predict that, on average, participants will report more positive and less negative affect on days they had vaginal sex compared to days they did not, but that this effect will not last into the day after. For our second aim, we will test for gender differences in these associations. Based on sexual double standards (Crawford & Popp, 2003) and research described above showing more negative mental health outcomes of sexual behavior for adolescent girls (Meier, 2007; Spriggs & Halpern, 2008), we predict that female students will report less positive and more negative affect than male students on days they have vaginal sex. Next, in separate models, we will focus on days participants report engaging in vaginal sex to examine how situational factors of the sexual experience predict positive and negative affect. For our third aim, we will examine whether affect differs on days individuals had sex with a non-dating partner compared to days they had sex with a dating partner. Based on research described above, we predict that sex with a non-dating partner will be associated with less positive and more negative affect. Finally, we will examine how individuals’ perceived positive and negative consequences of sex are associated with affect, and predict that reporting more negative and fewer positive consequences will be associated with more negative and less positive affect.

**Method**
Participants

Participants were part of the University Life Study (ULS), a longitudinal study of college students at a large, Northeastern university, which involved 14 days of daily data collection in each semester of college. A stratified random sampling procedure with replacement was used to achieve a diverse sample of first-year college students. In total, 746 students participated in the initial first semester baseline survey of the ULS (65.6% response rate). As this paper is primarily focused on within-person variability in affect as a function of engaging or not engaging in vaginal sex, only participants who responded yes to the item “Did you have vaginal sex yesterday?” on at least one of the 84 days of daily data collection during Semesters 1-6 (S1-S6) were included in analyses. Vaginal sex was defined for participants as “sex in which the penis penetrates the vagina.” Of the total study participants, 48.9% reported vaginal sex on at least one sampled day (N=364 participants; S1 Mean age=18.4; range 16.9-20.8; 57.4% female; 29.1% Hispanic/Latino [HL]; 25.0% non-HL European American, 17.3% non-HL Asian American, 17.0% non-HL African American, 11.5% non-HL multiracial). Most participants in this analytic sample (97.8%) reported a heterosexual orientation at the start of the study (1.6% bisexual; less than 1% either homosexual or other). Because individuals’ sexual identity may differ from their actual sexual behaviors (Diamond, 2002) and some sexual minority students in our sample reported engaging in vaginal sex in the daily surveys, we kept these participants in the analyses. However, this analytic sample likely underrepresents the number of sexual minority students in our larger sample, as students who did not engage in vaginal sex were excluded.

Procedures

Participants completed web-based surveys each semester. Each participant received an email containing a secure link to the study. After completing an initial survey each semester,
participants were invited to complete 14 days of daily diary data. Students could receive up to $70-100 each semester for completing all surveys ($20-40 for baseline semester survey, $3 for each day and an $8-18 bonus for completing all 14 days, with incentive increasing in later semesters). Nearly all ULS baseline participants (97.3%) completed at least one daily survey in Semester 1, and the majority of participants (about 86% each semester) completed at least 12 of the 14 daily surveys, resulting in 50,087 days of daily data for all study participants, and 26,609 days for participants in our analytic sample. Vaginal sex was reported on 2,313 of these days (4.6% of all ULS participant days; 8.7% of analytic sample participant days). About two-thirds of these vaginal sex days (1,541) were reported by female students.

Measures

All measures used in these analyses are drawn from the daily surveys, with the exception of gender, which was based on an item from the first initial survey asking whether a student was male or female.

**Daily Positive and Negative Affect.** We assessed daily affect using the Positive and Negative Affect Scale (PANAS, Watson et al., 1988). Each day, participants responded to a scale with the stem question “To what extent did you feel the following different emotions and feelings?” on the previous day. The questionnaire contains 10 items assessing positive affect (e.g. excited) and 10 assessing negative affect (e.g. distressed) and were rated on a scale from 1 (very slightly or not at all) to 5 (extremely). Reliability within days was high for positive affect ($\alpha=.92$) and negative affect ($\alpha=.87$).

**Sexual Behavior.** On each day they completed a daily survey, participants reported if they had engaged in vaginal sex on the previous day (no=0, yes=1). On days they answered “yes”, they answered a number of questions about their sexual experience on that day. To test
whether changes in affect as a result of sexual behavior carried over into the next day, we calculated an additional dichotomous variable indicating whether a participant engaged in vaginal sex on the prior day or not (0=no sex prior day, 1=sex on prior day).

**Relationship with Sexual Partner.** On days that participants reported engaging in sexual behavior, they were asked “How would you describe this partner?” Participants chose from seven possible responses. We recoded this item into a dichotomous variable such that 0=dating partner (casual dating partner, regular dating partner, living with, engaged or married) and 1=non-dating partner (stranger or friend). Participants reported sex with a non-dating partner on 15.7% of sex days (N=364).

**Daily Positive and Negative Consequences of Sex.** On days when participants engaged in sexual activity, they reported whether they experienced each of nineteen consequences of sex, drawn from research on reasons to have sex (Cooper, Shapiro & Powers, 1998; Patrick, Maggs, Lee, & Cooper, 2010; Sprecher & Regan, 1996; see Vasilenko, Lefkowitz, & Maggs, 2011 for items). The checklist contains 7 items about positive consequences (e.g. “feel more intimate or closer to partner”) and 12 items about negative consequences (e.g. “wish you had not had sex”). We summed items for positive and negative consequences to create two total scores. Participants reported, on average, more positive ($M=2.7$, $SD=1.6$) than negative consequences ($M=0.4$, $SD=1.2$).

**Other covariates.** On average, college students’ affect follows a weekly cycle in which they report more positive affect on weekends than weekdays (Larsen & Kasimatis, 1990), and sexual behavior was more likely to occur on Friday, Saturdays and Sundays in our sample. Therefore, we included a variable indicating whether a day was a weekday or on the weekend (Monday, Tuesday, Wednesday and Thursday=0; Friday, Saturday and Sunday=1). In addition,
because drinking is associated with positive affect (Rankin & Maggs, 2006) and students in our sample drink frequently and heavily (Patrick, Maggs, & Osgood, 2010) we included the number of drinks consumed on a given day as a covariate.

**Results**

We used multi-level modeling (Raudenbush & Bryck, 2002) of daily data from six semesters of the ULS to assess whether levels of positive and negative affect differ when an individual had sex and when an individual had sex on the prior day. First, we ran a set of 3-level models (person-days nested within semesters nested within individuals) using all days of diary data, with positive and negative affect as the outcomes. This analysis is represented with the following equations at Level 1:

\[
Affect_{ijk} = \pi_{0jk} + \pi_{1jk}(Weekend)_{ijk} + \pi_{2jk}(Number\ of\ Drinks)_{ijk} + \pi_{3jk}(Vaginal\ Sex\ Day)_{jk} + \pi_{4jk}(Sex\ on\ Prior\ Day)_{ijk} + e_{ijk}
\]

This equation contains an individual-specific intercept representing average daily affect within a given semester on non-sex days; \(\pi_{0jk}\), controls for whether a day was on a weekend (\(\pi_{1jk}; 0=Weekday, 1=Weekend\)) and the number of drinks consumed on that day (\(\pi_{2jk}\)), the effect of having sex on that day (\(\pi_{3jk}; no\ sex\ on\ day=0;\ sex\ on\ day=1\)), on the day prior (\(\pi_{4jk}; 0=no\ sex\ on\ prior\ day; 1=sex\ on\ prior\ day\)), and unexplained variation from the average affect (\(e_{ijk}\)). All Level 1 variables were group mean centered (e.g. centered around each individual’s mean) in order to examine within-person variations. At Level 2 we accounted for between-semester variability with the following equations:

\[
\pi_{0jk} = \beta_{00k} + r_{0jk}
\]

\[
\pi_{1jk} = \beta_{10k}
\]
\[ \pi_{2jk} = \beta_{20k} \]
\[ \pi_{3jk} = \beta_{30k} + r_{3jk} \]
\[ \pi_{4jk} = \beta_{40k} + r_{4jk} \]

\( \beta_{00k} \) through \( \beta_{40k} \) are intercepts representing each individual’s average level of affect within a given semester, and \( r_{1jk} \), \( r_{4jk} \) represent unexplained variability from the average. Finally, at Level 3 we examined how gender moderates associations between vaginal sex and affect, with the following equations:

\[ \beta_{000k} = \gamma_{000} + \gamma_{001} \text{(Gender)} + U_{00k} \]
\[ \beta_{01k} = \gamma_{010} \]
\[ \beta_{02k} = \gamma_{020} \]
\[ \beta_{03k} = \gamma_{030} + \gamma_{031} \text{(Gender)}_k + U_{03k} \]
\[ \beta_{04k} = \gamma_{040} + \gamma_{041} \text{(Gender)}_k + U_{04k} \]

\( \gamma_{000} \) represents the average level of affect for female students, and \( \gamma_{001} \) models the difference in affect for male students. The impact of our control variables, weekend and number of drinks, is represented by \( \gamma_{010} \) and \( \gamma_{020} \) respectively. Related to our hypotheses, \( \gamma_{030} \) and \( \gamma_{040} \) represent the impact of sex on that day and on the day prior on affect for female students, and \( \gamma_{031} \) and \( \gamma_{041} \) represent the difference for male students.

Results of these models are presented in Table 2.1. Note that because of the inclusion of the variable for sex on the prior day, which could not be calculated on the first day of data collection for each semester (i.e. we had no knowledge of their behavior on the prior day), the number of total days in this analysis is smaller than participants’ completed days; the final model used 23,134 person-days of data. Male students reported more positive affect than female students (\( \gamma_{001} \)). Students reported more positive affect and less negative affect on weekends
and more positive affect on days they drank more ($\gamma_{020}$). For our first aim testing how affect differed on days participants had sex compared to days they did not, we found that participants reported greater positive affect and slightly lower negative affect on days they had vaginal sex ($\gamma_{030}$). However, this association only lasted for one day, as there were no differences in affect on days participants reported sex on the prior day ($\gamma_{040}$). Thus, we found evidence supporting our hypothesis for Aim 1. For our second aim, we predicted that female students would experience less positive and more negative affect as a result of vaginal sex than male students; however, we found no gender differences in these associations ($\gamma_{031}$). Thus, we found no evidence for our hypothesis of Aim 2.

Next, we examined how situational factors of an occurrence of sex influenced affect using a three level MLM. Because items related to these situational factors were only asked on days participants engaged in sexual behavior, these analyses focused only on days participants engaged in vaginal sex. Within-person (Level 1) predictors included relationship with partner (0=dating partner, 1=non-dating partner) and the number of reported positive and negative consequences of sex. This analysis is represented by the following:

$$ \text{Affect}_{ijk} = \pi_{0jk} + \pi_{1jk} (\text{Weekend}) + \pi_{2jk} (\text{Number of Drinks}) + \pi_{3jk} (\text{Non-dating}) + \pi_{4jk} (\text{Positive}) + \pi_{5jk} (\text{Negative}) + e_{ijk} $$

Individuals’ level of affect on days they engage in vaginal sex was predicted by an individual intercept within a semester for days of relationship sex with an average level of consequences ($\pi_{0jk}$), controls for whether a day was on a weekend ($\pi_{1jk}$) and average number of drinks ($\pi_{2jk}$) and the effect of having sex with a non-dating partner ($\pi_{3jk}$), experiencing more positive consequences ($\pi_{4jk}$) and experiencing more negative consequences ($\pi_{5jk}$) on affect. All Level 1 variables were group mean centered, with the exception of type of sexual partner, as 70% of
participants reported sex with only a dating partner, and thus there was not enough within-person variability to calculate deviations from individuals’ means on this variable. At Level 2, we accounted for the variability within semesters using the following equations:

\[ \pi_{0jk} = \beta_{00k} + r_{jk} \]
\[ \pi_{1jk} = \beta_{10k} \]
\[ \pi_{2jk} = \beta_{20k} \]
\[ \pi_{3jk} = \beta_{30k} \]
\[ \pi_{4jk} = \beta_{40k} \]
\[ \pi_{5jk} = \beta_{50k} \]

In this model, \( \beta_{10k} \) through \( \beta_{50k} \) represent each individual’s average level of affect within a given semester, and \( r_{jk} \) represents unexplained variability from the average. Finally, at Level 3, we modeled the impact of gender on the association between type of partner and affect:

\[ \beta_{00jk} = \gamma_{000} + \gamma_{001} (\text{Gender})_k + U_{00k} \]
\[ \beta_{01jk} = \gamma_{010} \]
\[ \beta_{02jk} = \gamma_{020} \]
\[ \beta_{03jk} = \gamma_{030} + \gamma_{031} (\text{Gender})_k \]
\[ \beta_{04jk} = \gamma_{040} \]
\[ \beta_{05jk} = \gamma_{050} \]

\( \gamma_{000} \) indicated the overall intercept for the reference group (female students having sex with a dating partner), whereas \( \gamma_{030} \) represented female students’ intercepts for sex with a non-dating partner and \( \gamma_{040} \) and \( \gamma_{050} \) represented the effect of positive consequences and negative consequences on affect. \( \gamma_{001} \) models how average affect differed for male compared to female
students, whereas $\gamma_{031}$ represented how male students differed from female students in the effect of sex with a non-dating partner on daily affect.

Results are presented in Table 2.2. Male students reported more positive affect than female students ($\gamma_{001}$), and students reported more positive affect on days they drank more ($\gamma_{020}$). For our third aim, we predicted that sex with a non-dating partner would be associated with less positive and more negative affect, and that this association would be stronger for female compared to male students. We found no differences in positive affect depending on whether sex was with a dating or non-dating partner. However, sex with a non-dating partner was associated with more negative affect ($\gamma_{030}$), and there were no gender differences in this association ($\gamma_{031}$). Thus, the hypotheses of our third aim were partially supported. For our fourth aim, we predicted that students would report more positive affect on days they perceived more positive and fewer negative consequences, and more negative affect on days they perceived fewer positive and more negative consequences. Students reported more positive affect on days they perceived more positive consequences ($\gamma_{040}$), and more negative affect on days they reported more negative consequences ($\gamma_{050}$). Thus, we found partial support for the hypotheses of Aim 4.

**Discussion**

In this study, we investigated how engaging in vaginal sex on a given day was associated with daily affect, and how situational factors of the sexual experience predicted variations in affect. Consistent with prior work on late adolescents’ sexual behavior (Shrier et al., 2007; 2010), we found that college students experienced more positive affect and less negative affect on days they engaged in vaginal sex. However, vaginal sex was only associated with more positive affect on the day students engaged in sexual behavior, as affect did not differ when students had engaged in sex on the prior day. This finding is consistent with prior work on a
clinical sample of late adolescents (Shrier et al., 2010) which found that positive affect increased after intercourse, but returned to baseline levels about 8 hours after. Thus, it appears that, on average, sexual behavior contributes positively to mental health in college students, but this effect is relatively short-lived. However, because daily affect may cumulatively play a role in psychological distress, it is possible that repeatedly experiencing events associated with positive affect may contribute to individuals’ broader mental health (McCullough, et al., 2000). Future research should examine how daily occurrences of sexual behavior are associated with long-term mental health. In addition, measuring affect at only one point during a day makes it difficult to determine whether changes in affect occur prior to or after sex, and future research should attempt to understand this temporal ordering.

Contrary to our prediction, however, we did not find any gender differences in associations between vaginal sex and affect despite a large number of days in our sample. Prior research has suggested that first intercourse is associated with depressive symptoms for male, compared to female, adolescents (Meier, 2007; Spriggs & Halpern, 2009) and more positive body image for male, but not female, college students (Vasilenko, Ram, & Lefkowitz, 2011). However, studies using experience sampling have found a similar lack of gender differences (Shrier et al., 2007; 2010), suggesting that although first intercourse may be associated with poorer mental health for female, compared to male, adolescents, later occurrences of sexual behavior may be similarly associated with mental health for male and female adolescents. It is also possible that individuals may perceive an occurrence of sexual behavior differently after more time has passed; for example, an individual’s initial feelings about an occasion of sexual behavior may be positive, but may change after he or she has time to reflect. Future research should examine the experience of first intercourse shortly after the event has occurred, in order to
more accurately compare it to later occurrences of sex and see how these behaviors may differentially impact mental health.

Although having vaginal sex on a day is, on average, associated with increased positive affect, situational factors of individuals’ experiences can influence their level of affect on days they have sex. Participants reported more negative affect on days they engaged in sex with a non-dating, compared to dating partner, and there were no gender differences in this association. Past research has demonstrated between-person associations in non-dating sexual behavior and depressive symptoms; female adolescents and college students who have engaged in sex with a non-dating partner have more depressive symptoms than those who have not, whereas male college students who have engaged in non-dating sex have fewer depressive symptoms than those who have not (Grello et al., 2006; Shulman et al., 2009). However, qualitative research has suggested that male college students do feel regret about their non-dating sexual experience (Epstein, Calzo, Smiler, & Ward, 2010). Taken with prior research, the results in this paper suggest that between-persons and within-person associations of non-dating sexual behavior and mental health may differ. For example, male students who seek out sex in non-dating relationships may be less depressed overall than those who engage in sex only in dating relationships, but they may feel worse when they engage in non-dating sex, and thus report more negative affect on these days.

In addition, we found that individuals experienced more positive affect on days they perceived more positive consequences, and more negative affect on days they perceived more negative consequences. However, negative consequences did not predict positive affect, and positive consequences did not predict negative affect. These findings suggest that positive experiences of sex contribute to positive aspects of mental health, whereas negative experiences
contribute to negative aspects of mental health. Thus, although individuals may seek out sexual experiences to cope with unpleasant feelings and avoid negative affective states (Cooper et al., 1998) this research suggests that a more positive sexual experience may not decrease negative affect. In addition, the associations between relationship with partner and perceived consequences and affect suggest that although sexual behavior may be, on average, associated with positive affect, these associations may differ depending on situational factors and perceptions of the sexual experience. Future research should continue to examine the role of other individual and relational factors in associations between sexual behavior and mental health in order to understand which sexual experiences are associated with more positive mental health.

In addition, because prevention programs may be more effective when they include accurate information tailored to a specific population (Rotheram-Borus et al., 2009) health educators and prevention scientists should take into account that sexual behavior may not be associated with mental health in the same way in all situations, and frame programming accordingly. For example, programs focusing on abstaining from sex altogether ignore the positive impact of sexual behavior, whereas messages about avoiding sex with non-dating partners or negative consequences may better reflect college students’ experiences and be more effective.

There are several limitations of this paper that provide directions for future research. First, although we demonstrated that positive affect is higher on days individuals engage in vaginal sex, we were not able to determine the directionality of this association. It is possible that individuals are more likely to engage in sexual behavior on days they are already experiencing more positive affect, and researchers should examine these potential bidirectional associations by collecting multiple reports of affect each day. Our sample consisted only of college students, which limits the generalizability of our findings in several ways. We have no
information about late adolescents who do not attend college. Future research should examine whether sexual behavior is experienced differently for late adolescents who do not attend college, and may be in vastly different living situations (e.g. living with parents, living with a romantic partner or spouse). In addition, it is not known whether these findings would be similar in individuals at younger or older ages. Sexual behavior may be experienced more negatively during earlier adolescent periods when fewer peers are sexually active and individuals are less developmentally prepared to handle sexual behavior, but more positively in a committed adult relationship. Future studies could examine whether associations between sexual behavior and affect differ over time by following individuals from adolescence into adulthood. Using reports of daily sexual behavior limited the individuals included in our analysis to those who reported vaginal sex during a data collection period, and thus we may not capture the experiences of individuals who are sexually active, but engage in sex infrequently. Future studies should consider alternate methods, such as experience sampling with event reports of sexual behavior (Shrier et al., 2007), which may allow researchers to obtain more reports on sexual experiences without burdening participants. In addition, although we had a relatively large number of reports on days participants had vaginal sex, more of these days were reported by female participants and thus we may have had difficulty detecting gender differences with small effect sizes.

In addition, our focus on vaginal sex limited our sample to only individuals who engaged in one type of sexual activity with an opposite-sex partner, and future research should explore links between other types of sex and affect, as well as how sexual behavior and affect are associated in sexual minority students. Finally, although we examined how several factors are associated with mental health (e.g. gender, relationship with partner, perceived consequences of sex), there are many other factors that may be linked to sexual behavior and mental health. For
example, future research could examine how between-persons factors, such as personality or attitudes about sexual behavior may be associated with both perceptions of sexual behavior and mental health.

Despite these limitations, this paper contributes to knowledge of sexual behavior and mental health in several ways. First, many studies of college students used samples of primarily European American students, and our sample was racially and ethnically diverse. Second, our research examines the impact of sexual behavior on short-term mental health in late adolescence, whereas most research in this area has examined associations between first intercourse and longer-term mental health earlier in adolescence. Our findings suggest that, on average, sexual behavior is associated with better short-term mental health in college students. Second, this paper used reports obtained the day after participants engaged in vaginal sex, eliminating confounds of memory, passage of time and changes in relationship with a sexual partner. Finally, this paper examined how affect differed depending on situational factors of the sexual experience, demonstrating, for example, that students report more negative affect on days they have sex with a non-dating, compared to dating, partner. These findings underscore the importance of examining how associations between sexual behavior and mental health may differ vary across individuals and situations.
References


Table 2.1

*Multi-level Models Predicting Daily Positive and Negative Affect by Gender and Engaging in Vaginal Sex on Current Day and Prior Day*

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<td>( R_{0jk} )</td>
<td>.10***</td>
<td>.32</td>
<td>.07***</td>
<td>.26</td>
</tr>
<tr>
<td>( R_{2jk} )</td>
<td>.03*</td>
<td>.17</td>
<td>.01</td>
<td>.08</td>
</tr>
<tr>
<td></td>
<td>R_{4jk}</td>
<td>U_{00k}</td>
<td>U_{20k}</td>
<td>U_{40k}</td>
</tr>
<tr>
<td>-------</td>
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</tr>
<tr>
<td>Level 3</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>R_{4jk}</td>
<td>.03***</td>
<td>.17</td>
<td>.01*</td>
<td>.01</td>
</tr>
<tr>
<td>U_{00k}</td>
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<td>.61</td>
<td>.12***</td>
<td>.35</td>
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<td>.09</td>
</tr>
<tr>
<td>U_{40k}</td>
<td>.01</td>
<td>.02</td>
<td>.01</td>
<td>.04</td>
</tr>
</tbody>
</table>

*Note.* Level 1 $N=23,134$ person-days, Level 2 $N=2002$ person-semesters, Level 3 $N=364$ persons, $SE=\text{Standard Error}$, $SD=\text{Standard Deviation}$

*p<.05, **p<.01, ***p<.001.
Table 2.2

*Multi-level Models Predicting Daily Positive and Negative Affect by Situational Factors of Sex on Days Participants Engaged in Vaginal Sex*

<table>
<thead>
<tr>
<th>Fixed Effects</th>
<th>Positive Affect</th>
<th>Negative Affect</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coefficient</strong></td>
<td><strong>SE</strong></td>
<td><strong>Coefficient</strong></td>
</tr>
<tr>
<td>Average Affect $\gamma_{000}$</td>
<td>2.36***</td>
<td>0.05</td>
</tr>
<tr>
<td>Male $\gamma_{001}$</td>
<td>0.21**</td>
<td>0.02</td>
</tr>
<tr>
<td>Weekend $\gamma_{010}$</td>
<td>0.01</td>
<td>0.03</td>
</tr>
<tr>
<td>Number of Drinks $\gamma_{020}$</td>
<td>0.02**</td>
<td>0.02</td>
</tr>
<tr>
<td>Non-dating $\gamma_{030}$</td>
<td>0.01</td>
<td>0.08</td>
</tr>
<tr>
<td>Non-dating \times Male $\gamma_{031}$</td>
<td>0.13</td>
<td>0.13</td>
</tr>
<tr>
<td>Positive Consequences $\gamma_{040}$</td>
<td>0.05**</td>
<td>0.02</td>
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<tr>
<td>Negative Consequences $\gamma_{050}$</td>
<td>-0.01</td>
<td>0.04</td>
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Random Effects

<table>
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<tr>
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<th>SD</th>
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<tbody>
<tr>
<td>Level 2</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\text{r}_{0jk}$</td>
<td>.12***</td>
<td>.35</td>
<td>.05***</td>
<td>.22</td>
</tr>
</tbody>
</table>

Level 3
U_{00k} & .37*** & .60 & .15*** & .38 \\

*Note.* Level 1 \(N=2,304\) person-days, Level 2 \(N=900\) person-semesters, Level 3 \(N=363\) persons.  
\(SE=\) Standard Error, \(SD=\) Standard Deviation 
\(*p<.05, **p<.01, ***p<.001.*
Figure 2.1. Conceptual model linking adolescent sexual behavior with mental health. Adapted from Vasilenko, Lefkowitz & Welsh, 2011, presenting only aspects of conceptual model tested in this paper. Specific variables used in this study are in parentheses.
Changes in Psychological Distress After First Intercourse in Late Adolescence

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Target Journal: *Journal of Research on Adolescence*
Abstract

Although research has suggested that engaging in sexual intercourse early relative to peers may be associated with increased depressive symptoms, little research has examined whether engaging in first intercourse in late adolescence is associated with changes in mental health. This paper uses data from a sample of previously abstinent college students (N=119, 47.1% female, Mean age=18.5 years old, 22.7% Hispanic-Latino [HL], 30.3% non-HL European American, 13.5% non-HL Asian American, 17.6% non-HL African American and 5.9% non-HL multiracial) to examine whether psychological distress changes after first intercourse, and whether these associations differ by relationship with partner and perceived positive and negative consequences of sex. Results showed a decrease in psychological after first intercourse for both male and female adolescents. Engaging in first intercourse with a non-dating partner and experiencing fewer positive consequences of sex were associated with greater decreases in psychological distress. These findings suggest that first intercourse is associated with primarily positive mental health outcomes in late adolescence, although such associations may differ depending on situational factors of the sexual experience.
Changes in Psychological Distress After First Intercourse in Late Adolescence

First sexual intercourse is an important event in the lives of many individuals (Carpenter, 2002; Tsui & Nicoladis, 2004), but relatively little is known about how first intercourse is associated with mental health. Sexuality education programs focusing on abstinence often teach that sexual behavior before marriage is psychologically harmful (Santelli et al., 2006), but there is relatively little research to support or refute this contention. However, as nearly all individuals engage in sexual intercourse at some point in their lives, it is important to understand the impact of this transition and what factors may be associated with a more positive experience. Drawing from a model that suggests that mental health outcomes of sexual behavior are predicted by individual factors, relationship factors and individuals’ perceptions of their sexual behavior (Vasilenko, Lefkowitz, & Welsh, 2011; see Figure 3.1), we examine the psychological impact of first intercourse in late adolescence, including specific contexts of the experience that may predict more positive or negative outcomes.

Both researchers (Carpenter, 2001; Tsui & Nicoladis, 2004) and popular media (Kelly 2010) have presented first sexual intercourse as an important and meaningful transition. This research suggests that first intercourse may be a turning point, or a transitional event associated with changes in cognitions whereby adolescents feel they have moved to a qualitatively distinct state (Graber & Brooks-Gunn, 1996; Rutter, 1994). This transition could involve changes in the way individuals see themselves and subsequently their mental health. However, research on other life events suggests that events may have an impact only in the short-term; events as extreme as winning the lottery or becoming a paraplegic are only associated with short-term changes in well-being, as individuals adjust to their new state relatively quickly (Brickman, Coates, & Janoff-Bulman, 1978; Krause & Sternberg, 1997; Loewenstein & Frederick, 1999).
Thus, it is possible that the transition to first intercourse may be a turning point that leads to changes in psychological functioning, but that such changes may only be temporary as individuals become accustomed to viewing themselves as sexually active.

Cross-sectional studies have found that adolescents who have engaged in sexual intercourse have greater odds of depression and suicidal ideation and have lower self-esteem than abstenent adolescents (Hallfors et al., 2004; Young, Donnelly, & Denny, 2004). These studies compared groups with different patterns of behavior, making it difficult to determine if sexual intercourse in adolescence leads to more depressive symptoms, or if individuals who engaged in sexual behavior were already at greater risk. Several studies have used longitudinal data to examine changes after the transition to first intercourse, and have found more nuanced results. Sabia (2006) found no association between transitioning to sexual intercourse and self-reported depression or suicidal ideation a year later. However, other research has found that early (before age 16) initiation of sexual intercourse predicts increased depressive symptoms and decreased self-esteem in adolescent girls a year later, but early sexual intercourse does not predict depressive symptoms in young adulthood (Meier 2007; Spriggs & Halpern, 2008).

However, little is known about whether the transition to first intercourse is associated with changes in mental health for individuals who experience the transition late relative to their peers. One study of students who experienced the transition to first intercourse in college found that male students felt more positive about their appearance after engaging in first intercourse (Vasilenko, Ram, & Lefkowitz, 2011). Thus, there is some evidence that transitioning to first intercourse early relative to peers is associated with negative mental health outcomes, whereas transitioning later in adolescence may be experienced more positively, at least for some individuals.
However, changes in mental health after first intercourse may vary for different
individuals. Both individual (e.g. demographics, attitudes about sex) and relationship factors
(e.g. type of sexual partner, relationship quality) can play a role in the associations between first
intercourse and changes in mental health (Vasilenko, Lefkowitz, & Welsh, 2011). As discussed
above, research has demonstrated that female, but not male, adolescents experience increased
depressive symptoms after first intercourse, and male, but not female, college students
experience more positive body image after first intercourse (Meier, 2007; Spriggs & Halpern,
2008; Vasilenko, Ram, & Lefkowitz, 2011). This difference may be due to sexual double
standards that suggest that sexual behavior is appropriate for men, but not women (Crawford &
Popp, 2003).

Another factor that may affect the association between first sexual intercourse and
depressive symptoms is the relationship with first sexual partner. Although about three-fourths of
adolescents engage in first sexual intercourse with a romantic partner, some report engaging in
first intercourse with a friend or someone they just met (Manning, Longmore, & Giardano,
2000). First intercourse with a non-dating partner has been linked to depressive symptoms,
although these differences may exist prior to the transition to sexual behavior (Grello, Welsh,
Harper & Dickson, 2003). Gender differences in associations between type of sexual partner and
depressive symptoms have been found; female college students who had first intercourse with a
non-dating partner had more depressive symptoms than those who had first intercourse with
other types of partners, whereas male college students who ever had sex with a non-dating
partner reported fewer depressive symptoms compared to those who had never had sex or had
sex with only dating partners (Grello, Welsh, & Harper, 2006).

A final factor that may be associated with individuals’ mental health after first
intercourse is individuals’ own feelings about the event (Vasilenko, Lefkowitz & Welsh, 2011). Individuals who perceive life events to be more upsetting or likely to have a negative impact have poorer psychological functioning than those who perceive events to be more positive (Abramson, Metalsky, & Alloy, 1989; Beck, 1987; Diener, Oishi, & Lucas, 2003; Lyubimirusky, 2003; Schwarz & Stack, 1991). Thus, individuals’ mental health may be related to their perception of life events, and how this perception affects their feelings about themselves (Vasilenko, Lefkowitz, & Welsh, 2011). Although research has documented both individuals’ perceptions of their first intercourse (Darling, Davidson, & Passarello, 1992; Sprecher, Barbee, & Schwartz, 1995; Tsui & Nicoladis, 2004) and their changes in mental health after first intercourse (Meier, 2007; Sabia, 2006; Spriggs & Halpern, 2008; Vasilenko, Ram, & Lefkowitz, 2011) research has rarely how individuals’ perceptions of first intercourse may influence their long-term mental health. Adolescents who perceive more negative consequences of first intercourse, such as feeling guilty, may experience an increase in psychological distress compared to adolescents who perceive more positive consequences, such as feeling closer to a sexual partner (Vasilenko, Lefkowitz, & Welsh, 2011).

In the present paper we test whether first sexual intercourse in college students is associated with changes in psychological distress and what factors moderate this association. First, we examine whether students experience changes in symptoms of psychological distress, and whether such changes are relatively short-term or persist in the long-term. Based on past research on the sexual double standard (Crawford & Popp, 2003) and past research suggesting more positive and fewer negative outcomes for first intercourse for adolescent boys and male college students compared to adolescent girls and female college students (Meier, 2007; Spriggs & Halpern, 2008; Vasilenko, Ram, & Lefkowitz, 2011), we predict
1. Male students will experience a decrease in psychological distress after engaging in first intercourse, whereas female students will experience an increase in psychological distress.

Because some research has documented that major life events are associated with short-term, but not long-term changes in mental health, we predict

2. Students will experience a temporary change in psychological distress in the semester immediately after first intercourse, but will return to their pre-sex trajectory in subsequent semesters.

Next, we examine whether relationship with first sexual partner and number of positive and negative consequences of sex moderate short-term changes in mental health after first intercourse. Because first intercourse with a non-dating partner is associated with depressive symptoms in early and middle adolescence (Grello et al., 2003) and sex with a non-dating partner is associated with more negative outcomes for female college students (Grello et al., 2006), we predict:

3. Students who have first intercourse with a non-dating partner will experience an increase in psychological distress compared to students who have first intercourse with a relationship partner.

4. Gender will moderate this association; associations between sex with a non-dating partner and psychological distress will be stronger for female compared to male students.

Because perceiving an event to be more negative is linked to more depressive symptoms, we predict:

5. Students who report fewer positive and more negative consequences of first
intercourse will experience a greater increase in psychological distress compared to students who report more positive and fewer negative consequences.

Method

Participants

Participants were drawn from the University Life Study (ULS), a longitudinal study of college students recruited during their first year at a large, Northeastern university. A stratified random sampling procedure with replacement was used to achieve a diverse sample of first-year college students. Because this paper focuses on changes in psychological distress after first intercourse, we include only participants who transitioned to first intercourse during the period of our study and who have data on psychological distress from a semester both before and after first intercourse. The psychological distress variable was not included until Semester 2 of the study; therefore we include only participants who transitioned to first intercourse between Semesters 2 and 6. In total, 746 students participated in the initial first semester baseline survey (65.6% response rate). Of these 746 participants, 357 engaged in intercourse prior to the start of the study, 47 engaged in first intercourse between Semesters 1 and 2, 119 (our analytic sample) engaged in first intercourse between Semesters 2 and 6, 179 were abstinent at Semester 6 data collection and 44 dropped out prior to the end of the study and before reporting ever engaging in sexual intercourse. Thus, we used data from the 119 individuals who replied “no” to the question “Have you ever had vaginal sex?” at the first and second semesters of data collection, and “yes” at a subsequent semester. Vaginal sex was defined as “sex in which the penis penetrates the vagina.”

The 119 participants in this analytic sample were 47.1% female, and were, on average, 18.5 years old at Semester 1 (SD=0.4). The self-reported racial/ethnic composition was as
follows: 22.7% Hispanic-Latino [HL], 30.3% non-HL European American, 13.5% non-HL Asian American, 17.6% non-HL African American and 5.9% non-HL multiracial. The vast majority identified as heterosexual (97.5%), with two participants reporting a homosexual orientation and 1 participant reporting a bisexual orientation. Because individuals’ sexual identity may differ from their actual sexual behaviors (Diamond, 2002) and some sexual minority students in our sample reported engaging in vaginal sex, we kept these participants in the analyses. However, this analytic sample likely underrepresents the number of sexual minority students in our larger sample, as students who did not engage in vaginal sex were excluded.

To examine how individuals in this sample differed from students who dropped out of the study before reporting first intercourse, we ran a series of 2 t-tests and 4 \( \chi^2 \) tests on demographic and outcome variables. The participants included in this sample did not differ from those who dropped out on gender, ethnicity, parents’ education or Semester 2 psychological distress (\( p > .05 \)).

**Procedures**

Participants completed a web-based survey during each of their first six semesters of college. Each participant received an email containing a secure link to the study, and received $20-40 for completing this portion of the survey, depending on the semester.

**Measures**

**Timing of First Sexual Intercourse.** At each semester, participants who had not reported vaginal sex at an earlier semester of data collection were asked, “Have you ever had vaginal sex?” We used this information to determine whether participants engaged in first intercourse during the period necessary for inclusion in this analysis and to calculate three timing variables. The first was a time index measuring time to/from first intercourse. The timepoint of
the survey each individual first reported engaging in intercourse was set at 0, with negative
designates times before intercourse, and positive values indicating times after intercourse.
For example, if a participant reported first intercourse at Semester 3, their Semester 2 would be
coded -1, and their Semester 6 would be coded 3. This variable was used to center time around
each individual’s semester of first intercourse. To test whether post-sex reports of psychological
distress differed from the overall trajectory, we created two additional dichotomous variables.
One variable assessed short-term effects of first intercourse; the first wave an individual reported
vaginal sex was coded as 1, and all others were coded 0. The final timing variable assessed long-
term outcomes of sex; any semesters after, but not including, the first report of first intercourse
were coded as 1, with all others coded as 0.

**Psychological Distress.** Starting at Semester 2, participants completed the K6
questionnaire, a brief screening measure of psychological distress, including symptoms of
depression and anxiety (Kessler et al., 2002). Participants were asked how often they had
experienced particular feelings in the past 30 days. This scale contains six items (e.g. “so
depressed that nothing could cheer you up”) that are rated on a five point scale from none of the
time to all of the time. The scale adequately discriminates DSM diagnosable mental disorders
(Kessler et al., 2002). Participants’ individual Semester 2 mean scores ranged from 0 to 4
($M=1.1$, $SD=0.8$), with good reliability ($\alpha$ range from .85 to .90 across semesters).

**Relationship with First Sexual Partner.** When participants reported engaging in
vaginal sex for the first time, they were asked “How would you describe this partner at that
time?” and chose from seven options. We created a dichotomous relationship status variable for
this paper; dating partner (casually dating; regular dating partner, living with, engaged to, or
married to partner) was coded as 0 whereas non-dating partner (stranger, friend) was coded as 1. More than a third (38.6%) engaged in first intercourse with a non-dating partner.

**Consequences of First Sex.** When participants first reported vaginal sex, they reported whether they experienced each of nineteen consequences of sex, using the same items from our prior work on daily sexual behavior (Vasilenko, Lefkowitz, & Maggs, 2011a). These items were derived from prior research on reasons for engaging in sex or remaining abstinent (e.g. Cooper, Shapiro, & Powers, 1998; Patrick, Maggs, Cooper, & Lee, 2010; Sprecher & Regan, 1996). The checklist contains 7 items about positive consequences (e.g. “feel more intimate or closer to partner”) and 12 items about negative consequences (e.g. “wish you had not had sex”). On average, participants reported 3.6 positive consequences of first intercourse (SD=2.0) and 2.8 negative consequences (SD=2.6).

**Results**

To test whether first sexual intercourse leads to changes in psychological distress and what factors may lead to more negative functioning after first intercourse, we used multiphase growth curve modeling (Raudenbush & Bryck, 2002) person-centered around the semester prior to first intercourse, similar to the strategy used in our prior work (Vasilenko, Ram, & Lefkowitz, 2011). This model plotted normative developmental changes in psychological distress and examined how the transition to first intercourse is associated with deviations from this trajectory. Within-person changes (Level 1) in psychological distress were modeled with the following:

\[
\text{Psychological Distress}_{it} = \beta_{0i} + \beta_{1it} (\text{Semester}) + \beta_{2it} (\text{Time To/From Intercourse}) + \beta_{3it} (\text{Short-Term}) + \beta_{4it} (\text{Long-Term}) + r_{it}
\]

In this equation the repeated measures of psychological distress from person \(i\) at occasion \(t\) were modeled as a function of four parameters. First, an individual-specific intercept, \(\beta_{0i}\), indicated
each individual’s mean level of psychological distress. An indicator of the semester (2-6) controlled for the effect of time, and allowed us to disentangle changes occurring after first intercourse from changes that occur over time. Time To/From First Intercourse (TTFI; $\beta_{2i}$) modeled an individual-specific normative trend in changes in psychological distress over time (centered around each individual’s semester of first intercourse). $\beta_{3i}$ and $\beta_{4i}$ examined discrete shifts in psychological distress for the first and subsequent semesters after an individual engages in first intercourse. These coefficients can be interpreted as the main effect of different periods of time on psychological distress. Unexplained residuals were represented by $r_{ii}$.

Each participant’s intercept, $\beta_{0i}$, Semester, $\beta_{1i}$ normative developmental trends, $\beta_{2i}$, and the amount of discrete shift in the short and long-term, $\beta_{3i}$ and $\beta_{4i}$ were modeled (at Level 2) as a function of gender, relationship with first sexual partner, and number of positive and negative consequences of first intercourse experienced. Specifically,

$$\beta_{0i} = \gamma_{00} + \gamma_{01}(Male) + \gamma_{02}(Non\text{-}dating) + \gamma_{03}(Positive) + \gamma_{04}(Negative) + \gamma_{05}(Male \times Non\text{-}dating) + U_{0i}$$

$$\beta_{1i} = \gamma_{10}$$

$$\beta_{2i} = \gamma_{20} + \gamma_{21}(Male) + \gamma_{22}(Non\text{-}dating) + \gamma_{23}(Positive) + \gamma_{24}(Negative) + \gamma_{25}(Male \times Non\text{-}dating) + U_{2i}$$

$$\beta_{3i} = \gamma_{30} + \gamma_{31}(Male) + \gamma_{32}(Non\text{-}dating) + \gamma_{33}(Positive) + \gamma_{34}(Negative) + \gamma_{35}(Male \times Non\text{-}dating)$$

$$\beta_{4i} = \gamma_{40} + \gamma_{41}(Male) + \gamma_{42}(Non\text{-}dating) + \gamma_{43}(Positive) + \gamma_{44}(Negative) + \gamma_{45}(Male \times Non\text{-}dating)$$

The $\gamma$ coefficients represented sample level effects, and $u_{0i}$ and $u_{1i}$ represented unexplained interindividual differences. Of particular interest to our hypotheses were coefficients testing
differences by gender, relationship with first sexual partner, and number of positive and negative consequences; thus, the coefficients for male, non-dating, positive and negative represent interactions of demographics and situational factors on changes in psychological distress associated with first intercourse. Specifically, $\gamma_{01, 21, 31}$ and $41$ tested whether male students differed from female students (the reference group), on overall level of psychological distress, changes over time, and short-term and long-term changes after first intercourse. $\gamma_{32}$ and $42$ tested whether short-term and long-term changes in functioning differed as a result of relationship with first sexual partner (reference group=dating partner). Whether these associations differed by gender was tested by $\gamma_{35}$ and $45$. Finally, $\gamma_{34}$-$\gamma_{35}$ and $44$-$\gamma_{45}$ tested whether the number of positive and negative consequences experienced moderate changes associated with first intercourse.

Because of the large number of predictors and the risk of inflated standard errors when including non-significant interactions in a model (Aiken & West, 1991), we ran the full model and then removed non-significant moderators in steps, starting with the non-significant three-way interactions, then non-significant two-way interactions.

Results of the growth curve model are presented in Table 3.1. We removed all non-significant three-way interactions from the model (TTFI × Gender × Relationship, $\beta$=.13, $p$=.28; Short-Term × Gender × Relationship, $\beta$=.21, $p$=.48; Long-Term × Gender × Relationship, $\beta$=.15, $p$=.70) followed by the non-significant two-way interactions (TTFI × Gender, $\beta$=.08, $p$=.37; Short-Term × Gender, $\beta$=.34, $p$=.16; Long-Term × Gender, $\beta$=.41, $p$=.24; TTFI × Negative Consequences, $\beta$=.01, $p$=.66; Short-Term × Negative Consequences, $\beta$=.03, $p$=.39; Long-Term × Negative Consequences, $\beta$=.01, $p$=.92). However, we retained two marginally significant ($p<.10$) interactions because of our relatively small sample size, the difficulty of detecting interaction effects (McClelland & Judd, 1993) and the lack of substantive difference between
effects slightly above and below statistical significance (Gelman & Stern, 2006). In addition, we retained the nonsignificant TTFI × Positive Consequences interaction, in order to have all relevant time periods represented in the model and properly construct and interpret trajectories for the two AFI × Positive Consequences interactions. Results are presented in Table 3.1.

Looking first at main effects, individuals who had sex with a non-dating partner reported more baseline psychological distress (γ03), whereas individuals who reported more positive consequences of sex reported lower psychological distress (γ04). There were no significant differences in psychological distress by gender, semester, number of negative consequences, or time from first sex. However, partially consistent with our first and second hypothesis, individuals reported an average of .50 less psychological distress in the semester after they engaged in first intercourse (γ30; see Figure 3.2). However, contrary to predictions, there were no gender differences in this association (interactions removed from final model), and the changes persisted in subsequent semesters, which were associated with a .67 decrease in psychological distress (γ40).

We found several interactions between situational factors of the first sexual experience and changes over time and after first intercourse. Students who had first-sex with a non-dating partner experienced greater increase in psychological distress over time compared to individuals who had sex with a dating partner (centered around first sex; γ22). However, after first intercourse students who had sex with a non-dating partner experienced, on average, a greater decrease in psychological distress compared to those who had sex with a dating partner (.35 first semester after, γ32; .59 in subsequent semesters, γ42); however, these findings were in the p<.10 range, and thus are interpreted with caution. As shown in Figure 3.3, individuals who had first intercourse with a dating partner experienced relatively little change over time
compared to those who had sex with a non-dating partner, who experienced larger increases in distress over time, and a larger decrease after first intercourse. Thus, we found no support for Hypothesis 3, as findings were in the opposite direction as expected. In addition, because all Gender × Relationship interactions were nonsignificant and dropped from the final model we found no support for Hypothesis 4.

Participants’ changes in psychological distress over time were not predicted by the number of negative consequences they experienced (interaction removed from final model). However, in both periods after first intercourse, individuals who experienced more positive consequences experienced a smaller decrease in psychological distress compared to those who experienced fewer positive consequences ($\gamma_{33}$; and $\gamma_{43}$; Figure 3.4). Because these associations were in the opposite direction of our hypothesis, and we found no associations for negative consequences, we found no support for Hypothesis 5.

**Discussion**

In this paper we examined changes in psychological distress after college students engaged in first intercourse, and whether these changes differed depending on gender, relationship with first sexual partner, and the positive or negative consequences of first intercourse they experienced. We found that individuals experienced decreases in psychological distress in the semesters after they engaged in sexual intercourse for the first time. However, based on the literature on life events and well-being (Brickman et al., 1978; Krause & Sternberg, 1997; Loewenstein & Frederick, 1999), we had predicted these changes would only exist in the short-term (1 semester), but the decrease in psychological distress persisted in subsequent semesters. This finding suggests that psychological distress may not lead to a temporary change in how individuals assess their life, but that individuals may feel less distressed for months or
years after first intercourse. This finding is surprising, as research has shown only relatively short-term consequences of even major life events like winning the lottery or becoming paralyzed (Brickman et al., 1978; Krause & Sternberg, 1997; Loewenstein & Frederick, 1999). It is possible that the decrease in psychological distress is not due to changes in how individuals view themselves after first intercourse *per se*, but that college students may simply feel less distressed at times when they are sexually active. For example, research has shown that college students report more positive and less negative affect on days they engage in vaginal sex compared to days they do not (Vasilenko, Lefkowitz, & Maggs, 2011b). Future research should examine whether similar associations exist for long-term mental health outcomes, such as whether individuals have less psychological distress during semesters they are sexually active or engage in sex more frequently. It is also possible that changes in mental health occurred before first intercourse, and are associated with both a decreasing trajectory of psychological distress and increasing opportunities for sexual behavior, and future research with more closely-spaced timepoints could examine this possibility.

We also found several differences in the association between first intercourse and psychological distress by situational factors of the first sexual experience. We found several differences depending on whether first intercourse was with a dating or non-dating partner. First, it is notable that rates of non-dating sex were higher in this sample than other studies with younger adolescent samples (e.g. Manning et al., 2000). This difference may be due to relaxed attitudes about casual sex among college students (Lefkowitz, 2005). We found that individuals who had first intercourse with a non-dating partner had greater psychological distress overall, and experienced increased distress over time compared to those who had sex with a dating partner. However, they experienced a larger, marginally significant, decrease in psychological
distress after first intercourse compared to those who had sex with a dating partner. These findings suggest that individuals with more psychological distress may seek out sexual experiences with non-dating partners as a way to improve their mood, and is consistent with research showing that individuals in sexually non-exclusive relationships have higher coping motives for sex (i.e. using sex to feel better) than those in exclusive relationships (Cooper et al., 1998).

Individuals who perceived fewer positive consequences of sex were more distressed overall, suggesting that individuals who experience symptoms of depression and other disorders may interpret their sexual behavior in a less positive way. However, individuals who perceived fewer positive consequences also reported a larger decrease in distress after first intercourse compared to those who perceived more positive consequences. This finding may be because individuals who interpreted their behavior in a more positive way may already have low levels of symptoms of psychological distress overall, and thus cannot experience as great a reduction of symptoms after first intercourse. These results differ from our work on perceived consequences and daily affect; in which we found that perceiving more positive consequences was associated with more positive affect on the same day (Vasilenko, Lefkowitz, & Maggs, 2011b). This difference may be because reports of perceptions of an event measured a few hours after it takes place may be linked to episodic emotional knowledge (emotional reports closely tied to a specific event), whereas reports that take place several months later may reflect semantic emotional knowledge (more general beliefs about one’s emotions, separate from the specific event; Robinson & Clore, 2002). Thus, reports of perceived consequences of sex on a given day may reflect feelings about the event, whereas retrospective reports of consequences of first intercourse may reflect, in part, an individual’s overall emotional state and way of perceiving
events. Future research should attempt to disentangle perceptions of individuals’ experience of sex from their more general cognitive evaluations.

In contrast to our findings for positive consequences, no significant changes in psychological distress were found based on the number of negative consequences experienced. Students in our sample generally report more positive than negative consequences of their first intercourse, and subsequently it is possible that the positive consequences are more influential in how they evaluate their first intercourse experience. For example, students’ overall evaluations of their sexual behavior may be overly positive even if they have some negative feelings about the event, and thus the positive consequences may be more strongly associated with mental health.

We also predicted that women would report more distress as a result of sex than men, particularly when they had sex with a non-dating partner. However, no gender differences were found, suggesting that first intercourse is a largely positive experience for both male and female college students. This finding is in contrast to prior research (Meier, 2007; Spriggs & Halpern, 2008) which found increases in depressive symptoms for adolescent girls, but not boys, who engaged in intercourse early relative to peers. Taken together, these findings suggest that sexual intercourse and non-relationship sex are more positive for women in late adolescence compared to early or middle adolescence, perhaps due to weakening of sexual double standards (Crawford & Popp, 2003), relaxed attitudes about sex on college campuses (Lefkowitz, 2005), or sexual behavior being normative among late adolescents. It is also an interesting contrast to our prior work on body image, which used a similar method and sample from the same university. In that work, we found that male, but not female, students experienced an increase in body image after first intercourse (Vasilenko, Ram & Lefkowitz, 2011). These different findings suggest that
sexual behavior may be similarly associated with general mental health for male and female students, but that specific aspects of mental health, such as body image, may be particularly gendered and thus differentially associated with sexual behavior for male and female students.

There are several implications of this paper for sexuality education and sexual health programs. Many sexuality education programs for adolescents focus on delaying sexual behavior, including abstinence-only programs which often promote waiting until marriage (Santelli et al., 2006). This paper, compared with prior research on first sexual intercourse earlier in adolescence (Meier, 2007; Spriggs & Halpern, 2008), suggests that delaying sexual intercourse until late adolescence may be more psychologically healthy, but our research provides no evidence to support delaying first intercourse past the college years for mental health reasons. Instead, it is possible that by late adolescence, when sexual behavior is developmentally normative, such behavior contributes positively to mental health, and may be a healthy part of romantic relationships, as it is in marital relationships in adulthood (Edwards & Booth, 1994). In addition, an important component of designing effective programs for HIV and other STIs is understanding the specific barriers to prevention that particular populations experience (Rotheram-Borus et al., 2009). Our research identifies one such challenge, in that, contrary to our hypothesis, individuals who engaged in first intercourse with a non-dating partner actually experienced a marginally larger reduction in distress compared to those who had sex with a dating partner. This finding suggests that individuals experiencing psychological distress may continue to engage in non-dating sexual behavior in order to improve their mental health. Because individuals may know less about the sexual history of their non-dating partners and depressed adolescents may be less likely to use condoms (Shrier, Harris, Sternberg & Beardslee, 2001) these individuals may place themselves at greater risk for STIs. Thus it is particularly
important to promote condom use with non-dating partners, particularly for those who may be depressed and at greater risk of condom nonuse.

There are several limitations to this paper which provide directions for future research. Although we found associations between the transition to sexual behavior and psychological distress, we cannot prove a causal relationship, as a third factor, such as beginning or strengthening a relationship with a romantic partner, could explain this association. Future research should endeavor to better tease apart the impact of transitioning to sexual behavior and other related events. The sample consisted of individuals who transitioned to first intercourse during college, which limits the generalizability of the sample in several ways. First, we have no information about students who did not attend college. Second, we have no information about changes after first intercourse for students who transitioned to first intercourse prior to or after attending college. Students who transition to first intercourse earlier in adolescence may experience more negative psychological outcomes, as sex during this time is less normative (Meier, 2007; Spriggs & Halpern, 2008). Even less is known about individuals who transition to first intercourse in their mid-twenties or beyond, who may be abstinent until marriage or may be experiencing psychological difficulties which could impede romantic and sexual relationships (Sandfort, Orr, Hirsch & Santelli, 2008). Future research should examine how such associations differ for individuals who experience this transition at different stages of adolescence and young adulthood. Third, our focus on vaginal sex limited our sample to only individuals who engaged in one type of sexual activity with an opposite-sex partner, and future research should explore the transition to other types of sexual behavior, as well as how these behaviors are associated with psychological distress in sexual minority students. In addition, we collected data only once every semester, and cannot pick up on shorter-term changes in mental health outcomes. Finally,
the relatively small number of transitioners in our sample may have limited our ability to detect small effects.

In addition, research on this topic could be extended in several ways. First, future research could examine other factors that may influence differences in associations between mental health and sexual behavior. For example, individuals’ personal beliefs, including religiosity and sexual attitudes, may influence these associations. Individuals who hold more conservative views about sex, but become sexually active, may experience more distress after sexual behavior than those who are more accepting of sex. Similarly, other facets of the relationship with a partner, such as length of relationship, relationship quality, and communication, may influence these associations. Second, our findings suggest that individuals may continue to have less distress for some time after they transition to first intercourse, suggesting students may experience better mental health during periods in which they are sexually active. Future research could further examine this possibility by examining variability in psychological distress or affect based on sexual behavior, such as whether individuals have less distress during weeks they are sexually active or engage in more frequent sexual behavior.

This research contributes to our knowledge of sexual behavior and mental health in several ways. First, it extends knowledge on how transitioning to first intercourse may be associated with mental health outcomes at a time that is late relative to peers, a period about which relatively little is known. Our findings suggest that for college students, sexual behavior may be contributing primarily positively to students’ mental health. Taken with prior research on earlier sexual behavior, these findings provide information about when the transition to sex may be more or less developmentally healthy. Second, it uses longitudinal data to examine changes in mental health in the same group of individuals before and after engaging in first sex,
allowing us to understand changes in mental health associated with sex, rather than merely comparing sexually active and abstinent individuals. Finally, this paper moves beyond merely examining the impact of sexual behavior on health, but examines how individual differences in the sexual experience may differentially impact health. We found that individuals who have sex with a non-relationship partner and perceive fewer positive consequences of sex experience a larger decrease in psychological distress compared to students who have sex with a dating partner and perceive more positive consequences, which suggests that these individuals may be seeking out sexual behavior as a way to improve their mental health. These findings underscore the importance of examining how experiences of sexual behavior may vary for different adolescents based on their characteristics, relationships or experiences.
References


McClelland, G. H., & Judd, C. M. (1993). Statistical difficulties of detecting interactions and


Table 3.1

*Multiphase growth curve model testing changes in psychological distress after first sexual intercourse, centered around semester first sexual intercourse reported*

<table>
<thead>
<tr>
<th>Psychological Distress</th>
<th>β</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fixed Effects</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intercept, $\gamma_{00}$</td>
<td>1.44***</td>
<td>0.34</td>
</tr>
<tr>
<td>Male, $\gamma_{02}$</td>
<td>0.07</td>
<td>0.12</td>
</tr>
<tr>
<td>Non-dating Partner, $\gamma_{03}$</td>
<td>0.49*</td>
<td>0.20</td>
</tr>
<tr>
<td>Positive Consequences, $\gamma_{04}$</td>
<td>-0.13**</td>
<td>0.05</td>
</tr>
<tr>
<td>Negative Consequences, $\gamma_{05}$</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td>Semester, $\gamma_{10}$</td>
<td>0.01</td>
<td>0.05</td>
</tr>
<tr>
<td>TTFI, $\gamma_{20}$</td>
<td>0.01</td>
<td>0.09</td>
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<tr>
<td>1 Semester AFI, $\gamma_{30}$</td>
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<td>0.22</td>
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<tr>
<td>2+ Semesters AFI, $\gamma_{40}$</td>
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<td>0.31</td>
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<tr>
<td>TTFI*Non-dating Partner $\gamma_{22}$</td>
<td>0.22**</td>
<td>0.08</td>
</tr>
<tr>
<td>1 Sem AFI* Non-dating Partner $\gamma_{32}$</td>
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<td>0.20</td>
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<tr>
<td>2+ Sem AFI* Non-dating Partner, $\gamma_{42}$</td>
<td>-0.59+</td>
<td>0.30</td>
</tr>
<tr>
<td>TTFI*Positive Consequences, $\gamma_{23}$</td>
<td>-0.03</td>
<td>0.02</td>
</tr>
<tr>
<td>1 Sem AFI* Positive Consequences, $\gamma_{33}$</td>
<td>0.13+</td>
<td>0.50</td>
</tr>
</tbody>
</table>
2+ Sem AFI* Positive Consequences, $\gamma_{43}$ 0.16* 0.07

Random Effects

Variance Intercept, $\sigma^2_{u0}$ 0.22*** 0.04

Covariance of Intercept and TTFI, $\sigma_{u0u1}$ 0.02 0.01

Variance of TTFI, $\sigma^2_{u1}$ 0.01+ 0.01

Residual Variance, $\sigma^2_{r}$ 0.39*** 0.03

*Note. Time to/from First Intercourse (TTFI) refers to the number of semesters to/from an individual’s first report of first intercourse. After first intercourse (AFI) indicates how many semesters a measurement occasion is after an individual’s report of first intercourse. $SE =$ standard error.

$p<.10, *p<.05, **p<.01, ***p<.001.$
Figure 3.1. Conceptual model linking adolescent sexual behavior with mental health, adapted from Vasilenko, Lefkowitz, & Welsh, 2011, presenting only aspects of the model tested in this study. Specific variables used in this study are in parentheses.
Figure 3.2. Multiphase growth curve showing changes in psychological distress after first intercourse. Time is centered around semester participants reported first intercourse (0=semester first intercourse reported). Dotted lines indicate the period in which first intercourse took place.
Figure 3.3. Multiphase growth curve showing changes in psychological distress after first intercourse, by relationship with first sexual partner. Time is centered around semester participants reported first intercourse (0=semester first intercourse reported). Dotted lines indicate the period in which first intercourse took place.
Figure 3.4. Multiphase growth curve showing changes in psychological distress after first intercourse, by number of positive consequences of first sex reported. Time is centered around semester participants reported first intercourse (0=semester first intercourse reported). Dotted lines indicate the period in which first intercourse took place. $SD=$Standard Deviation.
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SELECTED PUBLICATIONS


SELECTED PRESENTATIONS
