EXAMINING THE ROLES OF PEER NORMS, PEER INFLUENCE SUSCEPTIBILITY, AND GENDER IN EARLY ADOLESCENTS' NUMBERS OF SEXUAL PARTNERS OVER TIME: AN INNOVATIVE EXPERIMENTAL PARADIGM AND LONGITUDINAL STUDY DESIGN

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ABSTRACT

Sophia Choukas-Bradley: Examining The Roles of Peer Norms, Peer Influence Susceptibility, And Gender in Early Adolescents' Numbers of Sexual Partners Over Time: An Innovative Experimental Paradigm and Longitudinal Study Design
(Under the direction of Mitchell J. Prinstein)

This dissertation considers the complex roles of peer norms in early adolescents' development of sexual behavior, with special attention to gender and peer influence susceptibility as moderators. Study 1 examined longitudinal associations between adolescents' perceived peer norms and numbers of sexual partners, with gender examined as a moderator. Participants were 546 adolescents in grades 7 and 8 at three rural, low-income middle schools (55.9% female; M_{age}=13; 46.3% Caucasian, 27.5% African American, 23.3% Hispanic/Latino, 2.9% Other), followed for three years. Adolescents self-reported their perceptions of friends' and popular peers' attitudes and behaviors regarding coital and noncoital sexual behaviors at baseline, along with their own numbers of partners at three annual time points. Results revealed that, overall, peer norms were associated with adolescents' numbers of sexual partners. Findings were generally stronger for boys than girls, and longitudinal associations were only found among boys. Additionally, results suggested that descriptive norms may be more relevant for adolescents' sexual behavior than injunctive norms, and that norms were more predictive of noncoital than coital behaviors. Study 2 paired an experimental paradigm with this longitudinal study in a subset of 272 participants, examining peer influence susceptibility as a moderator of associations between peer norms and sexual behavior. In addition to self-reporting peer norms and sexual behavior as in Study 1, this subset participated in an experimental "chat room"

paradigm involving "electronic confederates" who endorsed sexual behaviors. Changes in participants' responses to hypothetical scenarios before versus during the "chat room" were used as a performance-based measure of peer influence susceptibility. Most models examined in Study 2 were non-significant, and no longitudinal associations were revealed. Among boys, some findings were consistent with hypotheses; peer norms were more strongly associated with concurrent sexual behavior at higher levels of susceptibility. Among girls, in contrast, some findings were unexpected and in the opposite direction, with peer norms more strongly associated with sexual behavior at lower susceptibility levels. This dissertation highlights the important roles of peer factors and gender in adolescents' development of sexual behavior, and underscores the theoretical and methodological complexities of these associations. Implications for theory and prevention efforts are discussed.

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CHAPTER 1: INTRODUCTION

The fields of psychology and public health traditionally have viewed adolescent sexual activity as problem behavior that should be prevented. Recently, scholars have called for an understanding of adolescents' development of sexual behaviors from a positive framework, with attention to developmentally normative processes (Diamond & Savin-Williams, 2009; Halpern, 2010; Russell, 2005; Tolman, 2002; Tolman & Diamond, 2001; Tolman & McClelland, 2011). Additionally, evolutionary perspectives on adolescence highlight the normativity and centrality of sexual behavior during this developmental period (Ellis et al., 2012). Indeed, sexual behavior during adolescence is normative. Nationally representative studies indicate that by the end of high school, approximately 63% of adolescents have had sexual intercourse (CDC, 2012) and that almost 90% of young adults have premarital intercourse (Halpern, Waller, Spriggs, & Hallfors, 2006). Although few estimates of the prevalence of other sexual behaviors (i.e., noncoital activities) are available, extant research suggests that broadening the definition of sexual behavior yields even higher estimates of teen sexual activity (e.g., Akers et al., 2011; Bauserman & Davis, 1996; Halpern, Joyner, Udry, & Suchindran, 2000). However, in spite of the normativity of adolescent sexual behavior, and multiple decades of research on its correlates, predictors, and outcomes, many fundamental questions about adolescent sexuality remain (Diamond & Savin-Williams, 2009).

A full understanding of adolescents' sexual behavior requires attention to the developmental context of sexual activity and the consideration of both normative and maladaptive processes, consistent with theories regarding developmental psychopathology (see Masten, 2005), contextual developmental systems (see Cicchetti & Aber, 1998), and social

ecological systems (Bronfenbrenner, 1979). More specifically, research is needed that examines adolescents' development of sexual behaviors in the context of other developmental systems, including cultural, biological, and interpersonal factors (Halpern, 2010). Few studies have used longitudinal modeling techniques to examine adolescents' development of sexual behavior (e.g., normative trajectories of sexual development; O'Sullivan & Thompson, 2014). Additionally, compared to sexual intercourse, few studies have examined noncoital activities, which may capture a broader range of adolescent sexual behavior (see Diamond & Savin-Williams, 2009; Halpern, 2010). Moreover, a full understanding of adolescents' longitudinal sexual development requires beginning with an *early* adolescent sample, in order to capture (the majority of) youths' first sexual experiences.

The current study examines the roles of interpersonal and intra-individual factors in early adolescents' development of coital and noncoital behaviors over three annual time points, in a low-income, rural community sample. Whereas large-scale, nationally representative longitudinal studies can provide invaluable insight into broad patterns of sexual development, smaller-scale longitudinal studies allow an in-depth and multimethod examination of intersecting systems of development, which may provide a rich understanding of adolescent sexuality that complements the findings from larger studies (Halpern, 2010). Combining methods and theories from developmental, clinical, and social psychology, as well as public health and gender studies, this study pairs an innovative experimental paradigm with a longitudinal study design. Consistent with a developmental systems approach, adolescents' numbers of sexual partners will be examined over time, with attention to the interplay between interpersonal and intrapersonal factors. Specifically, associations among multiple types of peer norms and individual differences

in susceptibility to peer influence will be examined as predictors of adolescents' numbers of sexual partners over time, with attention to gender differences.

The first part of this introductory section will address what is known about adolescents' coital and noncoital sexual behaviors. Next, a brief overview of the literature on peer factors in adolescents' health-related behaviors will be provided, with a focus on peer influence. Following this section, research and theory regarding social norms, popular peers, and susceptibility to peer influence will be discussed in more detail. Next, the role of gender in adolescents' peer relations and sexual behaviors will be discussed. Finally, the importance of two other correlates of adolescents' sexual behaviors – ethnicity and pubertal timing – will briefly be addressed. This introductory section will conclude with an overview of the current study design and hypotheses.

Adolescents' Sexual Behavior

As noted previously, researchers have historically framed adolescent sexual behavior as risk behavior that should be prevented. Indeed, although sexual behavior is a normative part of adolescent development, many youth engage in behaviors that confer risks. For example, adolescent sexual behavior contributes to roughly 9 million new sexually transmitted infections (STIs) contracted among youth each year in the U.S., and also can lead to unplanned pregnancy (CDC, 2011a,b). In fact, among teenage girls aged 15-19, approximately 7% total, and 15% of those who are sexually active, become pregnant annually in the U.S. (Guttmacher Institute, 2010). Nationally representative samples suggest nearly one-quarter of U.S. adolescents have had sex with four or more partners, and as few as half of these sexually active youth use condoms consistently (CDC, 2012). Compared to adolescents with fewer sexual partners, those with higher numbers of sexual intercourse partners are more likely to acquire sexually

transmitted infections (STIs; e.g., Greenberg, Magder, & Aral, 1992; Kahn, Rosenthal, Succop, Ho, & Burk, 2002). Additionally, research suggests that atypically early engagement in sexual intercourse (i.e., commonly defined as intercourse prior to age 15) may be associated with more negative developmental outcomes, and is considered to be a marker for risk (e.g., Dixon-Mueller, 2008). Several unique features of adolescence have been linked to greater levels of sexual risk taking (e.g., intercourse without condoms). For instance, cognitive immaturity is believed to contribute to adolescents' difficulties with decision-making in the context of emotionally arousing situations, as well as to difficulties with conceptualizing the long-term consequences of sexual risk behaviors (see Pedlow & Carey, 2004).

Although it is important to acknowledge the risks associated with some forms of adolescent sexual behavior, the traditional focus on risk has limited our understanding of youths' sexual lives. Adolescent sexual behavior involves a complex confluence of biological, psychological, cultural, and interpersonal phenomena. Recently scholars have noted that this complexity is often lost in the "medicalized, reductionist, and implicitly moralizing view of adolescent sexuality as a collection of risk behaviors" (Diamond & Savin-Williams, 2009, p. 480). Scholars also have cautioned against the sole research focus on vaginal intercourse; relative to studies of adolescents' sexual intercourse, remarkably few studies have examined other sexual behaviors, in spite of the fact that heterosexual vaginal intercourse is only one of many ways in which adolescents express their sexuality (see Diamond & Savin-Williams, 2009; Tolman, 2002). Additionally, risk-reduction and overly simplistic models of adolescent sexual behavior do not allow a nuanced differentiation between behaviors that do confer risk from behaviors that may in fact be safe and adaptive (Schalet, 2011).

Even high-risk behaviors (sexual and other) may be evolutionarily adaptive if they

improve an individual's standing in the social hierarchy and/or increase access to sexual partners (Ellis et al., 2012). Additionally, unlike with other adolescent behaviors typically lumped together in the category of "problem behaviors" (e.g., drug use, deviance) – which are considered problematic across the lifespan – individuals are expected to develop their sexual identities by adulthood (Tolman, 2002). In fact, sexual behavior not only is a normative part of adolescence, but in fact is part of the inherent *definition* of this developmental period. For example, Ellis and colleagues define adolescence as "fundamentally a transition from the pre-reproductive to the reproductive phase of the life span" in which the individual "reallocates energy and resources toward transforming into a reproductively competent individual" (p. 601). In discussing the unique features of adolescence in contemporary U.S. society, Russell (2005) noted that "contemporary adolescence is in many ways defined by the negotiation of sexual maturation during the long period before social maturity" (p. 5). It is critical to study the myriad developmental pathways that characterize this negotiation, beginning when youth are in early adolescence.

Some researchers have shifted from an exclusive focus on vaginal intercourse toward an expanded conceptualization of adolescent sexual behavior, which allows the examination of predictors of normative sexual behavior development. For example, using data from the nationally representative Add Health study, Halpern and colleagues (2000) documented that adolescents typically develop sexual behaviors in the following sequence: holding hands, kissing, prolonged kissing (i.e., "making out"), breast touching, genital touching, and finally vaginal intercourse. Nationally representative data also indicate that oral sex is common among adolescents and young adults; for example, according to data from the National Survey of Family Growth (NSFG), by age 15, approximately one-quarter of adolescents have engaged in

oral sex (Chandra, Mosher, Copen, & Sionean, 2011). Although oral sex can transmit some STIs, it is associated with lower risks relative to sexual intercourse (e.g., Brady & Halpern-Felsher, 2007). When defining sexual activity as including genital touching, oral sex, and/or sexual intercourse, one study of college students found that 83.5% retrospectively reported sexual activity by age 16 (Bauserman & Davis, 1996). In addition to providing a more comprehensive picture of adolescents' sexual development broadly speaking, an expanded definition of sexual behavior (beyond vaginal intercourse) also allows the inclusion of youth with a range of sexual orientations and gender identities (e.g., Horowitz & Spicer, 2013).

Collectively, this growing body of work suggests that adolescent sexual behavior represents a developmentally normative phenomenon. Because this perspective – as opposed to a risk-reduction or "problem behavior" framework – is relatively new, many important questions remain regarding how adolescents develop their sexual behaviors (Diamond & Savin-Williams, 2009). One of the most important areas for future research involves the role of peers.

The Importance of Peers During Adolescence

Youth development involves complex interactions between the individual and multiple systems in which the individual is embedded (e.g., Cicchetti & Bukowski, 1995). Two major systems in adolescents' lives are peer groups and friendships (Masten, 2005). Peers are theorized to provide a socializing context in which development occurs, with children's peer experiences transacting with various behavioral, social-cognitive, and emotional competencies over time. During adolescence, the frequency and importance of peer interactions substantially increases, with peer approval playing a central role in adolescents' sense of self-worth (Harter, Stocker, & Robinson, 1996). Changes in the brain's reward circuitry are believed to underlie these shifts in the importance of peer interactions, peer approval, and peer status (Chein, Albert, O'Brien,

Uckert, & Steinberg, 2011; Crone & Dahl, 2012). By adolescence, youths' motivation to engage in behaviors that will earn adult approval is surpassed by their desire to engage in behaviors that might increase their peer status (Juvonen & Murdock, 1995). This heightened reactivity to peer interactions may have important evolutionary advantages (Ellis et al., 2012). Given these characteristics of this developmental period, it is unsurprising that adolescents are especially susceptible to *peer influence* (Steinberg & Silverberg, 1986).

Extensive research suggests that children and adolescents tend to choose friends who are similar to themselves in behaviors and attitudes (i.e., *selection* effects) and also tend to become more similar to their friends in behaviors and attitudes over time (i.e., *socialization* effects; Kandel, 1978; see also Prinstein & Dodge, 2008). Longitudinal study designs are necessary to determine whether peer influence (i.e., socialization) may have occurred, because observed concurrent associations between peers' behaviors and adolescents' own behaviors may reflect either selection or socialization processes (Kandel, 1978).

Collectively, extant research suggests that *social norms* may help explain the process of socialization. Specifically, teens are more likely to engage in behaviors if they perceive a high level of such behaviors among their peers. This phenomenon has been documented for a broad range of behaviors and symptoms (for a broad review, see Brechwald & Prinstein, 2011), including substance use (see Borsari & Carey, 2001; Kobus, 2003), deviant behaviors (e.g., Dishion, Eddy, Haas, Li, & Spracklen, 1997), depressive symptoms (e.g., Conway, Rancourt, Adelman, Burk, & Prinstein, 2011; Van Zalk, Kerr, Branje, Stattin, & Meeus, 2010), non-suicidal self-injury (e.g., Heilbron & Prinstein, 2008), and body image concerns (e.g., Hutchinson & Rapee, 2007; Rancourt, Choukas-Bradley, Cohen, & Prinstein, 2014).

Although peer norms and peer influences are relevant for a wide range of behaviors,

peers may play an especially important role in the development of sexual behaviors and attitudes. Research suggests that whereas parents and schools tend to act as agents that decelerate adolescents' development of sexual behaviors, mass media and peers accelerate this development (L'Engle, Brown, & Kenneavy, 2006). In the context of sexual behavior, researchers have noted that the mass media may serve as a "super peer," with messages transmitted (i.e., mediated) by the more proximal influences of friends and other peers (Brown, 2002; Brown, Halpern, & L'Engle, 2005; L'Engle et al., 2006). Leading experts on adolescent sexual risk reduction interventions have also highlighted the central role of peers (e.g., Pedlow & Carey, 2004).

The importance of peer influences for adolescents' sexual behaviors is unsurprising, given fundamental characteristics of this developmental period. Adolescence is characterized by identity development processes (Kroger, 2003), the development of desires for sexual and romantic relationships (Diamond & Savin-Williams, 2009), changes in brain reward circuitry that enhance the effects of peers (Chein et al., 2011; Crone & Dahl, 2012), increased reliance on peers for emotional support and acceptance (Harter et al., 1996), and heightened motivation to engage in behaviors that might increase popularity among peers (Juvonen & Murdock, 1995). Additionally, researchers have discussed the importance of peers in adolescents' sexual behavior from an evolutionary perspective, highlighting that a key goal of adolescence is the achievement of the competencies needed to gain access to sex (Ellis et al., 2012). Specifically, adolescents may strive to establish social positions that increase sexual attractiveness and access to partners (Ellis et al., 2012). Important gender differences in the role of peers will be discussed in a future section; first, the literatures on peer norms and sexual behaviors, the special role of popular peers, and individual variability in susceptibility to peer influence will be discussed.

Peer Norms and Adolescents' Sexual Behaviors

Within the field of adolescent sexual behavior, researchers have aimed to understand the importance of social/peer norms (i.e., adolescents' perceptions of what sexual behaviors and attitudes are normative among peers) as correlates and predictors of sexual behavior. This area of research is based on the theory of reasoned action (Ajzen & Fishbein, 1980) and the expanded theory of planned behavior (Ajzen, 1991), which posit that both social influences and personal attitudes affect intentions to engage in behavior, with intentions then predicting actual behavioral engagement. One important social influence in these models involves perceptions about the extent to which peers approve of the individual's engagement in a particular behavior (Ajzen, 1991; Ajzen & Fishbein, 1980). Researchers also have encouraged attention to perceptions of peers' actual engagement in the behavior (e.g., Rivis & Sheeran, 2003).

Indeed, in order to understand the role of peers in adolescents' sexual behaviors, it is important to distinguish between these two types of social norms. Specifically, *descriptive norms* refer to perceptions of peers' typical behaviors (e.g., friends' numbers of sexual partners), whereas *injunctive norms* refer to perceptions of peers' attitudes regarding what types of behaviors are approved of (e.g., whether one's friends think it is OK to engage in sexual behavior at this age); while descriptive norms describe what *is* done, injunctive norms describe what *ought* to be done (Cialdini, Reno, & Kallgren, 1990). This distinction is especially important to consider in studies of adolescents' sexual behavior, because while the two types of norms are correlated, peers' attitudes may not always match their behaviors. For example, an adolescent's friends may not yet have had sexual intercourse (descriptive norms) but may feel that sexual intercourse for teens their age is OK (injunctive norms). Conversely, peers may disapprove of particular sexual behaviors (injunctive norms) but nevertheless engage in those

behaviors (descriptive norms).

The vast majority of studies on descriptive norms and adolescents' sexual behavior have examined norms related to sexual intercourse, with most of those studies assessing participants' perceptions of the proportion of their friends who have had sexual intercourse (e.g., Miller et al., 1997; Nahom et al., 2001; Stanton et al., 1996a). Operational definitions of injunctive norms in studies of adolescents' sexual behaviors have varied, but most examine participants' perceptions of whether their friends feel sexual behavior at a particular age is acceptable. For example, researchers have asked adolescents how their friends would feel if the participant engaged in sexual behavior (Bersamin, Walker, Waiters, Fisher, & Grube, 2005; Little & Rankin, 2001), and whether their friends believe individuals of the participant's age should postpone sex until older (Carvajal et al., 1999).

Past research has revealed significant positive associations between both injunctive and descriptive norms and adolescents' sexual behaviors and behavioral intentions. With regard to descriptive norms, higher perceptions of peers' engagement in sexual behavior are associated with adolescents' higher intention to have sexual intercourse (Kinsman, Romer, Furstenberg, & Schwarz, 1998), higher likelihood of having had sexual intercourse (Little & Rankin, 2001; Nahom et al., 2001; Teitler & Weiss, 2000), earlier age of initiation of sexual intercourse (O'Donnell, Myint-U, O'Donnell, & Stueve, 2003; Miller et al., 1997), higher number of sexual intercourse partners (Lyons, Giordano, Manning, & Longmore, 2011), and subsequent engagement in sexual intercourse (Laflin, Wang, & Barry, 2008; Stanton et al., 1996a).

With regard to injunctive norms, adolescents' perceptions of peers' more favorable attitudes towards or greater approval of sexual behaviors are associated with higher intentions to have sexual intercourse (Flores, Tschann, & Marín, 2002; Gillmore et al., 2002; Watts & Nagy,

2000), higher likelihood to have engaged in sexual intercourse (DiIorio et al., 2001; Little & Rankin, 2001; O'Sullivan & Brooks-Gunn, 2005), higher likelihood to subsequently engage in sexual intercourse (Carvajal et al., 1999; O'Sullivan & Brooks-Gunn, 2005; Santelli et al., 2004), and higher likelihood to have engaged in, and to subsequently engage in, breast fondling, genital touching, and oral sex (Akers et al., 2011; Bersamin et al., 2005; O'Sullivan & Brooks-Gunn, 2005).

Most of these associations were found in models that controlled for a range of other correlates of adolescents' sexual behavior. A systematic literature review of predictors of adolescent sexual behaviors and intentions concluded that peer norms (descriptive and injunctive) were "fairly stable predictors of sexual behavior/ intention outcomes in this literature" (Buhi & Goodson, 2007, p. 18). However, while past work now has documented the importance of peer norms for adolescents' sexual behavior, prior research in this area has been limited in several notable ways.

First, most studies have examined concurrent associations between norms and behavior (Buhi & Goodson, 2007). As noted previously, such study designs cannot disentangle selection versus socialization effects (Kandel, 1978). In other words, studies using single time points cannot help to determine whether similarities in adolescent peers' sexual behaviors or attitudes reflect (a) socialization processes whereby adolescents have become more similar to each other over time (e.g., an adolescent engages in sexual activity with a higher number of partners over time because her friends have high numbers of partners), or (b) selection processes in which adolescents who originally show behavioral similarities tend to befriend each other (e.g., two adolescents with high numbers of sexual partners become friends with each other). Additionally, of the longitudinal studies that have been conducted, most have examined norms as prospective

predictors of sexual behavior at one specific later time point (see Buhi & Goodson, 2007; for a notable exception, see Coley, Lombardi, Lynch, Mahalik, & Sims, 2013). Although studies using two time points are better equipped than single time point studies to assess whether socialization (versus selection) has occurred, these studies cannot capture the complex processes believed to underlie behavioral development (Curran & Willoughby, 2003).

A second significant issue with extant research on peer norms and adolescents' sexual behavior is the relatively limited range of behaviors examined. Specifically, the vast majority of studies on norms and sexual behavior have only examined outcomes related to sexual intercourse (e.g., age of first coitus, number of intercourse partners) and norms specific to intercourse (e.g., peers' attitudes about intercourse; proportion of peers who have had intercourse). To date, very few studies have examined associations between peer norms and noncoital behaviors, with a few notable exceptions. For example, Akers and colleagues (2011) found that perceptions of friends' attitudes about "having sex" in various contexts were associated with higher likelihood of engagement in deep kissing, breast touching, genital touching, oral sex (receiving but not giving), anal sex, and vaginal sex (when controlling for demographic variables; some but not all associations remained significant in a model that fully adjusted for all other variables). Bersamin and colleagues (2005) found a significant bivariate association between a factor based on injunctive norms regarding multiple types of sexual behavior (i.e., genital touching, oral sex, intercourse) and initiation of those behaviors. Similarly, O'Sullivan & Brooks-Gunn (2005) found that a scale including items assessing friend injunctive norms regarding multiple sexual behaviors (i.e., kissing, sexual touching above the clothes, and intercourse) was associated with having engaged in breast fondling, genital touching, and intercourse, as well as subsequently initiating those behaviors. Further research is needed that examines norms related to noncoital

behaviors as predictors of noncoital behaviors.

A third limitation, as addressed in detail in a subsequent section, is that past studies examining associations between peer norms and sexual behavior have not considered individual differences in the extent to which adolescents are influenced by norms – in other words, their susceptibility to peer influence (Choukas-Bradley, Giletta, Widman, Cohen, & Prinstein, 2014).

Finally, the majority of studies regarding peer influence on sexual behaviors (and other behaviors; Brechwald & Prinstein, 2011) have focused on understanding the influence of friends (see Buhi & Goodson, 2007). However, peer influence occurs not only within dyads and friendship groups, but also within many types of interpersonal relationships (Brechwald & Prinstein, 2011; Prinstein & Dodge, 2008). In fact, peer influence may even occur among peers in a broad social context (e.g., across a school grade) in the absence of direct contact between adolescents, especially if the referent peers are of high social status (Brechwald & Prinstein, 2011), as discussed further in the next section.

Taking all of these limitations into account, it is clear that a full understanding of peer norms regarding sexual behavior will require a more nuanced understanding of specific types of norms. Not only would the field benefit from longitudinal studies that examine whether and how different types of norms affect adolescents' development of sexual behavior over time; basic descriptive research on the nature of these norms themselves also is sorely needed. Researchers have noted that as the field of research on adolescence has developed into a "mature science," the majority of studies have trended toward causal modeling, such that studies providing *description* are rare (Shanahan, Erickson, & Bauer, 2005). However, basic descriptive data are fundamental to an understanding of adolescent development, and Shanahan and colleagues claim that "the contemporary science of adolescence needs to re-discover the critical contributions that

description can make" (p. 384). The study of peer norms is an excellent example of an area of the field that still requires detailed descriptive data – for example, data regarding whether peer norms are more supportive of noncoital than coital behaviors, whether boys and girls differ in their perceived norms, and whether adolescents perceive their popular peers to endorse riskier attitudes and behaviors than their friends.

The Role of Popular Peers

Social status is of paramount importance to adolescents (e.g., Juvonen & Murdock, 1995), and perceptions of *popular* peers' sexual (and other) behaviors may exert an especially robust influence on adolescents' own behavior (see Sandstrom, 2011). Popularity is a construct with great social and developmental significance for adolescents. Whereas in childhood, popularity is closely related to how *likeable* an individual is (i.e., how many other children report personal preferences for the individual), by adolescence popularity and likeability are distinct constructs (Cillessen & Mayeux, 2004; Parkhurst & Hopmeyer, 1998). Whereas likeability is a *preference-based* construct*,* popularity is a *reputation-based* construct, characterized by dominance and visibility in the peer hierarchy (Mayeux, Sandstrom, & Cillessen, 2008; Parkhurst & Hopmeyer, 1998).

Theories regarding motivations for conformity can shed light on why popular peers may be especially influential. For example, popular peers serve as important reference groups and models of behavior during adolescence, helping to define norms for risky behaviors (Cohen & Prinstein, 2006) and determining which behaviors are "cool" (Pirkle & Richter, 2006). Adolescents may be motivated to conform to the social norms associated with popular peers, in order to align themselves with these reference groups and perhaps increase in their own social status (Brechwald & Prinstein, 2011). Thus, if behaviors are associated with popular peer

prototypes or are perceived to be common among popular peers, other adolescents will be more likely to engage in those behaviors (e.g., Gibbons, Pomery, & Gerrard, 2008). However, most of these theories have been tested with regard to aggressive and substance use behaviors, and have only rarely been tested with sexual behaviors.

Research from the last decade supports theories about the influential role of popular peers in other adolescents' behaviors. For example, research using an experimental paradigm has demonstrated that adolescents show greater conformity to the health-risk and deviant behaviors of peers who are high in popularity, relative to less popular peers. Specifically, Cohen and Prinstein (2006) used an innovative experimental paradigm in which adolescent boys believed they were interacting with real peers in an Internet chat room forum. In fact, participants were interacting with pre-programmed electronic confederates who endorsed high-risk behaviors; the implied popularity of these electronic confederates was manipulated across conditions. Adolescents conformed to the attitudes of these peers when the confederates appeared to be high in popularity, but not when the confederates were perceived to be unpopular.

Although the influence of popular peers has rarely been examined with regard to sexual behaviors, it is important to consider the evolutionary link between social status and sex. Gaining access to sexual partners is a central goal of adolescence, and individuals may indirectly strive for reproductive success through more tangible goals, such as attaining social status (Ellis et al., 2012). In the modern high school setting in the U.S., popular youth have been found to engage in higher levels of sexual behavior relative to their less popular peers (Mayeux et al., 2008; Prinstein, Choukas-Bradley, Helms, Brechwald, & Rancourt, 2011; Prinstein, Meade, & Cohen, 2003). Taking together the previously discussed theory and research about the important role of popular peers in adolescence, and prior work linking popularity with sexual behavior, it may be

that adolescents' sexual behaviors are influenced by their perceptions of what is normative among popular peers.

However, only one preliminary study has examined the role of adolescents' perceptions of their popular peers' behaviors in predicting other adolescents' own sexual behaviors over time. Using a small sample of adolescent males and females, Choukas-Bradley and colleagues (2014) found that adolescents who perceived their popular peers to have high numbers of sexual intercourse partners in 9th grade showed steeper trajectories of their own sexual partners over time. However, this association only held among adolescents who also showed higher levels of *susceptibility* to peer influence (Choukas-Bradley et al., 2014), measured using the experimental "chat room" paradigm discussed above (Cohen & Prinstein, 2006). Susceptibility is a crucial area for future work on peer influence processes, and is discussed in detail in the next section.

Susceptibility to Peer Influence

Although it is widely accepted that peer influence is an important predictor of risk behavior in adolescence, little is known about individual variability in susceptibility to peer influences. Even less is known about how susceptibility may be related to longitudinal changes in behaviors.

Many studies have aimed to measure susceptibility *indirectly*, either (a) by examining individual characteristics that moderate conformity to peer influence (e.g., social anxiety as a moderator of peer influence on deviant and substance use behaviors; Cohen & Prinstein, 2006), or (b) by examining group-level differences in associations between peer norms and adolescents' own behaviors (e.g., racial differences in associations between alcohol peer norms and adolescents' own alcohol use; Wallace & Muroff, 2002). Far fewer studies have attempted to directly examine peer influence susceptibility as a distinct psychological construct.

The few studies that have attempted to measure susceptibility directly have typically asked adolescents to self-report either (a) the extent to which they feel they are generally influenced by peers, or endorse positive attitudes about conformity (e.g., Steinberg & Monahan, 2007), or (b) their hypothetical responses to vignettes involving peer pressure, to measure the extent to which youth endorse responses that may be viewed favorably or unfavorably by peers (e.g., Steinberg & Silverberg, 1986). Although these approaches have yielded preliminary evidence to suggest that susceptibility plays a role in adolescents' health-related behaviors, such approaches likely generate biased assessments of susceptibility to peer influence. It is widely assumed that individuals' susceptibility to peer influence is determined by implicit processes (Prinstein & Dodge, 2008). Thus, explicit self-reports may be compromised by adolescents' limited self-awareness of their attitudes and behaviors. Indeed, work using experimental paradigms suggests that adolescents' reports of their own and their friends' susceptibility to peer influence may be inaccurate (Allen, Porter, & McFarland, 2006). Additionally, with regard to sexual behavior in particular, given that adolescents are inundated by (often conflicting) messages about sex from a multitude of sources (e.g., L'Engle et al., 2006), they may have especially limited awareness of the extent to which various social norms influence their own sexual attitudes and behaviors.

To overcome the limitations of adolescents' explicit self-reports, researchers have developed experimental paradigms that yield *in vivo*, performance-based measures of peer influence susceptibility. For example, Allen and colleagues (2006) designed an observational task in which adolescents were first asked to participate in a hypothetical decision-making task alone, and again after being exposed to differing opinions expressed by a friend. Susceptibility was operationalized as the extent to which adolescents changed their initial decision after being

exposed to the peer's differing opinion. In an ethnically diverse sample of seventh- and eighth-grade adolescents, the researchers found that higher levels of susceptibility were associated with higher odds of past-year engagement in sexual intercourse, as well as higher levels of concurrent externalizing behavior. Additionally, susceptibility moderated the association between peers' substance use and adolescents' own substance use, such that friends' substance use was more strongly associated with one's own use among more highly susceptible teens.

Preliminary work also has demonstrated the utility of using the previously discussed simulated Internet "chat room" paradigm (in which adolescents believe they are interacting electronically with peers from their school) in order to yield a performance-based measure of susceptibility (Choukas-Bradley et al., 2014; Prinstein, Brechwald, & Cohen, 2011). This paradigm allows an *in vivo* measurement of adolescents' adoption of their peers' attitudes toward risk behaviors. Specifically, adolescents respond twice to hypothetical scenarios involving opportunities to engage in risk behaviors – first in private at baseline, and again while ostensibly interacting with real peers from their school (i.e., electronic confederates) who endorse high-risk responses to the hypothetical scenarios (Cohen & Prinstein, 2006). Susceptibility is operationalized as the extent to which individual adolescents change their responses to risk behavior scenarios (compared to their baseline responses to identical scenarios) after being exposed to the electronic confederates' high-risk responses (Prinstein et al., 2011).

In the first preliminary study using this experimental paradigm, in a sample of eleventh-grade Caucasian boys, Prinstein and colleagues (2011) found that this performance-based measure of susceptibility moderated the socialization of deviant behaviors. Specifically, only among adolescents with high levels of susceptibility, a significant association was revealed between deviant behaviors of adolescents' best friends and their own deviant behavior 18 months

later. In a subsequent preliminary study (discussed above), Choukas-Bradley and colleagues (2014) used the chat room paradigm to extract a performance-based measure of susceptibility to sexual scenarios, in an ethnically heterogeneous sample of ninth-grade adolescent boys and girls. Results revealed that adolescents who were high in both peer influence susceptibility and perceptions of popular peers' numbers of sexual intercourse partners in ninth grade showed steeper longitudinal trajectories of their own numbers of intercourse partners over 18 months.

Thus, preliminary work has demonstrated the predictive validity of this performance-based measure, and has specifically suggested that susceptibility moderates the longitudinal associations between perceptions of peers' health-related behaviors and adolescents' own behaviors, including sexual intercourse. However, these preliminary results need to be replicated in a larger sample, with sufficient power to consider the role of gender. Additionally, research is needed regarding the role of susceptibility as a potential moderator of longitudinal associations between multiple types of peer norms (e.g., injunctive and descriptive norms for friends and popular peers) and different types of sexual behaviors (i.e., both noncoital and coital). Finally, these research questions must be examined in a sample of early adolescents, in order to capture the development of sexual behaviors over time.

The Role of Gender in Adolescents' Peer Relationships and Sexual Behaviors

As discussed earlier, it is clear that the prior sole research focus on intercourse and risk behaviors has limited our understanding of normative, healthy sexual development. However, it also is important to note that for adolescents coming of age in the U.S. and other Western societies today, attaining a healthy sense of sexual identity may be difficult – especially for girls. Indeed, a comprehensive understanding of peer factors in adolescents' development of sexual behavior requires an examination of the role of gender. Notably, most models of adolescent

sexual health do not consider the role of gender (see Tolman, Striepe, & Harmon, 2003).

With regard to main effects of gender on the development of sexual behavior, it was long believed that males initiated sexual intercourse at an earlier average age than did females (see Katz-Wise & Hyde, 2014). However, recent statistics from the National Survey of Family Growth (NSFG) indicate that adolescent males and females initiate vaginal intercourse at the same average age of 17.1 (CDC, 2013) and that similar proportions of male and female adolescents have had sexual intercourse (Martinez, Copen, & Abma, 2011). Researchers also have noted that males and females may be more similar than different when it comes to sexual behaviors and attitudes; for example, a recent meta-analysis of gender differences in sexuality revealed that most differences were small (Petersen & Hyde, 2010; for an earlier, seminal meta-analysis, see Oliver & Hyde, 1993).

However, the role of gender in moderating associations between peer norms and the longitudinal development of sexual behaviors is not yet understood and requires rigorous longitudinal research. Theory and research on gender socialization indicate that males and females may differ in the types and meaning of peer interactions, and that these differences have implications for how social factors impact adolescents' development of sexual behavior.

Researchers have long noted the central role of gender socialization in the ways that boys and girls interact with peers, and in the meaning and consequences of those interactions. For example, in her seminal book *The Two Sexes,* Maccoby (1998) documented the ways in which girls' and boys' social interactional styles and patterns differ, beginning in early childhood. Specifically, boys are more likely to interact in cohesive peer groups (i.e., separate from influences of girls and adults), which are characterized by rough-and-tumble play, competition, risky or rule-breaking behavior, and a dominance hierarchy structure. In contrast, girls are more

likely to interact in dyads, and to act in ways that nurture and maintain these relationships (Maccoby, 1998). In a subsequent review of gender differences in peer relationship processes, Rose and Rudolph (2006) described girls' relational style as being characterized by higher levels of interpersonal engagement and care than boys'. For example, girls are more motivated by connection-oriented peer goals, whereas boys tend to prioritize status-oriented and agentic goals, including dominance in the peer group (Rose & Rudolph, 2006).

These characteristics of boys' and girls' peer interactions and processes have important implications for the intersection of peer friendships, romantic relationships, and sexual behavior in adolescence. One implication of these gender differences is that girls tend to have higher sensitivity to evaluations from peers (Rose & Rudolph, 2006), which is believed to increase girls' motivation to minimize behaviors that may lead to social rejection (Rudolph & Conley, 2005). The relevance of this idea for girls' sexual desires and behaviors is discussed in more detail below. Another implication of these gender differences is that boys may be more motivated to engage in behaviors that establish dominance in the peer hierarchy (i.e., status), which during adolescence include behaviors aimed at increasing access to sexual partners, as discussed further below. Collectively, theory and research on gender differences in peer processes and sexual socialization suggest that associations between peer norms and the longitudinal development of sexual behaviors may differ for adolescent males versus females. However, the nature of these differences may be complex.

Both evolutionary perspectives and contemporary gender socialization theories suggest that the association between peer norms and sexual behavior may be especially strong among males (relative to females), due to complex associations among high-risk behaviors, social status, and access to sexual partners. Tolman (2013) has argued that by adolescence, proving one's

ability to have sex (preferably with multiple partners) is central to current conceptions of masculinity. More broadly, beginning in childhood, boys' conceptions of masculinity are tied to engagement in risk behaviors, and boys may engage in such behavior to prove their dominance in the peer hierarchy (Maccoby, 1998). This earlier pattern may set the stage for the intersection in adolescence of males' high-risk behaviors, peer status, and access to sexual partners. Among adolescent males, two paramount goals are to engage in behaviors that may increase social status (e.g., Juvonen & Murdock, 1995) and to engage in behaviors that may increase access to sexual partners (e.g., Maccoby, 1998; Ellis et al., 2012). Evolutionary theories indicate that high-risk behaviors may serve both functions (Ellis et al., 2012).

Theories regarding differential social rewards for males' and females' sexual behavior may provide further support for the possibility that peer norms will be more relevant to boys' sexual behaviors. For instance, the "sexual double standard" is well documented: Males are generally socially rewarded for having more sexual partners, while females are socially punished for having high numbers of partners or for explicitly demonstrating or pursuing their sexual interests (e.g., Maccoby, 1998; Tolman, 2002). Most research and theory regarding the "sexual double standard" have been developed in the fields of women's studies, gender studies, and feminist psychology. A separate line of work in developmental psychology, on associations between peer status and sexual behavior, provides further evidence for this idea. As discussed above, researchers have noted an association between popularity (i.e., high peer status) and sexual behaviors (e.g., Mayeux et al., 2008). Importantly, this association may be stronger for boys. For example, Prinstein and colleagues (2011) found that adolescents' higher levels of popularity were associated with higher numbers of sexual intercourse partners, but only among

males. In summary, it is possible that the desire for status and the desire for sexual partners are closely intertwined among adolescent boys.

It also is important to consider the possibility that recent substantial societal changes in the use of technology may further contribute to gendered scripts and to the link between social status and sexual behavior among males. For example, in the past 10-15 years there has been a dramatic increase in U.S. adolescents' access to Internet pornography – the majority of which is tailored to males and features objectified (and often violent) portraits of female sexuality (Tolman, 2013). Prior to the dramatic rise in Internet access and corresponding ubiquity of pornography, Maccoby (1998) noted that one common activity in boys' peer groups was rule-breaking behavior, including looking at pornographic images. Rigorous research on the effects of recent media changes on male sexuality is still needed. However, it seems likely that the surge in the availability of explicit pornographic videos (and video games) in the U.S. may increase the likelihood that adolescent boys – in an effort to prove masculinity and status – will talk with their male peers about sex in ways that objectify females and prioritize the pursuit of multiple sexual partners (Tolman, 2013). Although rigorous longitudinal research on these phenomena will be necessary to test these theories, initial work suggests that exposure to pornography and sexualized media images is associated with increased rates of objectifying women and committing acts of sexual aggression (see Purcell & Zurbriggen, 2013).

Collectively, these gender differences in the costs and benefits incurred through sexual activity will likely affect the nature of the longitudinal association between perceptions of peers' behaviors and adolescents' sexual behavior over time. Specifically, boys may be especially likely to engage in sexual behaviors that are supported by peer norms.

On the other hand, it is possible that the gendered socialization of sexual roles ultimately contributes to a stronger association between peer norms and sexual behavior among *girls.* In her seminal book on girls' sexual narratives, *Dilemmas of Desire,* Tolman (2002) documented the difficulties girls face in trying to understand and navigate their sexual desires and experiences. Tolman wrote that in a culture that strictly defines norms and expectations for male and female expression of sexuality, it is inevitable that desire becomes a social construction rather than a purely biological phenomenon. More specifically, in the U.S., girls are socialized to be objects of male sexual desire, and to respond to and regulate that male desire, rather than to be aware of, embody, and act upon their own sexual desires (e.g., Tolman, 2002, 2013). This gendered sexual socialization is embedded within broader processes that accompany the transition to adolescence, wherein girls learn to put others' needs above their own and to silence their own desires – which have been documented in (among other sources) the books *Meeting at the Crossroads* (Gilligan & Brown, 1993) and *Reviving Ophelia* (Pipher, 1994). Even prior to adolescence, beginning in early childhood, girls are taught to prioritize the maintenance of interpersonal relationships, at the expense of their individual needs (e.g., Maccoby, 1998). Girls also are more strongly socialized than boys to fear the social, emotional, and physical consequences of sexual activity (Tolman, 2002). For example, data from Add Health indicate that, relative to males, adolescent girls and young women perceive more negative and fewer positive consequences from sex, and report more guilt and shame related to sex (Cuffee, Hallfors, & Waller, 2007; Deptula, Henry, Shoeny, & Slavick, 2006). Adolescent girls are also given the message that they "need" sex less than males; this message is delivered directly and indirectly by parents, peers, and even schools (e.g., through sex education classes; see Diamond & Savin-Williams, 2009).

These gendered scripts are not only transmitted through proximal (i.e., parent, peer, and school) influences, but also through broad media messages, which have complex effects not yet fully understood. As noted previously, the mass media may serve as a "super peer," whose messages are transmitted more proximally through peer regulation of social reinforcements and punishments (e.g., L'Engle et al., 2006). In recent years there has been a dramatic increase in the frequency and form of media images that sexualize and objectify the female body in unrealistic ways, without portraying female sexual agency and desire (e.g., as in the increased availability of explicit Internet pornography, the "pornification" of advertising, and the dramatic rise of "reality TV"; see Harper, Katsulis, Lopez, & Gillis, 2013; Tolman, 2013). It is difficult to rigorously study the effects of such rapidly changing, ubiquitous, and insidious phenomena. However, the American Psychological Association's Task Force on the Sexualization of Girls (APA, 2007) concluded that media sexualization of females contributes to girls' mental health (e.g., increased rates of depression, anxiety, body image issues) and sexual self-concept (e.g., decreased sexual agency, assertiveness, and efficacy to use condoms). More broadly, objectification theory (Fredrickson & Roberts, 1997) states that adolescent girls' and women's tendency to internalize the male gaze has important consequences for their mental health and ability to recognize their own internal states; research indicates that many of the outcomes are sexual, including sexual arousal and desire (Steer & Tiggemann, 2008). One specific observable trend in very recent years involves adolescent girls' and young women's *performances* of sexual agency in public spaces (e.g., through sexualized social media profiles, "sexting," and popular fads such as "pole dancing as exercise"; see Tolman, 2013). Such performances of sexuality may represent an internalization of the male gaze rather than the embodiment of female desire, and may signify complex social scripts that encourage girls to appear interested in sex without prioritizing their

own sexual needs or acquiring "too many" sexual partners (Tolman, 2013). Thus, current social scripts complicate girls' sexuality by preventing girls from learning how to experience their own sexual desires in relation to others, or in some cases from even having awareness of their sexual desires (see Tolman, 2002; Diamond & Savin-Williams, 2009).

If girls are more likely than boys to rely on external cues to determine their sexual behaviors, then these sociocultural phenomena will have implications for gender differences in how peer norms affect behavior. Tolman and Diamond (2001) have proposed that cultural influences (e.g., gender scripts) on girls' sexuality result not only in social factors shaping how biological (i.e., hormonal) sexual drives are expressed, but in fact may shape the experience of desire itself. Empirical evidence indeed supports the idea that while boys' sexual behavior is predicted by biological factors, girls' sexual behavior is better predicted by social factors (e.g., Udry & Billy, 1987; see also Tolman & Diamond, 2001). Insofar as girls are socialized to separate their sexual behaviors from their sexual desires, whereas boys are encouraged to act in accordance with their sexual desires, peer norms may play a stronger role in girls' sexual behaviors than boys'. More specifically, because girls are more likely to learn to engage in sexual behaviors based on social rather than biological cues, peer norms about normative and condoned sexual behaviors may be especially salient and influential for girls.

In summary, past theory and research highlight the important and complex role of gender in both peer and sexual relationships. It is possible that the longitudinal associations between peer norms and adolescents' sexual behavior may be stronger for males or females, or that the strength of associations may differ across various types of norms and sexual behaviors. Potential gender differences will be a central focus of the current study.

Other Correlates of Sexual Behavior: Pubertal Timing and Ethnicity

This dissertation focuses on understanding the roles of various peer norms in adolescents' numbers of coital and noncoital partners over time, examining susceptibility as a potential moderator of these associations, and considering the role of gender. Although not a focus of the current investigation, the roles of pubertal timing and race/ethnicity in adolescents' development of sexual behaviors have been extensively explored in past work and will be controlled for in all analyses in the current study.

Pubertal timing. Pubertal development is a biological process that results in reproductive maturity; however, consistent with a developmental systems perspective, this physical process occurs in a social context and has important implications for adolescents' social and sexual trajectories (see Ellis et al., 2012; Halpern, 2006; O'Sullivan & Thompson, 2014; Rudolph, 2014). For example, the changes in physical appearance accompanying puberty may signal "sexual readiness" and elicit new reactions from peers and potential romantic partners (Halpern, 2006; O'Sullivan & Thompson, 2014). The onset of puberty also is associated with increases in romantic relationships, sexual harassment, and sensitivity to social appraisals of physical appearance (O'Sullivan & Thompson, 2014). It is important to distinguish between pubertal *status* and pubertal *timing;* whereas pubertal status refers to the extent to which an adolescent has matured, pubertal timing is a relative term that refers to the individual's degree of pubertal development compared to peers (see Halpern, 2006). Pubertal timing may be more relevant than pubertal development for psychological and social outcomes, especially if an individual's pubertal development is substantially "off-time" compared to peers (Halpern, 2006).

Among girls, pubertal timing has been documented as one of the strongest predictors of sexual behavior. Mendle and colleagues reviewed the literature on outcomes of pubertal timing

among girls, and reported that early pubertal timing is associated with earlier initiation of sexual intercourse and noncoital behaviors, as well as higher likelihood of pregnancy (Mendle, Turkheimer, & Emery, 2007). Correlates and outcomes of boys' pubertal timing have received less research attention, but a similar review of the literature by Mendle and Ferrero (2012) revealed an association between early pubertal timing and earlier initiation of a variety of sexual behaviors among males. These associations between early pubertal timing and sexual outcomes are likely driven by both biological and social mechanisms. For example, adolescents who mature earlier than their peers may have an increased interest in sexual activity due to the hormonal changes associated with puberty (see Halpern, 2006; Mendle et al., 2007; Mendle & Ferrero, 2012). However, social factors that accompany early pubertal timing may be equally if not more important. For example, girls who mature early receive heightened attention from males and are more likely to become romantically involved with older boyfriends, which then increases the likelihood of sexual behavior (see Halpern, 2006; Mendle et al., 2007). Boys who mature early may attain higher peer group status, with corresponding increased access to sexual partners (see Ellis et al., 2012).

Differences by racial/ethnic groups. Racial and ethnic differences in adolescents' rates and patterns of sexual behaviors have been widely documented. For example, data from the NSFG indicate that among adolescents aged 15-19, Caucasians are more likely than African American and Hispanic/Latino adolescents to have engaged in oral sex, but are less likely to have engaged in vaginal intercourse (Chandra et al., 2011). Additionally, relative to Caucasian and Hispanic/Latino adolescents, African American adolescents on average report higher numbers of past-year sexual partners (Martinez et al., 2011). Interesting patterns are revealed when statistics are broken down by race/ethnicity and gender. For example, among Caucasian

adolescents, a higher proportion of females than males report having had vaginal intercourse (i.e., approximately 42% of females versus 37% of males), whereas among African American and Hispanic/Latino adolescents, the opposite pattern holds (e.g., approximately 46% of African American females versus 59% of African American males; Martinez et al., 2011). Racial differences also emerge when examining more complex patterns of sexual behavior. For example, in a study examining membership in latent classes based on adolescents' and young adults' timing and sequencing of oral, anal, and vaginal sex, African American participants were less likely than Caucasian participants to be in classes characterized by initiating two or more behaviors within the same year, and more likely to be in classes characterized by initiating vaginal intercourse before other behaviors (Haydon, Herring, Prinstein, & Halpern, 2012).

The Current Study

Consistent with theories regarding developmental systems, this dissertation examines the intersection between peer factors (i.e., peer norms) and individual factors (with a focus on susceptibility to peer influence and gender, and also including ethnicity and pubertal timing) in predicting early adolescents' numbers of coital (i.e., sexual intercourse) and noncoital (i.e., sexual activity) partners over time. Figure 1 shows a social ecological systems model (Bronfenbrenner, 1979) that places the individual and peer factors of interest in this study within the broader cultural context. Figures 2 and 3 show the specific theoretical models tested in Study 1 and Study 2, respectively, which are discussed in further detail below.

In an ethnically heterogeneous sample of early adolescents in seventh and eighth grade at baseline, participants reported their perceptions of their close friends' and popular peers' numbers of sexual intercourse and sexual activity partners (descriptive norms), as well as their perceptions of the ages at which their close friends and popular peers would believe it is OK to

engage in sexual intercourse and sexual touching (injunctive norms). In total, adolescents reported eight specific types of norms. Additionally, participants reported their own numbers of sexual intercourse and activity partners at three annual time points.

Study 1 examined these multiple types of peer norms as predictors of adolescents' sexual behavior over time. Two separate models were examined: one with number of sexual activity partners as the outcome, and one with number of sexual intercourse partners as the outcome. In order to understand the unique predictive roles of the eight specific types of peer norms in adolescents' numbers of sexual partners over time, all types of norms were included in each of the two models. In each model, gender was examined as a moderator, and age, ethnicity, and pubertal timing were included as covariates.

In Study 2, a performance-based measure of susceptibility to peer influence was examined as a moderator of the longitudinal associations between peer norms and sexual behavior, for the subset of participants who were in seventh grade at baseline and who participated in an experimental "chat room" paradigm. Specifically, data from the chat room paradigm were paired with the longitudinal study design. A performance-based measure of susceptibility was computed for each individual adolescent, and was then tested as a moderator of the longitudinal associations between baseline descriptive and injunctive norms, and adolescents' own numbers of sexual activity and sexual intercourse partners across the three annual time points. Due to differences in how the chat room was constructed for boys versus girls, gender could not be tested as a moderator; rather, analyses were run separately for boys and girls.

Aims and Hypotheses

Aims and hypotheses for Study 1. First, an important aim of this study was a descriptive one: to thoroughly examine the descriptive nature of various types of perceived peer norms, in order to better understand (a) adolescents' perceptions of their friends' and popular peers' attitudes and behaviors regarding coital and noncoital sexual behaviors, and (b) gender differences in those norms. Consistent with the call for descriptive research by Shanahan and colleagues (2005), this study is expected to provide data that will help guide future theory and research regarding adolescents' perceived peer norms about sex.

Second, the primary aim of Study 1 was to examine associations between peer norms at Time 1 and adolescents' numbers of sexual activity and intercourse partners over time. Analyses stringently examined the unique predictive effects of each type of norm on adolescents' numbers of sexual activity and intercourse partners (separate models for the two outcomes) while controlling for all other norms as well as ethnicity, pubertal timing, and age. The primary hypothesis of Study 1 was that higher baseline levels of perceived peer norms (injunctive and descriptive norms, for sexual activity and intercourse, and for friends and popular peers) would be associated with greater numbers of sexual activity and intercourse partners, concurrently and over time.

However, note that no specific hypotheses were proposed for the types of norms that would be most strongly associated with specific sexual outcomes. To date, past theory and research do not indicate that one type of norm (e.g., injunctive or descriptive, popular peer or friend) should be more or less strongly associated with adolescents' sexual behaviors than another type of norm, or that specific types of norms should be more or less predictive of sexual intercourse versus sexual activity. An important aim of this study was to examine the unique

influence of these specific norms on sexual behavior outcomes, given the limitations of prior peer norms studies noted above. In addition to providing valuable descriptive data regarding peer norms, this study is expected to provide data that will help inform future theory and research regarding the role of peer norms in adolescents' sexual behaviors over time.

Third, this study aimed to understand the potential moderating role of gender in the associations between peer norms and adolescents' numbers of sexual partners discussed above. Each model included gender as a moderator of the association between peer norms and sexual behavior at each time point. However, no specific hypotheses were proposed for this aim regarding gender, given that the body of evidence on gender differences in associations between peer factors and sexual behavior has been equivocal. On the one hand, past research and theory suggest that social status and sexual behavior are especially tied for boys, and therefore associations between peer norms and sexual behavior may be expected to be stronger for boys than for girls; on the other hand, broad theories and some empirical findings suggest that girls may rely more heavily on social than on biological cues for decisions about their sexual behavior, and thus that peer norms may be especially predictive of girls' sexual behaviors. This study is expected to provide valuable insights into the intersecting roles of gender and peer factors in adolescents' development of sexual behavior.

Aims and hypotheses for Study 2. The primary aim of Study 2 was to understand the role of susceptibility to peer influence in the associations between peer norms and sexual behavior. The hypothesis was that susceptibility to peer influence would moderate the associations between peer norms and adolescents' numbers of sexual activity and intercourse partners. More specifically, it was expected that the concurrent and longitudinal associations between peer norms and sexual behavior would be stronger at higher levels of susceptibility,

such that adolescents with higher perceived peer norms paired with greater levels of susceptibility would evidence higher baseline numbers of sexual partners and greater increases in partners over time. As in Study 1, the roles of specific types of norms were explored, but specific hypotheses were not proposed, given that no prior study has examined how susceptibility interacts with different types of peer norms to predict adolescents' development of sexual behavior. Models were examined separately by gender, by type of sexual behavior, and for each specific peer norm, and adolescents' "pre-scores" for the hypothetical scenarios examined in the chat room were included as covariates.

CHAPTER 2: STUDY 1

Method

Participants

Participants included 546 adolescents (55.9% female, 44.1% male; 46.3% Caucasian, 27.5% African American, 23.3% Hispanic/Latino, 2.9% Other; M_{age} = 13) in 7th and 8th grade at study onset (54.6% in 7th grade), at three rural, low-income middle schools in the southeastern United States. All students in 7th and 8th grade from three schools in a single county (N =1,463) were recruited for participation in a study of peer relations and health risk behaviors, with the exception of students in self-contained special education classes. A letter of consent was distributed to each adolescent's family with an option for parents to grant or deny consent; numerous adolescent-, teacher-, and school-based incentives were used to ensure the return of these consent forms (e.g., a $10 gift card was given to each student who returned the form, regardless of whether it provided or denied consent to participate). Consent forms were returned by 82.4% of families (n = 1,205); of these, 74.7% of parents gave consent for their child's participation (n = 900). Of these 900 students, data were unavailable for 32 students (7 due to moving away from the area, 4 due to withdrawing from school, 16 due to school absence, 5 due to participants' declining participation), yielding a Time 1 sample of 868 adolescents.

Of these 868 adolescents, a substantial number had missing data on one or more of the primary study variables (eight peer norms variables, two sexual behavior variables), yielding a final sample of 546 participants with complete study data at Time 1. More specifically, there was a substantial proportion of missing data on the norms variables: data were missing from 98

participants on descriptive friend activity norms, 64 on descriptive friend intercourse norms, 198 on descriptive popular activity norms, 211 on descriptive popular intercourse norms, 50 on injunctive friend activity norms, 49 on injunctive friend intercourse norms, 103 on injunctive popular activity norms, and 107 on injunctive popular intercourse norms. Note that the vast majority of these missing data were due to participants' selection of the response option "I don't know." Missing data for the Time 1 sexual behavior variables was less common: at Time 1, only 25 participants did not provide data on their own numbers of sexual activity partners, and 14 did not provide data on their own numbers of sexual intercourse partners. Analyses were conducted in SPSS 22.0 to compare participants with complete Time 1 study data (n = 546) to those who participated at Time 1 but did not provide data for one or more of the study variables (n = 322). Those with complete Time 1 data reported significantly lower numbers of sexual activity partners at all time points (for Time 1, t [690.52] = -2.44, p = .02; for Time 2, t [657.28] = -2.69, p = .01; for Time 3, t [743] = -2.38, p = .02), and significantly lower descriptive friend activity norms at Time 1 (t [768] = -2.16, p = .03). No other differences were significant.

Of the 546 adolescents included in the overall analytic sample, 476 had available data on number of sexual activity and intercourse partners at Time 2 (87% of Time 1 participants), and 460 at Time 3 (97% of Time 2 participants; 84% of Time 1 participants). All 546 participants were included in all analyses, but estimates of effects involving numbers of sexual partners at Times 2 and 3 included 476 and 460 participants, respectively. Attrition between Time 1 and 2 was due to students' moving away from the area (n = 24), withdrawing from school (n = 13), school absence (n = 15), declining to participate (n = 4), or providing incomplete data on one or more of the sexual behavior outcome variables (n = 14). Attrition analyses were conducted among the 546 participants with complete data at Time 1, to compare those with complete sexual

behavior data at all three time points to those who were missing one or more sexual behavior variables at Time 2 and/or 3. Those with complete data reported higher descriptive friend intercourse norms at Time 1 (t [126.90] = 2.42, p = .02). No other differences were significant.

Procedures

Youth provided assent to participate in both the questionnaire-based and experimental portions of the study (for Study 2) at baseline. All study procedures were approved by the University of North Carolina at Chapel Hill human subjects committee. Trained research assistants (including project coordinators, post-doctoral fellows, graduate students, and undergraduate research assistants) administered surveys during school hours at each time point. Following assent procedures, participation in this study began with the first phase of data collection, "Time 1 – Questionnaire" (T1-Q), when participants were in the spring of their 7th or 8th grade year. All measures collected at each time point (for Study 1 and Study 2) are shown in Table 1.

T1-Q included adolescents' completion of self-report questionnaires assessing demographic information, pubertal development, sexual behaviors, and peer norms. Participants also completed follow-up questionnaire-based assessments of their numbers of sexual intercourse and activity partners, one year after T1-Q (i.e., Time 2, spring of 8th/9th grade), and again two years after T1-Q (i.e., Time 3, spring of 9th/10th grade). (A subset of participants also participated in an experimental paradigm at "Time 1- Chat Room" [T1-CR], as discussed in Study 2; see Table 1.)

Importantly, all survey measures were administered using computer-assisted self-interviews (CASIs). CASI procedures were used to reduce social desirability biases and increase the validity of self-report data about adolescents' sexual behaviors (Turner et al., 1998). To

further increase privacy, for each participant: (1) privatizing dividers were placed around his/her computer, (2) a research assistant provided a direct verbal summary of how data would be kept confidential, and (3) the research assistant entered the participant's ID number into the computer in front of the participant. Experts on adolescent sexual health have emphasized the importance of making every effort to ensure adolescents' sense of (and actual) privacy when reporting on sexual behavior, in order to obtain valid data (e.g., Diamond & Savin-Williams, 2009).

For participation in the survey-based data collections, participants were compensated with a $10 gift card at T1-Q, a $20 gift card at T2, and a $10 gift card at T3.

Measures

Demographic factors. At Time 1, adolescents were asked to self-report their gender (male or female), age (in whole numbers), and race or ethnicity (African-American/Black, Asian, White/Caucasian [not Latino/a], Hispanic/Latino/a, Other). Those who selected "Other" for race/ethnicity also were asked to provide a free-form response. Several steps were taken to recode the race/ethnicity variable for the current study. First, adolescents who selected "Other" and then described being both White/Caucasian and African American/Black were recoded as African American/Black, and those who described being both White/Caucasian and Hispanic/Latino were recoded as Hispanic/Latino. Adolescents who reported identifying with more than one minority category (e.g., Latino and African American) remained in the Other category. Finally, given the small sample size in the Asian and Other categories, these two categories were combined, resulting in four categories for ethnicity: African American, Latino, White, and Other. Note that throughout this paper, the term "ethnicity" will be used to capture all racial and ethnic groups examined in the study.

Pubertal timing. At Time 1, participants completed the 5-item Pubertal Development Scale (Petersen, Crockett, Richards, & Boxer, 1988). For girls, the scale includes items about growth spurt, pubic hair growth, skin changes, breast development, and menarche. For boys, the scale includes items about growth spurt, pubic hair growth, skin changes, facial hair, and voice deepening. Participants rated each item on a 4-point Likert scale (1 = *not started* to 4 = *seems completed*), with higher scores indicating more advanced pubertal status (boys $\alpha = .70$, girls $\alpha = .58$). Consistent with past work (e.g., Flannery, Rowe, & Gulley, 1993), participants' pubertal development was standardized to reflect timing relative to peers. In order to assess pubertal timing relative to the most relevant group of peers, pubertal development scores were standardized within gender and grade. Higher scores indicate greater maturation relative to peers, or earlier *pubertal timing*.

Sexual behavior. At Times 1, 2, and 3, adolescents self-reported their number of sexual intercourse and sexual activity partners over the past year. For the question about sexual intercourse, adolescents were asked: "In the past year, with how many people did you have sex?" Sex was defined as "sexual intercourse." For the question about sexual activity, adolescents were asked: "In the past year, with how many partners did you engage in sexual activities, including making out and sexual touching?" Sexual touching was defined as "touching below the clothes (for example, touching breasts or genitals)." For each question, adolescents responded using a 6-point Likert scale representing counts of sexual partners (0 = *0 partners*, 1 = *1 partner*, 2 = *2 partners*, 3 = *3 partners*, 4 = *4 partners*, 5 = *5 or more partners*).

Peer norms. At Time 1, in addition to assessing adolescents' own numbers of sexual intercourse and activity partners, participants were asked to report their perceptions of two types of peer norms – descriptive norms and injunctive norms.

Descriptive norms. To assess descriptive norms, participants reported the perceived numbers of sexual intercourse and sexual activity partners of "your best friend," "the typical 'popular' girl in your grade," and "the typical 'popular' boy in your grade," using the same definitions and scales provided for the self-report questions about numbers of partners. The correlation between the "popular girl" and "popular boy" items was high (r =.85 for sexual activity question; r = .83 for sexual intercourse); thus, for each sexual behavior, each participant's responses to the popular girl and boy items were averaged to yield a measure of perceptions of popular *peers'* numbers of intercourse and activity partners, respectively.

Note that an alternative, gender-specific method of analyzing descriptive norms was explored, in which girls' descriptive norms were only based on their reports of their female popular peers' behaviors, and boys' descriptive norms were only based on reports of male popular peers' behaviors. Examining associations between these alternative variables and other study variables revealed similar patterns of results as with the general, non-gender specific measure. Thus, the general measure was used, in order to be consistent with the general "popular peers" language used in the injunctive norms measure, discussed below.

In total, four types of descriptive norms were computed: (1) perceptions of friends' numbers of sexual activity partners (*descriptive friend activity norms*), (2) perceptions of friends' numbers of sexual intercourse partners (*descriptive friend intercourse norms*), (3) perceptions of popular peers' numbers of sexual activity partners (*descriptive popular activity norms*), and (4) perceptions of popular peers' numbers of sexual intercourse partners (*descriptive popular intercourse norms*). For all four types of descriptive norms, higher values indicate higher perceived numbers of peers' sexual partners.

Injunctive norms. To assess injunctive norms, participants were asked to report the age at which their peers would think it is OK to engage in sexual intercourse and sexual touching. The same definitions were provided as in the self-report questions about numbers of partners. For sexual intercourse, the following two questions were asked: "What age would your close friends think it would be OK to have sex?" and "What age would the popular kids in your school think it is OK to have sex?" For sexual touching, participants were asked: "What age would your close friends think it would be OK to engage in sexual touching?" and "What age would the popular kids in your school think it is OK to engage in sexual touching?" Note that the questions about noncoital sexual behaviors in this case specifically asked about "sexual touching" and not the broader construct of "sexual activity" assessed in the sexual behavior outcome measures and descriptive norms measures; however, for simplicity, "sexual activity" will be used throughout this paper to describe all measures related to noncoital behavior.

For each of the four questions, participants either chose a specific age ("11 or younger, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21 or older") or chose the option "after married" or "never" (note that the "never" option was included in the scale in order to be consistent with other items about substance use). There was no theoretical reason to believe that responses of "21 or older," "after married," or "never" represented meaningful differences in perceived norms for the early adolescents participating in this study. Additionally, exploratory descriptive analyses comparing associations between these three responses and other variables revealed no significant or meaningful differences across the three responses; thus, they were combined. The final scale therefore includes 11 points (11 = *11 or younger*, 12 = *12 years old*, 13 = *13 years old*, 14 = *14 years old*, 15 = *15 years old*, 16 = *16 years old*, 17 = *17 years old*, 18 = *18 years old*, 19 = *19 years old*, 20 = *20 years old*, 21 = *21 or older, after married, or never).*

In total, four types of injunctive norms were computed: perceptions of the age at which (1) friends would think sexual activity is OK (*injunctive friend activity norms*), (2) friends would think sexual intercourse is OK (*injunctive friend intercourse norms*), (3) popular peers would think sexual activity is OK (*injunctive popular activity norms*), and (4) popular peers would think sexual intercourse is OK (*injunctive popular intercourse norms*). For all types of injunctive norms, lower values indicate greater peer approval of younger ages of sexual initiation. Note that whereas higher levels of descriptive norms indicate "riskier" peer norms, *lower* levels of injunctive norms indicate riskier peer norms. Thus, negative coefficients were expected for the associations between injunctive peer norms and adolescents' own numbers of sexual partners.

Data Analytic Plan

Descriptive statistics. Descriptive statistics were conducted in SPSS 22.0 to examine the means and standard deviations of the primary study variables at all three time points. Independent samples *t* tests were used to compare boys' and girls' reports of all study variables. Additionally, paired samples *t* tests were used to compare adolescents' perceptions of their peers' numbers of sexual partners (i.e., descriptive norms) with their own self-reported numbers of sexual partners. Bivariate correlational analyses were also performed between all continuous study variables.

Hypothesis testing. Hypotheses regarding associations between peer norms and numbers of sexual partners were tested with log linear models, using a Poisson distribution for the theoretical distribution of the error terms, and adjusting standard errors for multiple observations within subjects. All primary study analyses were examined using SAS version 9.3.

Poisson distributions were used to model adolescents' numbers of sexual partners, in order to account for the non-normal distribution of sexual behavior. Poisson distributions are

appropriate to use for count data that are non-normally distributed (e.g., Atkins & Gallop, 2007; Coxe, West, & Aiken, 2009). The use of Poisson distributions for the theoretical distribution of error terms avoids the problems inherent in common methods for dealing with non-normal data in ordinary least-squares regression; for example, a log transformation cannot correct a large preponderance of zeros, as is the case with the current study data on numbers of sexual partners. Like other count variables, the dependent variables used in the current study (i.e., adolescents' numbers of past-year sexual intercourse and activity partners) share the characteristics of being non-negative integers that are positively skewed. Such data violate the assumptions of ordinary least-squares regression, including a normal theoretical distribution of residuals; the Poisson distribution is especially important to use when the mean of the count data is close to zero (Atkins & Gallop, 2007; Coxe, et al., 2009), as is the case in the current study. Poisson regression relies on the maximum likelihood estimation strategy, in order to find estimates of regression coefficients that are most likely to give rise to the observed data; these coefficients define the parameters that describe the structure of the data (Atkins & Gallop, 2007). The log linear models used in the current study are similar to Poisson regression, while also adjusting the standard errors for the multiple observations within subjects (i.e., at the three time points).

Separate models were examined for the prediction of numbers of sexual activity partners and numbers of sexual intercourse partners. In all analyses, gender was examined as a moderator, and ethnicity (dummy-coded to represent the four categories), age, and pubertal timing were included as covariates.

The models for numbers of sexual activity partners and numbers of sexual intercourse partners were examined in an identical fashion. First, terms were created for the association between each of the eight types of norms (i.e., descriptive friend activity, descriptive friend

intercourse, descriptive popular activity, descriptive popular intercourse, injunctive friend activity, injunctive friend intercourse, injunctive popular activity, injunctive popular intercourse) and each of the three sexual behavior outcome variables (i.e., number of sexual activity or intercourse partners at Times 1, 2, and 3) for boys and girls. Note that for each type of peer norm, six terms were computed. For example, for the descriptive friend activity norm, terms were computed for boys and girls at Times 1, 2, and 3. In this example, the Time 1 female term captures the association between adolescent girls' descriptive friend activity norms and their number of sexual partners at Time 1.

Next, for each type of peer norm (e.g., descriptive friend activity), Wald's chi-square tests were used to test whether any of the six associations for that norm (i.e., at Times 1, 2 and 3, for males and females) was significant. When a non-significant overall test result was revealed for a specific norm, associations will not be further discussed for that norm. When a significant chi-square test result was revealed for a peer norm variable, specific associations were then tested between that norm and the number of sexual partners at each of the three time points, for males and females. However, note that all terms remained in the model, such that final associations provided are adjusted for the effects of all covariates in addition to all associations with other norms.

For each significant overall test for a specific norm, the six associations for that norm (i.e., at Times 1, 2 and 3, for males and females) were each tested for significance. Estimates of effects were in the form of count ratios, such that a significant test indicated that at that time point for that gender, this specific type of norm was associated with odds of a significantly increased or decreased number of sexual partners (i.e., a count ratio that was significantly different than 1). For example, if a count ratio estimate significantly greater than 1 was revealed

for Norm X for girls at Time 1, it would indicate that Norm X significantly increased the odds of girls' having a greater number of sexual partners at Time 1. Specific interpretations of count ratios will be provided in the Results section.

Finally, two types of contrasts were tested for each significant overall Wald's chi-square test. First, to examine gender moderation, within-time contrasts were tested for gender differences in the strength of associations. More specifically, if the overall test of a specific norm was significant, gender differences in the strength of association between that norm and the number of sexual partners were tested at each time point. Second, to examine whether associations between a specific norm and the number of sexual partners differed across time, a within-gender Wald's chi-square test was used to test whether any of the three associations conditioned on time (i.e., associations between the norm and number of sexual partners at Times 1, 2, and 3) were significantly different from each other. If a non-significant result was revealed, this indicated that the strength of the association did not differ at Time 1 versus 2 versus 3. If a significant result was revealed, further contrasts were examined to determine which time-specific associations differed from each other (i.e., Time 1 versus 2, Time 1 versus 3, and Time 2 versus 3).

Results

Descriptive Analyses

Descriptive statistics for sexual behavior. Table 2 shows means and standard deviations for the six sexual behavior outcome variables (numbers of sexual activity and intercourse partners at the three study time points) for the full sample and by gender, along with results of *t* tests examining gender differences for each variable. Additionally, percentages of adolescents who had engaged in *any* sexual activity or intercourse are provided. Numbers of sexual

intercourse partners were low, reaching an average of approximately 0.5 sexual intercourse partners in the past year at Time 3 (i.e., Grades 9/10). The percentage who had engaged in any intercourse started at roughly 7% at Time 1 and was roughly 28% by Time 3. For sexual intercourse, no gender differences were revealed for either numbers of partners or percentages.

As expected, numbers of sexual activity partners were higher than numbers of intercourse partners at each time point, with participants reporting an average of roughly one sexual activity partner in the past year at each time point. No gender differences were revealed in the number of sexual activity partners, but chi-square tests indicated that a significantly greater *percentage* of girls, compared to boys, had engaged in any sexual activity at Times 2 and 3 (e.g., 47% of boys and 57% of girls at Time 3).

Descriptive statistics for peer norms variables. In addition to the primary study aim regarding the prediction of adolescents' numbers of sexual partners, an important, descriptive aim of the current study was to better understand the nature of adolescents' peer norms. The current study offers a unique opportunity to examine early adolescents' perceptions of their peers' attitudes and behaviors, related to both sexual activity and intercourse, and regarding both friends and popular peers – and to examine gender differences in these perceived norms. Thus, attention will be paid here to the nature of each of the eight types of peer norms. Table 3 shows means and standard deviations for the eight peer norms variables for the full sample and by gender, along with results of *t* tests examining gender differences for each variable. All norms discussed were assessed at Time 1.

Peer norms in the full sample. With regard to descriptive norms, across the full sample, adolescents perceived that their friends had an average of 1.11 past-year sexual activity partners at Time 1. Paired samples *t* tests revealed that this partner count estimate was significantly higher

than adolescents' self-reports of their own numbers of partners – 0.91 past-year sexual activity partners at Time 1, t (545) = -3.64, $p < .001$. Additionally, adolescents perceived that their friends had an average of 0.27 past-year sexual intercourse partners, significantly higher than adolescents' average self-reports of their own 0.13 past-year sexual intercourse partners, t (545) = -4.54, $p < .001$. When these analyses were repeated separately for boys and girls, differences remained significant, all $ps < .01$, with the exception that boys' estimates of their friends' numbers of sexual activity partners were only marginally significantly higher than their own self reports, $p = .052$.

Adolescents perceived substantially riskier descriptive norms among their popular peers. Specifically, adolescents perceived that their popular peers had an average of 2.33 past-year sexual activity partners and an average of 0.95 sexual intercourse partners. These estimates were significantly higher than adolescents' own self-reported numbers of partners at Time 1, t (545) = -18.56, $p < .001$ for sexual activity, and t (545) = -13.64, $p < .001$ for sexual intercourse; significant differences remained when repeating tests separately by gender (all $ps < .001$).

With regard to injunctive norms, on average, across the full sample, adolescents perceived that their friends believed it is OK to engage in sexual activity at age 17.41 and to initiate sexual intercourse at age 18.42. As with descriptive norms, adolescents reported popular peer injunctive norms that were significantly riskier than friend injunctive norms. Specifically, adolescents reported that their popular peers believed it is OK to engage in sexual activity at age 15.87 and that it is OK to engage in sexual intercourse at age 16.73.

These riskier popular peer descriptive and injunctive norms (relative to friend norms) were consistent across gender, but girls' perceptions of popular peers' norms were much riskier than were boys', as is discussed next.

Gender differences in perceived peer norms. Tests of gender differences revealed interesting findings. Although gender differences were not observed for any of the friend norms, gender differences were observed for *every* popular peer norm, with girls consistently reporting riskier popular peer norms than boys. First, findings for descriptive norms indicated that, compared to boys, girls on average perceived their popular peers to have higher numbers of sexual activity and intercourse partners. Second, findings for injunctive norms indicated that, compared to boys, girls on average perceived their popular peers to believe earlier ages of engagement in sexual activity and intercourse are OK.

Note that the popular peer descriptive and injunctive norms were not gender-specific; the descriptive norms variables were based on an average of adolescents' reports of the behaviors of their popular male and female peers' behaviors, and for injunctive norms, adolescents reported the attitudes of "the popular kids in your school." Interestingly, in exploratory analyses aimed at understanding this finding, these gender differences remained when tests were repeated for within-gender popular peer descriptive norms (i.e., girls perceived higher numbers of their female popular peers' partners, compared to boys' perceptions of their male popular peers' partners) *and* for opposite-gender popular peer descriptive norms (i.e., girls perceived higher numbers of their *male* popular peers' partners, compared to boys' perceptions of their *female* popular peers' partners).

Correlational analyses. Results from bivariate correlational analyses are shown in Table 4. Correlations among girls are shown below the diagonal, and those among boys are shown above the diagonal.

Unsurprisingly, within the set of sexual behavior variables (i.e., numbers of sexual activity and intercourse partners at the three time points), correlations were generally moderate

or large. Similarly, within the peer norms variables, correlations were generally moderate or large. Additionally, associations among norms were generally stronger when categories matched in some way (e.g., injunctive norms for popular peers and friends; injunctive and descriptive norms for friend activity). Note that, as expected, the correlations were negative between injunctive and descriptive norms (and between injunctive norms and numbers of partners, discussed next), given that higher levels of risk were indicated by higher levels of descriptive norms but *lower* levels of injunctive norms.

Across time points, peer norms variables were generally significantly correlated with numbers of sexual partners, but the strength of the associations varied. Broadly speaking, correlations with numbers of sexual partners were stronger for peer norms that were descriptive (versus injunctive), related to friends (versus popular peers), and related to sexual activity (versus intercourse). Additionally, associations were stronger between norms and numbers of sexual activity partners, compared to numbers of intercourse partners. Finally, there were more significant correlations between norms and sexual behavior for boys than for girls.

As expected, some significant associations were revealed between the covariates and other study variables. However, findings were not as consistent as expected. For example, age was associated with some, but not all, of the sexual behavior variables and peer norms variables. Earlier pubertal timing generally was associated with riskier peer norms and greater numbers of sexual partners, consistent with past work.

Hypothesis Testing

Associations between norms and numbers of sexual activity partners in multiple log linear analyses. Results of the overall Wald's chi-square tests from multiple log linear analyses examining numbers of sexual activity partners are shown in Table 5. This table specifically

shows the results of tests that, for each predictor and covariate, tested whether any of the six associations for that variable were significant (e.g., associations between descriptive friend activity norms and number of sexual activity partners, at Times 1, 2, and 3, for males and females) after controlling for all other variables in the model. Results revealed that, after controlling for all peer norms and other covariates, age, ethnicity, and pubertal timing were not significantly associated with numbers of sexual activity partners at any time point.

Controlling for all other variables, three types of peer norms were significantly associated with adolescents' numbers of sexual activity partners: descriptive friend activity norms, descriptive popular activity norms, and injunctive friend activity norms. Notably, none of the types of norms related to sexual *intercourse* were significantly associated with adolescents' numbers of sexual activity partners. The significant Wald's chi-square test results for these three norms indicated the need for further testing to understand the specific pattern of associations between these norms and adolescents' numbers of partners. Specifically, estimates of effects were tested by gender for each time point, to examine whether each of these three norms was significantly associated with girls' and/or boys' numbers of sexual activity partners at Times 1, 2, and/or 3.

Estimates of effects and tests of gender differences. Table 6 shows count ratios depicting the estimates of effects of specific norms on boys' and girls' numbers of sexual activity partners at the three time points. Note that every association reported below controls for age, ethnicity, pubertal timing, all other norms, and numbers of sexual activity partners at all three time points; count ratios are adjusted for these other variables and the associations among them.

Descriptive friend activity norms. As shown in Table 6, a significant association was revealed between boys' perceptions of their friends' numbers of sexual activity partners, and

boys' own numbers of sexual activity partners, at each of the three time points. These results indicated that for every one additional sexual activity partner an adolescent boy perceived his best friend to have at Time 1, his own number of sexual activity partners was approximately 30% higher at each of the three time points (33% higher at Time 1, 29% higher at Time 2, and 28% higher at Time 3).

Among girls, in contrast, the association was only concurrent. Results indicated that for every one additional sexual activity partner an adolescent girl perceived her best friend to have, her own number of sexual activity partners at Time 1 was on average 32% higher; this association was no longer significant at Times 2 or 3. Note that it is not possible to determine temporal precedence of norms versus behavior in the case of this concurrent association (or other concurrent associations).

Note that the gender difference in the association between this norm and numbers of sexual activity partners was statistically non-significant at Time 1 ($p = .98$), marginally significant at Time 2 ($\chi^2[1] = 3.18$, $p = .07$), and significant at Time 3 ($\chi^2[1] = 5.79$, $p = .02$).

Descriptive popular activity norms. A concurrent association was revealed between popular activity norms and numbers of sexual activity partners among girls; no significant associations were revealed for boys at any time point. For every one additional sexual activity partner an adolescent girl perceived her popular peers to have, her own number of sexual activity partners at Time 1 was 45% higher; the association was no longer significant at Times 2 or 3. The observed gender difference in the Time 1 associations was statistically significant ($\chi^2[1] = 12.63$, $p < .001$).

Injunctive friend activity norms. Significant associations were revealed for injunctive friend activity norms, but only at Time 1 for girls, and only at Times 2 and 3 for boys.

Results indicated that for every one-year increase in the perceived age at which an adolescent boy's friends believed sexual activity is OK, his own number of sexual activity partners was 16% lower at Time 2 and 17% lower at Time 3. Note that, although only the associations at Times 2 and Time 3 were significant, there was no statistically significant difference between these associations and that at Time 1 (both *p*s > .20), or between the Time 2 and Time 3 associations ($p = .85$).

Results for girls indicated that for every one-year increase in the perceived age at which a girl's friends believed sexual activity is OK, her own number of sexual activity partners at Time 1 was 11% lower. The association was no longer significant at Times 2 or 3. However, the association at Time 1 was not significantly different than the association at Time 2 ($p = .11$); it was only significantly different than the Time 3 association ($\chi^2[1] = 5.39$, $p = .02$).

With regard to gender differences, although the association between this norm and adolescents' number of sexual activity partners was only significant for girls at Time 1 and for boys at Times 2 and 3, the only statistically significant gender difference was at Time 3, when boys' count-ratio was significantly stronger than girls' ($\chi^2[1] = 8.17$, $p = .004$; other *p*s > .10).

Summary of findings for numbers of sexual activity partners. In summary, significant concurrent associations were revealed between adolescent girls' perceived peer norms and their own numbers of Time 1 sexual activity partners, but longitudinal associations were not revealed. In contrast, longitudinal associations were revealed among boys.

Associations between norms and numbers of sexual intercourse partners. Results of the overall Wald's chi-square tests from multiple log linear analyses examining numbers of sexual intercourse partners are shown in Table 5 (alongside results for the model examining numbers of sexual activity partners). As a reminder, this table shows the results of tests that, for

each norm and covariate, tested whether any of the six associations for that variable were significant (after controlling for all other variables). Results revealed that ethnicity and pubertal timing were not significantly associated with numbers of sexual intercourse partners at any time point. Age, however, was significantly associated with numbers of sexual intercourse partners.

Results also revealed that, controlling for all other variables, two types of norms were associated with adolescents' numbers of sexual intercourse partners: descriptive friend activity norms and descriptive popular intercourse norms. Notably, none of the injunctive norms were significantly associated with adolescents' numbers of sexual intercourse partners. The significant overall test results for these two norms indicated the need for further testing to understand the specific pattern of associations between these norms and adolescents' numbers of intercourse partners. More specifically, as with the model examining numbers of activity partners, effects were estimated by gender for each specific time point, to examine whether each of these norms was significantly associated with boys' and/or girls' numbers of intercourse partners at Times 1, 2, and/or 3.

Estimates of effects and tests of gender differences. Table 7 shows count ratios depicting the associations between specific norms and adolescents' numbers of sexual intercourse partners at the three time points. Note that, as with the model examining numbers of sexual activity partners, every association reported below controls for age, ethnicity, pubertal timing, all types of norms, and numbers of sexual intercourse partners at all three time points; count ratios are adjusted for these other variables and the associations among them.

Notably, no significant associations were revealed for girls for any of the norms at any time point.

In contrast, among boys, a significant association was revealed between boys' descriptive friend activity norms and their own numbers of sexual intercourse partners, at each of the three time points. These results indicated that for every one additional sexual *activity* partner an adolescent boy perceived his best friend to have, his own number of sexual intercourse partners was on average 66% higher at Time 1, 46% higher at Time 2, and 20% higher at Time 3. Note that although the strength of the association appears to decrease over time, there was no significant difference in the associations across the three time points ($\chi^2[1] = 3.13$, $p = .21$). Also note that although none of these associations were significant for girls, the gender differences also were not statistically significant for any time point (all ps > .10).

With regard to descriptive popular intercourse norms, a significant association was revealed for boys at Times 1 and 2, such that for every one additional sexual intercourse partner an adolescent boy perceived his popular peers to have, his own number of sexual intercourse partners was on average 66% higher at Time 1 and 41% higher at Time 2. There was no significant difference between these associations ($p = .39$) but each was significantly stronger than the association at Time 3 ($\chi^2[1] = 8.02$, $p = .005$ for Time 1 vs. Time 3; $\chi^2[1] = 5.75$, $p = .02$ for Time 2 versus Time 3). Although none of the associations for girls were significant, the gender difference was only significant at Time 1 ($\chi^2[1] = 4.44$, $p = .04$).

Discussion of Study 1

Developmental psychologists and evolutionary theorists have highlighted the central role of peers in adolescents' identity development and behavioral decision-making, and have noted that peers may be especially relevant to adolescents' sexual behavior. More specifically, researchers have emphasized the importance of incorporating perceptions of peers' attitudes and behaviors into theories regarding adolescents' sexual behavior (Ajzen & Fishbein, 1980; Rivis &

Sheeran, 2003). Many studies have found both injunctive norms (i.e., perceptions of peers' attitudes) and descriptive norms (i.e., perceptions of peers' behavior) to be associated with adolescent's sexual behavior (see Buhi & Goodson, 2007). However, prior work on the role of peer norms in adolescents' sexual behavior has generally been limited in a number of important ways. These limitations include an over-reliance on cross-sectional study designs, a limited focus on sexual intercourse, and a lack of attention to the specific types of peers who may be most influential in other adolescents' sexual behavior (e.g., friends versus popular peers).

Study 1 had three aims: (1) to provide detailed descriptive data on different types of peer norms, (2) to examine associations between specific types of peer norms and adolescents' numbers of sexual partners over time, and (3) to examine gender as a moderator of those associations. Rather than focusing solely on sexual intercourse, as has traditionally been common in studies of adolescent sexual behavior, this study examined adolescents' coital as well as noncoital behaviors (operationalized as adolescents' numbers of sexual intercourse and sexual activity partners). Additionally, multiple types of perceived peer norms were examined, including injunctive norms (operationalized as the age at which peers believe sexual behavior is OK) and descriptive norms (operationalized as peers' number of sexual partners), for both friends and popular peers, regarding both sexual activity and intercourse. Overall, peer norms were found to be associated with adolescents' sexual behavior. However, findings were stronger for boys than for girls, for descriptive than injunctive norms, and for the prediction of numbers of sexual activity partners than for intercourse partners. Each of these findings will be discussed, following a discussion of the descriptive data on peer norms.

Descriptive Data on Peer Norms Variables

In addition to providing results from sophisticated longitudinal analyses, this study also provides valuable descriptive data regarding typical norms in an early adolescent sample. Basic descriptive data remain fundamental to the field of research on adolescence (Shanahan et al., 2005), and this study provides the most detailed picture to date of adolescents' perceptions of their peers' sexual attitudes and behaviors. Some interesting patterns of findings are highlighted below. Each of these results has implications for sexual education and prevention programs, which will be discussed in the General Discussion.

With regard to descriptive norms for friends, participants reported significantly higher numbers of their friends' sexual intercourse and activity partners compared to their own numbers of partners. Additionally, adolescents reported substantially higher estimates of their popular peers' numbers of sexual partners; for example, for sexual intercourse, adolescents provided an estimate for popular peers that was roughly 3.5 times what they had estimated for their friends and roughly seven times their own self-reported number of partners. These findings are consistent with past work indicating that adolescents generally overestimate their peers' sexual behaviors (e.g., Gibbons, Helweg-Larsen, & Gerrard, 1995; see also Prentice, 2008). Additionally, one study revealed that adolescents perceive much higher numbers of popular peers' sexual partners relative to other peers (Helms et al., 2014). However, research is equivocal regarding whether, in the case of popular peers, these estimates reflect an overestimation of popular peers' numbers of sexual partners (Helms et al., 2014) or a true reflection of higher numbers of sexual partners among popular adolescents compared to other youth (Mayeux et al., 2008; Prinstein et al., 2003; Prinstein et al., 2011). Regardless, however, of whether adolescents' perceptions of their peers' behaviors are inaccurate, past theory and research indicate that they

have implications for adolescents' own behaviors (Brechwald & Prinstein, 2011; Buhi & Goodson, 2007). The current study's examination of longitudinal associations provides further support for the importance of these norms in adolescents' development of sexual behavior, as discussed later.

Consistent with the findings for descriptive peer norms, adolescents also perceived their popular peers to have more permissive injunctive norms than those of their friends. Specifically, adolescents reported that their popular peers would approve of sexual activity and sexual intercourse roughly 1.5 to two years earlier than their friends would approve of the same behaviors. Interestingly, however, for *both* popular peers and friends, adolescents estimated that their peers would approve of sexual activity roughly one year earlier than sexual intercourse. This finding indicates that youth perceive differences in the appropriateness of coital versus noncoital sexual behaviors. Given the higher risks associated with coital as compared to noncoital behaviors (e.g., Brady & Halpern-Felsher, 2007), this finding could indicate a potentially positive role of peer norms in adolescents' development of sexual behaviors.

Regarding gender differences, boys and girls did not differ in their perceptions of friend injunctive or descriptive norms. It is somewhat surprising that boys did not perceive their friends (who are presumably male peers) to encourage earlier initiation of sexual behavior than did girls, given theory and research indicating that boys are more strongly encouraged than girls to engage in sexual behavior (e.g., Tolman, 2013). This finding could have implications for sexual health prevention campaigns. However, it should be noted that the participants in this study were on average age 13 at study onset; gender differences in injunctive norms may have emerged in an older sample (e.g., as was seen in a sample with an average age of 15; Carvajal et al., 1999).

In contrast, substantial gender differences were consistently revealed in adolescents' perceptions of their popular peers' sexual behaviors and attitudes. Specifically, compared to boys, girls reported significantly higher average numbers of popular peers' sexual activity and intercourse partners, and reported their popular peers to believe earlier ages of sexual activity and intercourse were OK. Note that adolescents' reports of their popular peers' numbers of sexual partners were not gender-specific; rather, girls perceived significantly higher numbers of their popular peers' sexual partners even though they presumably were reporting on *the same popular peers* as boys.

These descriptive findings are valuable in and of themselves, in their illustration of early adolescents' perceptions of their peers' behaviors and attitudes. Additionally, and importantly, results from log linear models suggest that these norms have implications for adolescents' sexual behavior over time, as discussed below.

Associations Between Peer Norms and Adolescents' Sexual Behavior Over Time: Overview of Study Findings

Study 1 provides a thorough and detailed examination of which specific types of norms are uniquely associated with adolescents' coital and noncoital behaviors over time. The current findings contribute to the body of work documenting the role of peer factors in adolescents' sexual behavior (see Buhi & Goodson, 2007) and to the broader literature on peer influence (see Brechwald & Prinstein, 2011; Prinstein & Dodge, 2008). Importantly, this study demonstrates that peer norms are associated with adolescents' behaviors not only concurrently, but also over time. These associations were significant even in models that stringently controlled for the effects of covariates previously identified as important predictors of sexual behavior – age, ethnicity, and pubertal timing – and for the effects of all other norms included in the model.

Overall, four key patterns of findings emerged in log linear models: (1) peer norms were more strongly associated with boys' sexual behaviors than with girls' (and longitudinal associations were only revealed among boys); (2) both friend and popular peer norms were significantly associated with adolescents' sexual behaviors; (3) descriptive norms were more relevant than injunctive norms; and (4) peer norms were more predictive of numbers of sexual activity partners than numbers of sexual intercourse partners. These key points will each be discussed below. Implications for prevention and sexual education efforts will be discussed in the General Discussion.

The Importance of Gender in Associations Between Peer Norms and Adolescents' Sexual Behaviors

A key finding in this study concerns the role of gender; specifically, gender was found to interact with peer norms in predicting adolescents' numbers of sexual partners. Across different types of norms and sexual behavior, findings were generally stronger among boys than among girls, and the longitudinal associations discussed above were only significant among boys. Several of the gender differences in patterns of association were not statistically significant, and thus results regarding gender differences should be interpreted with caution. It also should be noted that significant associations may have been revealed among girls if various combinations of norms had been examined, rather than examining each norm separately. Nonetheless, the current findings indicate that peer norms may be more predictive of boys' sexual behaviors than girls'. Additionally, among girls, the possibility cannot be ruled out that all of the observed concurrent associations between norms and behavior involved girls' prior behaviors affecting their perceptions of norms – and/or their prior behaviors affecting their choice of peers with whom to associate – rather than a direction of effects involving peer influence on sexual behavior. Surprisingly, most theoretical models of adolescents' sexual behavior fail to

incorporate the role of gender (see Tolman et al., 2003), and this study underscores the critical importance of considering gender in theory and future research.

No specific gender hypotheses had been proposed for the current study, given the equivocal nature of past bodies of work on the role of peers in boys' and girls' sexual behavior. However, there are multiple theories that may help explain the observed stronger associations among boys.

First, broad theories regarding gender differences in the nature and meaning of peer interactions highlight that boys, more so than girls, tend to be oriented to group peer interactions and to be more motivated by status-oriented goals than by connection-oriented goals (Rose & Rudolph, 2006). It is possible that these characteristics of boys' peer interactional and cognitive-interpersonal styles may exacerbate the importance of peer norms. Additionally, developmental, gender-based, and evolutionary theories collectively point to the potentially unique intersection among adolescent males of peer status goals and sexual behavior goals. For instance, theorists have noted that definitions of masculinity in the U.S. are closely tied to the attainment of sexual partners (preferably multiple partners), and that boys are much more likely than girls to be rewarded for sexual behavior (Maccoby, 1998; Tolman, 2013). Additionally, evolutionary theory highlights that adolescent males are strongly motivated to increase social status in order to gain access to sexual partners, such that status goals and sexual goals may become inextricably linked (Ellis et al., 2012). To the extent that boys are motivated by both status-oriented and sexually-oriented goals, it follows that they may be highly attuned to sexual peer norms and strongly driven to match their own behavior to those norms.

However, the current findings regarding the stronger associations between peer norms and sexual behavior among boys contradict some prior research and theory. For example, some

prior empirical evidence supports the idea that while boys' sexual behavior is predicted by biological factors, girls' sexual behavior is better predicted by social factors (e.g., Udry & Billy, 1987; see also Tolman & Diamond, 2001). It is likely, however, that among adolescent girls, individual differences in sexual behavior are predicted by a more complex set of factors than were examined in the current study. For instance, girls are much more likely than boys to receive messages from their parents, the media, and even their schools that discourage sex (e.g., Tolman, 2002; see also Diamond & Savin-Williams, 2009). Girls also receive confusing messages that glamorize the *performance* of being "sexy" while discouraging girls' recognition of their own sexual desires or the accumulation of "too many" partners (Tolman, 2013). It is possible that these complex messages may counteract or weaken the effects of the peer norms examined in this study. Additionally, because girls are particularly discouraged (relative to boys) from accumulating multiple partners, it is possible that the current study's outcome variable of numbers of sexual partners did not optimally capture the connection between peer norms and girls' sexual behaviors.

Additionally, an important factor not examined in the current study is the role of perceived norms and influences from specific sexual partners. Unlike other commonly studied behaviors in adolescence, such as alcohol use and weight-related behaviors, an adolescent's engagement in coital or noncoital sexual behavior by definition involves another person. The majority of adolescents' sexual interactions involve opposite-gender peers. Thus, the observed associations between boys' peer norms and numbers of sexual partners likely have important implications for their female partners, and thus for adolescent girls more broadly. More specifically, boys who feel pressure to conform to peer norms may in turn place pressure on adolescent girls to engage in sexual behavior. Perhaps for adolescent girls, messages from sexual

partners are more important than those from close friends or popular peers. Of course, none of these proposed ideas were examined in the current study. Future work will need to investigate the complex roles of gender, peer norms, and other messages about sex, in adolescent boys' and girls' development of sexual behavior.

The Importance of Different Types of Peer Norms in Adolescents' Sexual Behaviors

The current study underscores the importance of considering different specific types of peer norms in models of adolescents' sexual behavior. Adolescents do not receive messages about sex from only one source in isolation, and theoretical models should embrace this complexity.

Different sources of peer norms: Popular peers and friends. Results from the current study revealed that peer norms related to both friends and popular peers may be important in adolescents' sexual behaviors. Controlling for the influence of friend norms, several popular peer norms emerged as significant predictors of adolescents' sexual behaviors, and vice versa.

Findings regarding friend influence are consistent with a longstanding and extensive body of work documenting the influence of friends' attitudes and behaviors on adolescents' own health risk behaviors (see Brechwald & Prinstein, 2011; Prinstein & Dodge, 2008). Far fewer studies had examined the role of popular peer norms in adolescents' behaviors, in spite of the special importance these peers are believed to have in socialization processes (Brechwald & Prinstein, 2011; Sandstrom, 2011). There are several notable exceptions. For example, Cohen and Prinstein used an experimental "chat room" paradigm to demonstrate empirically that adolescent boys were more influenced by their popular "peers" (i.e., electronic confederates) than by less popular peers. Two prior studies specifically examined the influence of adolescents' perceived popular peer norms on their own behaviors over time; these studies found that

perceptions of popular peers' behaviors were associated with longitudinal trajectories of alcohol use (Helms et al., 2014) and numbers of sexual intercourse partners (Choukas-Bradley et al., 2014). However, no prior studies had examined norms related to popular peers' noncoital sexual behaviors or attitudes, or compared the relative influences of friends and popular peers on adolescents' sexual behaviors (or any behaviors) in the same model. The current study addressed each of these needs in the literature, with potentially important theoretical implications.

The current study only examined whether peer influence occurs, and not how it occurs. However, past theory and research suggest potential differences in the processes through which popular peers versus friends may influence other adolescents' behaviors.

The theory of reasoned action (Ajzen & Fishbein, 1980) states that behavior is based on behavioral intentions, and that those behavioral intentions are determined by two factors: attitudes toward the behavior, and perceptions of social norms regarding the behavior. (The expanded theory of planned behavior (Ajzen, 1991) added a factor related to perceived behavioral control, but the attitude and social norm components remained central.) These theories posit that adolescents are more likely to intend to engage in sexual behavior if (a) they hold positive attitudes regarding the behavior and (b) they also perceive social approval for engaging in the behavior.

Social norms related to popular peers may be particularly relevant for these theories. First, given that popular peers may serve as reference groups for their schools, dictating social norms for a wide network of peers (Sandstrom, 2011), then popular peer norms that support sexual behavior would impact adolescents' behavioral intentions through tenet (b) above. Second, the theory of reasoned action states that attitudes toward a behavior (tenet [a]) are based on beliefs about the consequences of that behavior (Ajzen & Fishbein, 1980). If adolescents

associate sexual behaviors with popularity, then they may expect their own engagement in those behaviors to result in social rewards, in the form of increased peer status (Brechwald & Prinstein, 2011). Thus, if adolescents desire to emulate their popular peers due to the processes described previously, the perception that popularity is associated with sexual behavior may increase *both* adolescents' positive attitudes toward sexual behavior *and* the perception of social support for it – in other words, both tenets of the theory of reasoned action. Therefore, according to these principles, adolescents may increase in their intentions to engage in sexual behavior if they perceive sexual behavior to be associated with popularity. However, the role of high-status peers has never been considered in the context of the widely cited theory of reasoned action and theory of planned behavior.

A separate theory that has been connected more often to high-status peers is the prototype willingness model (Gibbons & Gerrard, 1995; Gibbons, Gerrard, Blanton, & Russell, 1998; Gibbons et al., 2008). This model states that individuals are willing to engage in behaviors that are associated with favorable peer prototypes. For example, if sexual behaviors are associated with popular peer prototypes, adolescents may desire to engage in sexual behaviors themselves in order to improve or maintain their self-image. These processes are especially relevant during the years of adolescence, given that youth are often using social comparison and reflected appraisal processes, in order to construct a sense of identity (Brown & Lohr, 1987; Felson, 1985; Harter et al., 1996). More specifically, adolescents often rely on feedback from peers for their own identity development and sense of self-worth. According to these developmental and social psychology theories, when adolescents perceive similarity between their own behaviors and attitudes and those of popular peers, then their self-image improves; in contrast, if they perceive

*dis*similarity, they may experience negative feelings and cognitive dissonance. This cognitive dissonance may then increase motivation to change one's own behaviors or attitudes.

Finally, note that the theory of reasoned action, theory of planned behavior, and prototype willingness model all have roots in social cognitive theory (an extension of social learning theory), which involves principles of social rewards and vicarious reinforcement through observational learning (Bandura, 1986). At a very basic level, if adolescents observe that sexual behavior is reinforced in the peer network, then they may engage in sexual behavior themselves in order to achieve social rewards.

Some of these same theories proposed for popular peer norms may also apply to the transmission of attitudes and behaviors between *friends*. For instance, with regard to the theory of reasoned action, friends' attitudes and behaviors may increase adolescents' own intentions to engage in sexual behavior, by (a) changing their own attitudes, and/or (b) changing their perceptions of social norms (Ajzen & Fishbein, 1980). Additionally, in keeping with the prototype willingness model, adolescents may socially compare themselves to their friends, and may seek to bring their own behaviors and attitudes in line with those of friends, if those friends are viewed as favorable prototypes (e.g., Gibbons & Gerrard, 1995). Furthermore, according to basic principles of social learning theory, adolescents may model their sexual behaviors based on those of their friends, especially if they observe their friends receiving rewards for their behaviors (Bandura, 1986).

In addition to the processes discussed above, processes involving direct communication between friends are likely to be involved in the transmission of attitudes and behaviors. In fact, past results from the current sample indicate that 75% of early adolescents have directly

discussed at least one sexual health topic with their best friend in the past year (Widman, Choukas-Bradley, Helms, Golin, & Prinstein, 2014).

The broader literature on adolescent health risk behaviors supports the importance of dyadic conversations between friends in predicting adolescents' behaviors over time. For instance, Dishion and colleagues have demonstrated that in boys' friendships, deviant and health risk behaviors may be transmitted via shared engagement in deviant talk – a process labeled *deviancy training* (e.g., Dishion & Owen, 2002). This process has been studied with *in vivo* laboratory conversation tasks between friend dyads, rather than self-report surveys. In this process, adolescent friends verbally or nonverbally (e.g., through smiling or laughing) reinforce each other's talk about deviant behaviors; this type of interaction is longitudinally associated with substance use, aggression, and other delinquent behaviors (e.g., Dishion et al., 1997; Dishion & Owen, 2002). Given that boys frequently discuss sexual behavior in favorable ways (Maccoby, 1998; Tolman, 2013), it is likely that similar training processes happen in discussions about sex, although deviancy training as a concept has typically been discussed with regard to substance abuse, aggression, and rule-breaking behaviors.

Some research suggests that these deviancy training processes may be relevant to girls as well, although perhaps less so than for boys (Piehler & Dishion, 2007). Additionally, girls' conversations within friendships have been shown to transmit depressive symptoms, through a process labeled *co-rumination* (Rose, 2002), and to transmit weight-related attitudes and behaviors, through a process labeled *fat talk* (see Webb & Zimmer-Gembeck, 2014). Furthermore, a broad review of gender differences in peer relations concluded that girls are more likely than boys to engage in intimate dyadic talk (Rose & Rudolph, 2006). Moreover, the prior analysis of the current sample found that girls, on average, discussed more sexual health topics

with their best friends than did boys (Widman, Choukas-Bradley, et al., 2014; note, however that these topics focused on sexual health specifically – i.e., condoms, birth control, STIs, HIV/AIDS, pregnancy, and delaying sexual behavior – rather than on numbers of sexual partners or a direct discussion of appropriate ages of initiation).

Collectively, these literatures provide insight into the potential role of conversations between friends in adolescents' exchange of peer norms. Future research will need to examine whether direct conversations are involved in friends' transmission of these norms about sex.

Peers' behaviors versus attitudes: Descriptive and injunctive norms. Although results generally suggest that peer norms related to both friends and popular peers may influence adolescents' numbers of sexual partners, findings more specifically indicated that some types of norms may be more relevant than others. The overall pattern of findings suggested that descriptive norms were more predictive of adolescents' sexual behavior than were injunctive norms. This finding should be interpreted with caution, given that the study outcome (i.e., adolescents' own numbers of sexual partners) was measured using the same scale and language as the descriptive norms predictors (i.e., perceptions of peers' numbers of sexual partners). In contrast, injunctive norms assessed the age at which sexual behavior was perceived to be OK. Additionally, the measure of injunctive norms assessed attitudes regarding "sexual touching," rather than "sexual activity." However, in spite of the potential role of these measurement limitations in the observed pattern of findings, it also is possible that adolescents' perceptions of their peers' behaviors are more influential than perceptions of peers' attitudes.

Interestingly, the original theory of reasoned action (Ajzen & Fishbein, 1980) and the related and extended theory of planned behavior (Ajzen, 1991) only highlighted peers' *attitudes* as predictors of individuals' behaviors. Even when studies based on these theories examine

multiple sources of interpersonal influence on adolescents' sexual behaviors, they usually focus exclusively on attitudes (e.g., Flores et al., 2002). Researchers have noted that perceptions of peers' behaviors should also be incorporated into such models (Rivis & Sheeran, 2003). The study of peers' behaviors – or adolescents' perceptions of them – is common in the broader area of adolescent peer influence. However, the field of adolescent sexual behavior has yet to synthesize, or to systematically compare, findings regarding injunctive and descriptive norms. For example, a systematic review of the literature on predictors of adolescent sexual behavior concluded that both injunctive and descriptive norms were "fairly stable predictors of sexual behavior/ intention outcomes in this literature" (Buhi & Goodson, 2007, p. 18), but this review did not discuss whether injunctive or descriptive norms appeared to be more influential.

One possible explanation of the stronger effects of descriptive norms is that adolescents may be more aware of their friends' behaviors than of their attitudes. It is possible that youth discuss their engagement in sexual behavior with peers, without discussing their general attitudes toward those behaviors. For example, an adolescent boy may have knowledge that his best friend has had a certain number of sexual partners, without knowing how the friend feels about the appropriate age for that behavior. Similarly, adolescents may believe they have knowledge of how many sexual partners their popular peers have had, based on the "rumor mill" of information about sexual relationships between classmates, but may have no knowledge of those peers' attitudes toward those behaviors.

Note that, although there was evidence that descriptive norms may be *more* relevant than injunctive norms for adolescents' sexual behavior, injunctive norms also emerged as significant predictors in some of the models. These significant associations controlled for the effects of descriptive norms variables, indicating that injunctive norms may uniquely explain some of the

variance in adolescents' numbers of sexual partners. Theoretical models of adolescent sexual behavior should incorporate both peers' perceived attitudes and behaviors.

The Importance of Studying Different Types of Adolescents' Sexual Behaviors

Finally, results suggest that peer norms are more relevant for adolescents' numbers of noncoital partners, as opposed to coital partners. More significant associations between norms and sexual behavior were revealed in the model predicting numbers of sexual activity partners, than in the model predicting numbers of sexual intercourse partners. For instance, none of the peer norms was associated with girls' numbers of sexual intercourse partners at any time point.

This pattern of findings is especially important given that most research on adolescent sexual behavior (in the peer norms area and more broadly) has focused on sexual intercourse. Studies of noncoital sexual activity may capture greater variability in adolescent sexual behavior (e.g., Halpern, 2010) and may be especially important in studies of early adolescents' sexual behavior. Note that in addition to a stronger pattern of findings for the models predicting adolescents' numbers of sexual activity partners as the outcome, results also revealed that *norms* related to sexual activity (versus intercourse) seemed to be more predictive of adolescents' sexual behavior. For example, controlling for all other types of norms, boys' perceptions of their friends' numbers of sexual activity partners were associated with their own numbers of sexual activity *and* intercourse partners at all three time points. In contrast, none of the norms related to sexual intercourse were associated with adolescents' numbers of sexual activity partners.

The approach and findings of this study are consistent with the recent call for researchers to shift away from a sole focus on adolescents' sexual intercourse. Relative to studies of adolescents' sexual intercourse, remarkably few studies have examined other sexual behaviors, yet heterosexual vaginal intercourse is only one of many ways in which adolescents express their

sexuality (see Diamond & Savin-Williams, 2009; Tolman, 2002). Given the developmental normativity of adolescents' engagement in sexual behavior (CDC, 2012; Halpern et al., 2006), and the need to study sexual behaviors that are relevant to adolescents of all sexual orientations and gender identities (see Diamond & Savin-Williams, 2009), it is critical to examine a broad range of adolescents' behaviors. Had the current study only examined intercourse, far less would have been revealed about the role of peers in adolescents' sexual behaviors.

The Importance of Considering Individual Differences in Conformity to Peers: A Brief Introduction to Study 2

Study 1 highlights the important role of peer norms in adolescents' numbers of sexual behaviors. Significant associations were revealed between adolescents' perceptions of their peers' specific behaviors and attitudes and their own numbers of coital and noncoital partners over time, after rigorously controlling for the effects of age, ethnicity, pubertal timing, and all other norms. However, a crucial question remains after examining these overall patterns of association between adolescents' norms and sexual behavior: How do individual adolescents differ in their conformity to peer norms? The finding that gender moderates the associations between norms and behavior suggests that, on average, boys may be more susceptible to peer norms than are girls. However, Study 1 cannot address the possibility of *individual* differences in susceptibility to peer influences. Researchers have now developed innovative experimental paradigms that allow the observation of *in vivo* peer influence processes (Allen et al., 2006; Cohen & Prinstein, 2006). One such paradigm, the "chat room," has been used to yield performance-based measures of peer influence susceptibility that are associated longitudinally with adolescents' behavior (Choukas-Bradley et al., 2014; Prinstein et al., 2011). Study 2 extends this preliminary work, to rigorously examine whether a performance-based measure of peer

influence susceptibility moderates the associations between specific peer norms and adolescents' numbers of coital and noncoital sexual partners over time.

Study 2 included a subset of 297 participants from Study 1. Because the experimental paradigm used in this study was a time-consuming procedure involving deceptive elements, it was not possible to involve every Study 1 participant in the experiment. Thus, for feasibility, only a subset of participants participated in the chat room paradigm. Participants who were in seventh grade at the Time 1 questionnaire-based data collection were recruited. The decision to exclude eighth grade participants was necessary, given that the chat room would occur several months later, during the following school year. It was necessary for chat room participants to be enrolled in the same school (and with the same group of grademates) for the questionnaire-based and chat room phases of Time 1, and eighth graders would be transitioning to high school during the following school year. Additionally, only two of the three study middle schools were selected for chat room participation based on schedule flexibility (note that there are no systematic differences in student characteristics across the three schools). The seventh grade students from these two schools were selected for participation in the chat room.

CHAPTER 3: STUDY 2

Method

Participants. Participants included 297 adolescents (54.9% female, 45.1% male; 42.6% Caucasian, 29.4% African American, 24.3% Hispanic/Latino, 3.7% Other; M_{age} = 12.66) in 7th grade at study onset; this group of participants represents a subset of the Study 1 sample. (Refer to the Study 1 Participants section for detailed information on the recruitment of the original Study 1 sample of 868 7th and 8th grade students from three rural, low-income schools in the Southeastern U.S.). As discussed above, students who were 7th graders at T1-Q in one of the two selected middle schools (n = 350) were selected for participation in the chat room.

Of those 350 students, 24 were no longer enrolled in the school by the time of the chat room data collection and 2 were absent during data collection, yielding a total of 324 adolescents who participated in the chat room paradigm. Of those 324, technical difficulties and missing data resulted in unusable data for 10 participants on the sexual behavior chat room items, resulting in a total of 314 adolescents who had data on the susceptibility measure used in the current study. Of those 314, 17 provided no data for any of the eight peer norms measures, and thus were excluded from Study 2, yielding a Study 2 sample of 297 (84.86% of the participants recruited for Study 2, who came from the original Study 1 sample; see Study 1 for information on response rates in the overall sample). (Note that whereas inclusion in Study 1 analyses required participants to have data on all eight peer norms, separate models were examined for each norm in Study 2; thus, adolescents were included in the Study 2 sample as long as they provided data on at least one peer norm variable.) *T* tests revealed no significant differences on any study

variable between the final Study 2 sample (n = 297) and the adolescents who were eligible for Study 2 but were not included in the final sample (n = 53).

Of the 297 participants with Time 1 data, 277 (93.3%) had Time 2 sexual outcome data, and 267 had Time 3 sexual outcome data (96.4% of Time 2 participants; 89.9% of Time 1 participants). Of the 20 participants who had data at Time 1 but not Time 2, missing data were due to moving away from the area (n = 9), withdrawal from school (n = 4), participants' declining participation (n = 5), and incomplete data (n = 2). Of the 10 participants who had data at Time 2 but not Time 3, missing data were due to moving away from the area (n = 7), withdrawal from school (n = 2), and declining to participate (n = 1). Attrition analyses revealed only one significant difference between adolescents who had data at all three time points compared to those who did not: Participants with data at all time points reported higher levels of friends' injunctive intercourse norms (i.e., later ages).

Note that all 350 participants who were in 7th grade at T1-Q at one of the two selected schools participated in two aspects of the Study 2 procedures and measures discussed below, which were used to construct the chat room paradigm: the sociometric assessments used to construct the chat room "electronic confederates," and the baseline report of hypothetical scenario responses used to construct electronic confederates' responses (and also used as the "pre-test" scores for the computation of susceptibility to peer influence).

Procedures

As is discussed in Study 1, youth provided assent to participate in both the questionnaire-based and experimental portions of the study at baseline, and all study procedures were approved by the University of North Carolina at Chapel Hill human subjects committee. Trained research assistants administered surveys during school hours at each time point. Following assent

procedures, participation began with the first phase of data collection, T1-Q, when participants were in the spring of their 7th grade year. All measures collected at each time point are shown in Table 1.

T1-Q included the completion of sociometric assessments by all 350 eligible participants, as well as completion of self-report questionnaires assessing all measures discussed in Study 1 (i.e., adolescents' demographic information, pubertal timing, number of sexual intercourse and activity partners, and peer norms). All adolescents (n=350) also provided pre-test responses to the hypothetical scenarios used in the experimental paradigm. As discussed in Study 1, many steps were taken to ensure participants' comfort in responding to sensitive questions.

In between T1-Q and T1-CR, T1-Q data were coded and experimental manipulations were constructed. T1-CR occurred five months after T1-Q, when participants were now at the beginning of the fall of their 8th grade year. At that time, 324 adolescents participated in the experimental paradigm that allowed for an *in vivo* examination of peer influence susceptibility, which also was administered by trained research assistants during school hours.

As discussed in Study 1, following these baseline (i.e., Time 1) measures, all participants completed follow-up questionnaire-based assessments of their numbers of sexual intercourse and activity partners, one year after T1-Q (i.e., Time 2, spring of 8th grade), and again two years after T1-Q (i.e., Time 3, spring of 9th grade). In addition to the compensation structure discussed in Study 1, adolescents who participated in the chat room paradigm for Study 2 at T1-CR were compensated with an additional $20 gift card.

Measures

Survey measures. See Study 1 descriptions of the measurement and coding of self-reported gender, ethnicity, age, pubertal timing, sexual behavior, and peer norms variables.

Sociometric assessments. Three sociometric assessments were administered to all 7th graders from the two selected schools at T1-Q (n = 350) in order to measure adolescents' peer-perceived popularity, likeability, and friendship nominations. Sociometric nomination procedures are widely accepted as the most reliable and valid measures of peer status and friendship nominations (see Rubin, Bukowski, & Laursen, 2009). Procedures standard in developmental psychology research were used for these assessments (Parkhurst & Hopmeyer, 1998; see also Cillessen, 2009). Participants were provided with multiple alphabetized rosters, each listing all students in their grade, from which they were asked to nominate an unlimited number of peers for each question. On all rosters, the order of alphabetized names was counterbalanced (i.e., A - Z; Z - A) to control for possible order effects on nominee selection.

For the assessment of popularity, participants were provided with one roster on which they were asked to nominate peers who were "most popular," and a second roster on which they were asked to make "least popular" nominations. A sum of the number of nominations each adolescent received for each roster was computed and then standardized. A difference score between standardized "most popular" and "least popular" nominations was then computed and re-standardized to obtain a measure of peer-perceived popularity, with higher scores indicating greater popularity among peers. For the assessment of likeability, participants were provided with one roster on which they were asked to nominate peers whom they "like the most," and a second roster to nominate peers whom they "like the least." As in the calculation of popularity, after the nominations for each roster were summed and standardized, a difference score between the standardized "like most" and "like least" nominations was computed and re-standardized to obtain a measure of likeability, with higher scores indicating greater likeability (or social preference) among peers. In the third sociometric assessment, participants selected an unlimited

number of their "closest friends" from a roster and then, from this selection, specified a "very best friend" and two additional "best friends."

In the current study, these sociometric popularity and friendship nominations were not used directly in analyses; rather, these data were used in the construction of the experimental paradigm, as described below.

Hypothetical scenarios. Three hypothetical scenarios were used to assess adolescents' endorsement of sexual behaviors. These scenarios were adapted from previous work demonstrating the reliability and validity of similar hypothetical scenarios regarding broader health-risk and deviant behaviors (Cohen & Prinstein, 2006; Prinstein et al., 2011) and sexual behaviors (Choukas-Bradley et al., 2014), and were developed in collaboration with focus groups of middle school students. The scenarios depict situations in which adolescents may have opportunities to engage in sexual behavior, including the opportunity to engage in sexual behavior with an unknown student from another school, with a popular student from one's school, and with a boyfriend/girlfriend who is exerting pressure to "do more" sexually than is desired. Response options in the form of a 9-point Likert scale reflect increasing likelihood to engage in sexual behavior; responses ranged from 1=*not at all* to 9=*definitely*. Adolescents were instructed to choose the response that most closely matched what they would do in that situation.

Participants completed the hypothetical scenarios instrument at T1-Q. As in prior work (Choukas-Bradley et al., 2014; Prinstein et al., 2011), these hypothetical scenarios were used in two ways in this study. First, the scenarios were employed in the creation of the experimental manipulation. Specifically, results from a grade-wide administration of the items at baseline (n = 350) were used to determine the normative (i.e., mean) response to each scenario within gender. "Above average" (i.e., + 1 *SD,* based on within-gender norms) levels of behavior endorsement

later were attributed to electronic confederates as they ostensibly responded to the same hypothetical scenarios in the simulated chat room. Second, for the subset of participants who completed the chat room for Study 2, participants' initial, private "pre-test" responses to these items (i.e., responses provided at T1-Q) were compared to their "public" responses to the same scenarios (i.e., responses provided when in the presence of ostensible peers in the chat room) after being exposed to higher-risk norms communicated by electronic confederates (based on norms specific to each electronic confederate's implied gender). Specifically, participants' responses to the sexual behavior items *before* versus *during* the chat room interaction were used to compute a measure of peer influence susceptibility. Computation of susceptibility scores is discussed in further detail below.

Experimental paradigm. At T1-CR, adolescents participated in an experimental paradigm that simulated an Internet chat room. Participants were told they would have an opportunity to communicate electronically with three same-gender students in their grade who supposedly were working on computers in other rooms of the school. In reality, the three "students" in each participant's chat room were preprogrammed, computer-generated electronic confederates (hereafter referred to as "e-confederates"), constructed using Direct RT software (Jarvis, 2004).

Before "logging in" to the chat room, participants were told that the purpose of the study was to understand "how teens communicate over the Internet." It was explained that the chat room was designed to allow adolescents to communicate with one another in a specific order (i.e., Participant 1 responds first, Participant 2 responds second, etc.), in the context of responding to hypothetical scenarios that teens might encounter. Participants were told that the specific order in which they would respond to these questions had been randomly determined. In

reality, the order was predetermined to ensure that all participants responded to the presented questions last. Thus, the design of the chat room ensured that participants were first exposed to the responses of all three e-confederates in the chat room (i.e., "Participants" 1, 2, and 3) before providing their own responses, such that all participants were exposed to the same level of peer norms.

After the participant was seated in front of the laptop computer, he/she was first presented with an image of the University of North Carolina's Internet homepage. While this image was in fact only a screenshot image pre-programmed with DirectRT software, it appeared to be a real Internet webpage. By "clicking" on various parts of the screenshot images, which then led to other images of "websites," the researchers further bolstered the credibility of the chat room, when in fact the participant was never interacting with any website during the experiment. Once the participant had gotten to the screens ostensibly associated with the chat room specifically, the researcher left the participant to continue with computer-generated instructions on/his her own.

For the ostensible reason of acquainting members of the chat room with one another, before participants were "e-introduced" to each other, instructions appeared on the screen asking the participant to provide personal background information. Specifically, participants were asked to enter the first name and last initial of each of their two best friends from their grade at school, as well as to choose their two favorite activities from a list. Participants were told that they might have an opportunity to meet the other three members of their chat room later, in person. They then "logged on" to the chat room. The verisimilitude of the log-on process was bolstered by several screens, which showed information presumably being downloaded from other members of the chat room. Once participants were "in" the chat room, as shown in Figure 4, they believed

they were now in a virtual common area. In this virtual common area, they could see a response window associated with their own identity ("Person 4 – You"), as well as three other response windows associated with the identity of each of the three e-confederates. In these response windows, information about best friend names and hobbies appeared. Thus, participants were led to believe that the information provided about the three e-confederates had been provided by real students from their grade with whom they were interacting electronically. All background information remained on the screen during the participants' time in the chat room, during which they responded to a series of hypothetical scenarios; participants believed that the other three chat room members (i.e., the e-confederates) could see this background information about them throughout the chat room.

No specific identity was provided for the e-confederates. However, the social status of each e-confederate was systematically manipulated and implied, to make participants believe that they were interacting with peers of a particular social status. Specifically, for each e-confederate, peer status was indicated by the two types of information provided on the chat room screen and discussed above: 1) the names of two ostensible "friends" of the e-confederate (first name and last initial of two popular peers from the participant's grade who belonged to the same friend group, determined from prior popularity and friend nomination sociometric procedures); and 2) two hobbies associated with specific levels of peer status (based on focus group input; e.g., for female popular conditions, shopping and using Facebook). For example, Figure 4 shows a sample chat room screen for a hypothetical female participant, in which the names shown are of popular girls in the participant's grade at school.

After receiving an orientation to the chat room and its members, participants responded to the same set of hypothetical scenarios that they had completed privately at T1-Q. First, the

scenario appeared on the screen. Next, "Person 1" (i.e., the first e-confederate) provided a numerical response to the hypothetical scenario from the 9-point Likert scale. Next, "Person 2" responded, followed by "Person 3." The e-confederates consistently endorsed higher response options relative to the grade- and gender-specific norms established at baseline (i.e., approximately +1 *SD*). However, to increase verisimilitude, responses differed slightly from e-confederate to e-confederate and from item to item (for example, in the scenario shown in Figure 4, two e-confederates provided a response of 7, while the other provided a response of 8). Additionally, pauses of varying lengths were used between the e-confederates' responses, in order to ostensibly portray the e-confederates' "reading" and "thinking" about the scenarios before responding. Finally, after viewing the three e-confederates' high-risk responses, the participant selected the option that would best characterize his/her own behavioral response, and this response appeared on the screen, ostensibly for the other chat room members to see. The participant's responses were used in the computation of peer influence susceptibility.

All adolescents were debriefed following participation in the experimental paradigm. Specifically, due to the need for all participants to complete the chat room paradigm without learning about the deceptive elements from peers, students were debriefed in groups once all participants had completed the chat room. Debriefing followed a "funnel" procedure as in Cohen and Prinstein (2006); participants were first asked to report general impressions of the study, followed by more specific questions regarding the perceived purpose of the study and their fellow participants. Debriefing then included an explicit discussion of the deceptive elements of the study protocol. Specifically, adolescents were informed that they had communicated only with e-confederates, not actual adolescents, and that the behavioral responses endorsed by those e-confederates had been substantially above the mean level reported by their grademates. A

licensed clinical psychologist was present at all debriefing meetings to ensure that participants understood the nature and purpose of the study and the reasons for its deceptive elements, as well as to be available to discuss emotional distress; no participant reported emotional distress. As noted previously, all procedures were approved by the University of North Carolina at Chapel Hill human subjects committee.

Peer status, gender, and ethnicity considerations in chat room construction. Several further specific features of the chat room paradigm used in this study warrant explanation, as they necessitated the use of separate statistical models for boys and girls. The first issue regards the peer status of the e-confederates. Note that the chat room paradigm was originally designed for an overarching study of peer influence, and one of the aims of the overarching study was to examine the effects of peer status manipulations on adolescents' levels of conformity (as in Cohen & Prinstein, 2006). It was briefly noted that the peer status of the e-confederates was manipulated. In fact, several different conditions based on peer status were created for this experimental paradigm. These conditions differed for boys and girls, given key gender differences in peer status ratings. For boys, it was possible to identify e-confederates who were high in both popularity and likeability, as measured through the sociometric assessments. However, for girls, it was not possible to identify a sufficient number of e-confederates who were high in both popularity and likeability. This gender difference is consistent with past work, which has documented that the correlation between popularity and likeability is significantly lower for girls than for boys by late elementary school, and decreases more steeply among girls from 5th to 9th grade (Cillessen & Mayeux, 2004). Although not unexpected, this phenomenon precluded the creation of equivalent chat room conditions for girls versus boys. Instead, for boys, two chat room conditions were created – popular/liked and unpopular/disliked – whereas for

girls, three conditions were required – popular/disliked, unpopular/liked, and unpopular/disliked (again, a popular/liked condition was not possible).

Note that one aim of the *overarching* study was to understand between-group differences in conformity by condition. However, in contrast, the purpose of the current Study 2 was to understand the susceptibility of specific *individuals,* regardless of condition, and whether individual differences in susceptibility were associated longitudinally with actual behaviors. In other words, Study 2 required the extraction of within-individual susceptibility scores, based on differences between pre-test and within-chat room performance. For the sexual behavior hypothetical scenarios in particular, no significant within-gender differences were revealed in average levels of susceptibility across the chat room conditions (for boys' two conditions: $t(145) = .12$, $p = .50$; for girls' three conditions: $F(2, 164) = .11$, $p = .90$). Given that the different conditions of the chat room yielded no differences in the average susceptibility scores of the participants for the sexual behavior items, and given concerns about power, participants from all chat room conditions were used in analyses.

A second consideration of the construction of the chat room paradigm concerned the ethnicity of the e-confederates. Given the ethnically heterogeneous composition of the sample, efforts were made to create chat room screens that showed names of students from different ethnic backgrounds. These efforts were successful in the female conditions; in each school, the names that appeared on the screen (i.e., the "friends" of e-confederates) represented a mix of popular Caucasian, African American, and Latino female students. However, in the case of males, it was not possible to identify a sufficient number of African American or Latino male students who were (1) consented to participate, (2) received high peer status ratings, and (3) had identified other consented friends who were of high peer status. Thus, for boys, only the names

of Caucasian students were used for the e-confederates' friends, in order to minimize the potential confounding effects of ethnicity (as in Choukas-Bradley et al., 2014).

Calculating peer influence susceptibility. As in prior work (Choukas-Bradley et al., 2014; Prinstein et al., 2011), a within-subjects standardized difference score was computed to indicate each participant's susceptibility to peer influence. First, two average composite scores were created for each participant: (1) an average of the private, pre-test responses to the three hypothetical sexual scenarios at T1-Q, and (2) an average of the "public," post-test responses to the scenarios in the chat room. Next, each of these composite scores was standardized. Finally, a difference score was taken (standardized post-test score minus standardized pre-test score) and re-standardized. Susceptibility was operationalized as each participant's change in response to the hypothetical scenarios when they were presented *before* versus *during* the experimental paradigm. Higher standardized composite scores indicated greater susceptibility relative to peers.

Data Analytic Plan

Descriptive Statistics. Descriptive statistics were conducted in SPSS 22.0 to examine the means and standard deviations of the primary study variables. Independent samples *t* tests were used to compare boys' and girls' reports of these study variables. Bivariate correlational analyses were also performed between all continuous study variables.

Hypothesis testing. As in Study 1, hypotheses were tested with log linear models, using a Poisson distribution for the theoretical distribution of the error terms, and adjusting standard errors for multiple observations within subjects. All primary study analyses were examined using SAS version 9.3. All analyses were run separately by gender, due to differences in the construction of the chat room paradigm for boys and girls, as discussed previously.

In Study 1, each of the statistical models included all eight types of norms. This method allowed the examination of the unique predictive effect of each type of peer norm on adolescents' numbers of sexual partners, controlling for the effects of all other types of norms. However, in Study 2, there was significantly lower statistical power, due to the smaller sample of participants and the need to run analyses separately by gender. Thus, rather than including all norms in each model, models were examined separately for each specific type of norm.

As in Study 1, separate models were examined for the prediction of numbers of sexual activity partners and numbers of sexual intercourse partners. Participants' chat room pre-scores were included as a covariate in all models, consistent with past work (Choukas-Bradley et al., 2014). All covariates from Study 1 were included as covariates in one set of models: ethnicity (dummy coded to represent the four categories), age, and pubertal timing. However, some of the models would not converge with all covariates included. Thus, in a separate set of models, analyses were repeated without the inclusion of ethnicity, age, or pubertal timing as covariates.

Each of the models (i.e., for each of the eight norms, paired with each of the two sexual behavior outcomes, for boys and girls) was examined in an identical fashion. First, terms were created for the association between the norm and the sexual behavior outcome at each time point, conditioned on susceptibility. Rather than treating susceptibility as a continuous moderator, associations between peer norms and sexual behavior were conditioned on three levels of susceptibility, in order to allow the examination of specific count ratios. For example, for the model examining descriptive friend activity norms and numbers of sexual activity partners, terms were computed for low (i.e., one standard deviation below the mean), medium (i.e., mean levels), and high (i.e., one standard deviation above the mean) levels of susceptibility for Times 1, 2, and 3, respectively. In this example, the Time 1 low susceptibility term in the boys' model captured

the association between adolescent boys' descriptive friend activity norms and number of sexual activity partners at Time 1, when levels of susceptibility were one standard deviation below the mean.

Next, for each model, Wald's chi-square tests were conducted for each time point, to test whether there was a significant interaction between the peer norm and susceptibility in the association with the sexual behavior outcome. When a non-significant test result was revealed, associations will not be further discussed for that time point. When a significant Wald's chi-square test result was revealed, specific associations were then tested for that time point, between the norm and the number of sexual partners at each of the three levels of susceptibility.

For each significant overall Wald's chi-square test for a specific time point, the three associations for that time point (i.e., associations between the norm and the sexual behavior at low, medium, and high levels of susceptibility) were each tested for significance. As in Study 1, estimates of effects were in the form of count ratios, such that a significant test indicated that at that time point and for that level of susceptibility, a one-unit change in the norm variable was associated with odds of a significantly increased or decreased number of sexual partners (i.e., a count ratio that was significantly different than 1). Specific interpretations of count ratios will be provided in the Results section.

Study 2 Results

Descriptive Analyses

Descriptive statistics for peer norms and sexual behavior. Table 8 shows means and standard deviations for the peer norms and sexual behavior outcome variables for the full sample and by gender, along with results of *t* tests examining gender differences for each variable. (As noted previously, susceptibility scores and pre-scores were both standardized variables.) N's for

each analysis also were reported, given that these numbers varied across the different peer norms and sexual behaviors for Study 2. Compared to Study 1, a highly similar pattern was revealed in the nature of the peer norms and sexual behavior variables. No gender differences were revealed in adolescents' numbers of sexual activity or intercourse partners at any time point, or in adolescents' perceptions of their friends' behaviors or attitudes. Girls perceived substantially riskier norms among popular peers than did boys. Both boys and girls perceived their popular peers to have substantially riskier norms than their friends. Each of these patterns is consistent with those of Study 1.

Correlational analyses. Results from bivariate correlational analyses are shown in Table 9. Correlations among girls are shown below the diagonal, and those among boys are shown above the diagonal. For the variables that were also examined in Study 1 (i.e., all but susceptibility and pre-scores), a highly similar pattern of results was revealed.

Unsurprisingly, adolescents' pre-scores on the hypothetical scenarios were significantly positively correlated with all sexual outcome variables and peer norms variables (negative associations for injunctive norms), with associations generally in the moderate or large range.

Correlations between susceptibility and the sexual behavior variables were generally non-significant, or were significant with small to moderate *negative* associations (positive for injunctive norms), such that higher levels of susceptibility were associated with lower numbers of sexual partners and less risky peer norms. This pattern may seem counterintuitive; it might be expected that youth high in susceptibility would be more likely to perceive riskier peer norms and to have higher numbers of partners. However, note that susceptibility is based on the *difference* score between adolescents' "public" chat room responses to hypothetical sexual scenarios, and the responses they provided to those same responses at baseline. For adolescents

who had high pre-scores on the scenarios, it was not possible to shift as substantially in their responses once in the chat room. For example, an adolescent girl who at baseline said her likelihood of engaging in a particular sexual behavior was a 7 out of 9 could only then move a maximum of 2 points "up" on the 9-point scale when in the chat room (see Figure 4). In contrast, an adolescent who at baseline said her likelihood was a 3 out of 9 could move a maximum of 6 points "up" on the scale. Therefore, adolescents who had higher pre-scores were more likely to have lower susceptibility scores, and given the strong positive associations between the pre-scores and the norms and sexual behavior variables, it is unsurprising that susceptibility was negatively correlated with norms and sexual behavior. This phenomenon also necessitates the inclusion of adolescents' pre-scores in all models examining susceptibility, discussed next.

Hypothesis Testing

Models were examined separately for boys and girls, but several points are relevant to both boys' and girls' analyses. As noted previously, all models for Study 2 originally included age, ethnicity, and pubertal timing as covariates, but because some of these models would not converge, a second set of models was run that did not include these covariates. Note that none of the effects of the covariates were significant. The results presented in Tables 10-14 are for these models without covariates. However, for all models that would converge when covariates were included, for both boys and girls, the same pattern of results emerged as is discussed below; the same set of significant associations for particular norms was revealed, and count ratios trended in the same directions (only the exact count ratios changed). Additionally, all models (including those for which other covariates were removed) included adolescents' pre-test scores for the hypothetical scenarios. Unsurprisingly, these pre- scores were significantly positively associated with numbers of sexual partners in every model that converged, for both boys and girls.

Tests of interactions between norms and susceptibility in multiple log linear analyses: Models for boys. Results of the overall Wald's chi-square tests from multiple log linear analyses for boys are shown in Table 10, for all models (i.e., each of the eight norms, in models examining numbers of sexual activity partners as the outcome, and models examining numbers of sexual intercourse partners). Each interaction term between a specific type of peer norm and susceptibility was examined in a separate model. Table 10 specifically shows the results of analyses for each norm and each time point; significant Wald's chi-square tests indicated a significant interaction effect between the norm and susceptibility at that time point.

Significant interactions were revealed between susceptibility and three peer norms variables (each at Time 1) in associations with boys' numbers of sexual activity partners: descriptive friend activity norms, descriptive popular activity norms, and injunctive popular activity norms. No significant interactions were revealed in associations with Time 2 or Time 3 numbers of sexual activity partners. The significant associations revealed in these overall Wald's chi-square tests indicated the need for further testing to understand the nature of the interaction, by examining count ratios that depicted the specific effect of the norm on boys' numbers of Time 1 sexual partners, at each level of susceptibility. Specific estimates of effects for these models are discussed below.

Notably, no significant interactions were revealed in associations with boys' numbers of sexual intercourse partners at any time point. However, also note that, even with covariates removed, two models for boys' sexual intercourse partners would not converge, and thus, information is not available for these models.

Estimates for models predicting boys' numbers of sexual activity partners. The estimates of the effects of the three significant peer norms on boys' numbers of Time 1 sexual

activity partners, conditioned on each of the three levels of susceptibility, are shown in Table 11. These estimates are in the form of count ratios. Results consistently revealed that, in keeping with hypotheses, the association between peer norms and numbers of sexual activity partners was stronger at higher levels of susceptibility. However, note that each of these interaction effects was only significant at Time 1.

Results for descriptive friend activity norms revealed that at Time 1, for boys with low levels of susceptibility, perceptions of friends' numbers of sexual activity partners were not associated with boys' own numbers of partners. However, for a boy at the medium (i.e., average) level of susceptibility, for every one additional sexual activity partner he perceived his best friend to have, his own number of sexual activity partners increased by 203%. Even more strikingly, for a boy at high levels of susceptibility, a one-unit increase in his perceived number of his friend's partners was associated with a 438% increase in his own number of partners.

Regarding descriptive popular activity norms, there was not a significant association between norms and numbers of partners for boys with low or medium levels of susceptibility. For a boy at high levels of susceptibility, however, a one-unit increase in his perceived number of popular peers' partners was associated with a 69% increase in their own number of partners.

Finally, results for injunctive popular activity norms indicated that there was no significant association between this norm and number of sexual activity partners at low levels of susceptibility. At medium levels of susceptibility, a one-unit increase in the perceived age at which popular peers would believe sexual activity is OK was associated with an 18% reduction in boys' own number of partners. At high levels of susceptibility, a one-unit increase in this norm was associated with a 33% reduction in boys' own number of partners.

Tests of interactions between norms and susceptibility in multiple log linear analyses: Models for girls. Results of the overall Wald's chi-square tests from multiple log linear analyses for girls are shown in Table 12, for all models. Each interaction term between a specific type of peer norm and susceptibility was examined in a separate model. Table 12 specifically shows the results of analyses for each norm and each time point; significant Wald's chi-square tests indicated a significant interaction effect between the norm and susceptibility at that time point. Note that, even with covariates removed, one model for girls' sexual intercourse partners would not converge, and thus, information is not available for this model.

Across all girls' models, only two significant interactions were revealed between susceptibility and peer norms in associations with adolescents' number of sexual partners, and both of these were for sexual behavior at Time 3. First, the overall Wald's chi-square tests revealed that susceptibility significantly moderated the association between descriptive popular activity norms and girls' numbers of sexual activity partners at Time 3. Second, susceptibility significantly moderated the association between descriptive friend intercourse norms and girls' numbers of sexual intercourse partners at Time 3. No significant interactions were revealed in associations with Time 1 or Time 2 numbers of sexual activity or intercourse partners. The significant associations revealed in these overall Wald's chi-square tests indicated the need for further testing to understand the nature of the interaction, by examining count ratios that depicted the specific effect of the norm on girls' numbers of Time 3 sexual partners, at each level of susceptibility, as discussed below.

Estimates for models predicting girls' numbers of sexual activity and intercourse partners. The estimates of the effects of descriptive popular activity norms on girls' numbers of Time 3 sexual activity partners, conditioned on each of the three levels of susceptibility, are

shown in Table 13. Although the overall Wald's chi-square test had indicated a significant interaction effect between descriptive popular activity norms and susceptibility at this time point, specific effects estimates did not reveal any count ratios that were significantly different than one. In other words, there was no significant association between peer norms and girls' numbers of Time 3 sexual intercourse partners at any level of susceptibility. However, these estimates trended in an unexpected direction, as discussed below for the associations shown in Table 14.

Table 14 shows the estimates of the effects of descriptive friend intercourse norms on girls' numbers of Time 3 sexual intercourse partners, conditioned on each of the three levels of susceptibility. This analysis revealed patterns of association in the opposite direction than was expected, and in the opposite direction as was seen for boys: Norms were more strongly associated with numbers of sexual partners at *lower* levels of susceptibility. A trend in this direction was also observed in the associations between descriptive popular activity norms and adolescents' numbers of sexual activity partners shown in Table 13, but the count ratios shown in Table 14 reached significance. For girls with *high* levels of susceptibility, perceptions of friends' numbers of sexual intercourse partners were *not* associated with a significant change in the average number of girls' own numbers of intercourse partners. However, for a girl at the medium (i.e., average) level of susceptibility, for every one additional sexual activity partner she perceived her best friend to have, her own number of sexual intercourse partners increased by 172%. Surprisingly, the strongest association between this peer norm and girls' numbers of intercourse partners was revealed for *low* levels of susceptibility: A one-unit increase in this norm was associated with a 283% increase in girls' own number of sexual intercourse partners.

Brief Discussion of Study 2

Study 1 examined average associations between peer norms and sexual behavior across adolescents. However, individual adolescents vary in the degree to which they conform to peer norms (e.g., Choukas-Bradley et al., 2014; Prinstein et al., 2011). Survey-based studies of peer influence can *suggest* factors that may increase susceptibility; for example, the results from Study 1 implied that boys might be, on average, more susceptible to peer norms than girls. However, recently developed experimental paradigms have allowed the *direct* measurement of adolescents' susceptibility to peer influence. Study 2 paired one such novel experimental paradigm with a longitudinal study design, in a subset of seventh grade adolescents from the Study 1 sample. Specifically, Study 2 examined whether a performance-based measure of susceptibility to peer influence moderated the associations between peer norms and adolescents' numbers of sexual partners.

The vast majority of the interaction effects did not reach significance. However, results revealed some significant findings for boys at Time 1, wherein – consistent with study hypotheses – peer norms were more strongly associated with sexual behavior at higher levels of susceptibility. The findings among girls, when significant, were unexpected and in the opposite direction, with peer norms more strongly associated with sexual behavior at *lower* levels of susceptibility. These Study 2 results will be discussed briefly below, followed by a General Discussion.

Discussion of Findings for Boys

Results for boys revealed that the associations between peer norms and numbers of sexual activity partners at Time 1 were stronger at higher levels of susceptibility. These findings suggest that boys who showed greater conformity to peers in the chat room may also be more

influenced by peer norms. However, none of the associations between peer norms and sexual behavior at Times 2 or 3 were significant. In other words, it cannot be concluded that boys with greater susceptibility would show greater conformity to peer norms over time. That said, some of the non-significant findings for these longitudinal associations also trended in the expected direction. It is likely that with a larger sample size and greater power, more significant findings would have emerged.

Importantly, among boys, susceptibility did not significantly moderate any of the associations with numbers of sexual intercourse partners. In contrast, a previous preliminary study of older adolescents found that, collapsing across gender, susceptibility significantly moderated the association between perceived popular peer norms in grade 9 and longitudinal trajectories of adolescents' numbers of sexual intercourse partners from grades 9 to 11 (Choukas-Bradley et al., 2014). It is possible that the lack of significant findings in the current study was related to the lower levels of (and lower variability in) sexual intercourse in this younger sample.

Although the findings regarding boys' susceptibility should be interpreted with caution given the overall preponderance of non-significant associations, the results provide some further support for susceptibility as a moderator of associations between norms and behavior (Choukas-Bradley et al., 2014; Prinstein et al., 2011). Collectively, current and past studies of susceptibility have theoretical and practical implications; they suggest that adolescents are not equally susceptible to peer norms, and that these individual differences have implications for adolescents' real-life behaviors. Thus, findings call into question theories that posit a direct link between norms and behavior. However, one could argue that specific components of the leading theories of reasoned action (Azjen & Fishbein, 1980) and planned behavior (Ajzen, 1980) are similar to the construct of susceptibility to peer influence. For example, the theories of reasoned

action and planned behavior incorporate the idea of "motivation to comply" with the perceived norm, which is typically multiplied by perceptions of specific injunctive norms. This construct assesses the degree to which the individual *wants* to conform to the source of the norm. Although not conceptually equivalent with the construct of susceptibility, the motivation to comply construct similarly allows individual variability in the extent to which a norm is influential on a specific target individual's behavior. Research on peer norms should continue to consider individuals' personal perceptions of norms, as well as the extent to which those norms are important or influential for the individual.

Discussion of Findings for Girls

It is unclear why some models of girls' behavior revealed an opposite pattern of results than expected. The only significant interaction effects for girls indicated that associations between peer norms and sexual behavior were stronger at *lower* levels of susceptibility. These significant interactions were only revealed for numbers of Time 3 sexual activity and intercourse partners. These findings are inconsistent with results from boys, as well as with theory and prior empirical findings. However, note that no prior investigation had examined susceptibility models specifically for girls; Prinstein and colleagues (2011) examined susceptibility in a sample of boys, and Choukas-Bradley and colleagues (2014) examined a mixed sample of boys and girls together, but did not have sufficient power to test for gender interaction or to examine models separately by gender.

Several possible explanations could account for the unexpected findings among girls. The first potential explanations are methodological. Specifically, it is possible that the measure of susceptibility in the girls' chat room conditions did not capture girls' peer conformity processes as expected. Several unique features of the girls' chat room paradigm in the current study

differed in significant ways from other versions of the chat room. For instance, as is discussed in the Study 2 Method section, the composition of e-confederates' identities was unique in terms of both peer status and ethnicity. These differences may have limited the validity of the susceptibility measure among girls. Alternatively, it is possible that girls' conformity processes are unique at this early adolescent stage, given that all prior chat room studies examined older adolescents (Choukas-Bradley et al., 2014; Cohen & Prinstein, 2006; Prinstein et al., 2011).

Although it is possible that unique methodological issues affected the girls' chat room data, it is unclear why or how these issues would produce findings in the *opposite* direction as expected. Several qualifiers of these findings are important to note, however. First, of the sixteen models examined for girls in Study 2, only two revealed significant overall effects, and further testing revealed non-significant count ratios within one of those two models. Second, in Study 1, no longitudinal findings were revealed between peer norms and girls' sexual behaviors, whereas in Study 2, moderation effects were only revealed at Time 3. This pattern of results is difficult to explain. Nevertheless, the possibility should be considered that susceptibility to peer influence operates differently for adolescent girls than for boys. Several broad theories regarding girls' socialization of sexual behaviors, conceptions of their sexuality, and public expression of their sexuality may be relevant to this discussion. Specifically, it is possible that girls' presentations of themselves in the chat room do not map onto the way they would actually behave in real sexual situations.

As discussed previously, girls are bombarded by messages from a wide variety of sources about the physical, emotional, and social risks of sexual behavior (see Diamond & Savin-Williams, 2009), while simultaneously receiving explicit and implicit messages that being "sexy" is one of the most important goals for young women in the U.S. (Tolman, 2013). In other

words, girls are taught to *perform* being sexually desirable, without actually acquiring "too many" sexual partners. It is possible that this complex set of messages teaches girls to closely monitor how they present themselves, as suggested by objectification theory (Fredrickson & Roberts, 1997). Specifically, girls may learn to *present* a version of themselves that does not match their true behaviors.

Technological changes in recent years are likely exacerbating this phenomenon. Consider that the current sample of adolescents (born between 1997 and 1999) represents the first generation of youth to grow up with the Internet. This cohort thus comprises a unique segment of the population whose peer and sexual relationships developed concomitantly with the rise of the Internet. As part of this significant sociocultural change, this cohort has grown up with social media sites as a central aspect of their peer and dating relationships. For instance, it is very common for adolescent girls and young women to use these forums to create online personas in which they present objectified, "sexy" versions of themselves; simultaneously, however, girls who *actually* behave sexually in ways not condoned by peers will often be "slut shamed" through these online forums (see Harper et al., 2013).

As adolescent girls of today have developed with these new forms of social interaction and self-presentation, some girls may have become practiced and skilled at displaying public personas of their sexuality, which may be socially reinforced but may differ from their real behaviors. The dialectic of appearing "sexy" while limiting actual sexual behaviors could be a successful strategy for girls' navigation of the complex messages discussed above. Note that the chat room paradigm used in the current study uses an ostensible *Internet* chat room, thereby bringing to bear the relevance of this cohort's experiences with Internet communication regarding sexuality.

Taking together these ideas about the sociocultural context of this cohort's sexual development, it is possible that girls' conformity to peers in the ostensibly public space of the chat room does *not* adequately capture their susceptibility to broader peer norms. Rather, it is possible that girls who conform strongly in the chat room are simply those who have become adept at presenting a public (or "online") image that does not match reality. Additionally, it is possible that these girls are in fact very well adjusted overall; perhaps they are the same girls who have learned to skillfully manage their confusing social environments. If this is the case, then perhaps conformity in the chat room is a marker of adaptation rather than risk. In other words, to the extent that the processes described previously have become normative among adolescent girls, then perhaps it is a marker of broader *mal*adaptation when girls do *not* conform publicly to peers in a forum such as the chat room. Indeed, researchers have begun to note that conformity to peer influences is not a maladaptive process in and of itself; in fact, conforming to peers, broadly speaking, is a marker of social adjustment (e.g., Allen & Antonishak, 2008).

As noted previously, these ideas are highly speculative and go well beyond the current data. The complex set of influences on adolescent girls' sexual behavior remains an extremely important area for future research.

CHAPTER 4: GENERAL DISCUSSION

Sexual behavior is a normative and developmentally central aspect of adolescence (Ellis et al., 2012). Scholars have called for research that moves beyond a sole focus on intercourse, and examines a broader range of adolescents' sexual behaviors, with attention to developmentally normative processes (e.g., Diamond & Savin-Williams, 2009; Halpern, 2010; Tolman, 2002). In part due to a traditional sole focus on sexual intercourse, and to the framing of all adolescent sexual behavior as problem behavior that should be avoided, many fundamental questions about adolescent sexuality remain (Diamond & Savin-Williams, 2009).

One key area of research involves the role of peer factors in adolescents' development of sexual behavior. Peers play a central role in adolescents' behavioral development, and perhaps especially in sexual behavior. Peer groups and friendships have been conceptualized as important developmental systems (Masten, 2005), which are critical in adolescents' development of identity and self-worth (Brown & Lohr, 1987; Felson, 1985; Harter et al., 1996). The sharp increase from childhood to adolescence in the frequency and importance of peer interactions has been linked to changes in brain reward circuitry (Chein et al., 2011; Crone & Dahl, 2012) and may have evolutionary advantages (Ellis et al., 2002). In particular, social status and peer approval reach paramount importance during the same period in which youth also become motivated to develop romantic and sexual relationships with their peers (Crone & Dahl, 2012; Ellis et al., 2002).

One specific peer factor that often has been studied in connection with adolescent sexual behavior is perceived peer norms – or perceptions of peers' attitudes and behaviors. Overall,

perceptions of peers' attitudes (i.e., injunctive norms) and behaviors (i.e., descriptive norms) are considered to be important factors in adolescents' sexual behaviors (see Buhi & Goodson, 2007). However, this body of literature has been limited in a number of key ways. First, most studies rely on cross-sectional designs, which do not allow conclusions about temporal precedence (Kandel, 1978). Second, the vast majority of studies have focused solely on sexual intercourse, thereby not capturing the full range of developmentally normative adolescent sexual behaviors (Halpern, 2010). Third, virtually all of these studies have focused on friends or general peers, without consideration of the potentially important role of popular peers, who have been theorized to be important reference groups for adolescents' behaviors (Brechwald & Prinstein, 2011; Sandstrom, 2011). Fourth, a rigorous comparison of unique predictive effects of specific types of norms remains needed. Finally, the vast majority of studies posit a direct link between norms and behavior, without consideration of individual differences in adolescents' susceptibility to those norms (Prinstein et al., 2011).

This dissertation addresses each of these needs in the literature, and provides a thorough and rigorous examination of the role of peer norms in adolescents' longitudinal development of sexual behavior. More specifically, these two studies examined the complex roles of peer norms, gender, and susceptibility to peer influence in adolescents' coital and noncoital behaviors over time.

Overview of Study Findings

Consistent with hypotheses, results of Study 1 indicate that peers are a significant source of influence on adolescents' sexual behaviors, above and beyond the effects of age, ethnicity, and pubertal status. More specifically, in a sample of seventh and eighth graders from rural, low-income schools, Study 1 tested the competing influences of eight different types of peer norms as

predictors of adolescents' numbers of sexual activity and intercourse partners at three annual time points, with gender examined as a moderator. Results revealed that, across adolescents, both friend and popular descriptive and injunctive peer norms were associated with adolescents' numbers of sexual partners. However, patterns varied for specific combinations of norms and behaviors. Overall, descriptive norms were more predictive of sexual behavior than were injunctive norms, and norms related to sexual activity (e.g., perceptions of peers' numbers of activity partners) were more predictive of sexual behavior than were norms related to intercourse. Furthermore, results revealed that overall, peer norms were more relevant for the prediction of participants' numbers of sexual activity partners as the outcome, compared to numbers of intercourse partners. Finally, gender was found to moderate the associations, with different patterns and strengths of associations revealed for boys and girls; longitudinal associations between norms and behavior were only revealed among boys, and overall, peer norms were more predictive of boys' sexual behavior than of girls'. Taken together, findings from Study 1 underscore the important role of peer norms and gender in adolescent sexual behaviors. However, the pattern of results also reveals the complexities of these associations.

A key question that follows from Study 1 is whether individual adolescents differ in the extent to which they conform to peer norms. Study 2 investigated this question in a subset of 272 Study 1 adolescents who were in grade 7 at baseline. Specifically, pairing an experimental paradigm with the longitudinal study design, Study 2 examined susceptibility as a moderator of the associations between peer norms and sexual behavior. In addition to self-reporting perceived peer norms and sexual behavior as in Study 1, this subset of adolescents participated in an experimental "chat room" paradigm involving "electronic confederates" who endorsed sexual behaviors. Changes in participants' responses to hypothetical scenarios before versus during the

"chat room" were used as a performance-based measure of peer influence susceptibility. The majority of the models examined in Study 2 were non-significant, and no longitudinal associations were revealed. Among boys, some concurrent findings emerged; consistent with study hypotheses, some of the peer norms were more strongly associated with sexual behavior at higher levels of susceptibility. In contrast, some of the findings among girls were unexpected and in the opposite direction, with peer norms more strongly associated with sexual behavior at *lower* levels of susceptibility.

Collectively, these two studies highlight the important roles of peer factors and gender in adolescents' development of sexual behavior, and underscore the theoretical and methodological complexities of these associations. Additionally, these studies took a developmentally sensitive approach to the examination of early adolescents' sexual behaviors, types of peer norms, and individual differences in susceptibility. Consistent with calls to attend to developmentally normative processes and behaviors, this study examined peer norms and behavioral outcomes related to noncoital as well as coital activities. In addition to the important patterns of findings highlighted above, study results point to the importance of moving beyond sexual intercourse in studying adolescents' sexual behaviors, in order to capture the variety of adolescents' sexual experiences; far more was learned about predictors of numbers of sexual activity partners in these studies, compared to numbers of sexual intercourse partners.

These findings have been interpreted and discussed in earlier sections of this dissertation. In this final section, implications for sexual education and prevention programs are proposed, and limitations and future directions for research are discussed.

Education and Prevention Implications

An important question for the field is whether the behaviors examined in the current study constitute *risk* or *problem* behaviors. It is generally accepted that early sexual intercourse (i.e., before age 15) is a marker for risk (see Dixon-Mueller, 2008). It remains to be determined whether early engagement in other forms of sexual behavior should be considered problematic (see Diamond & Savin-Williams, 2009). Nevertheless, findings from the current study have implications for sexual education and risk prevention programs, which can aim to reduce adolescent behaviors that carry clear risks (e.g., unprotected intercourse) while promoting the development of a healthy sexuality. In particular, the findings highlight the important role of peers in early adolescents' development of sexual behaviors, and suggest that peer factors should be addressed in developmentally sensitive programs for adolescent sexual health.

A review by Pedlow and Carey (2004) of developmentally-appropriate randomized controlled trials found that many interventions targeting adolescents aged 13-15 were effective in increasing condom use and reducing engagement in early sexual behavior. However, the researchers noted that many interventions for adolescents had been downward-extended from adult models, without attention to key developmental factors that require specific attention in adolescents' sexual behaviors – including the central role of peer norms (Pedlow & Carey, 2004). Findings from this dissertation may inform sexual education and prevention programs by providing unique insights into the role of peer norms.

Re-norming campaigns. First, study findings may be relevant to re-norming campaigns. Past research has indicated support for the use of re-norming campaigns that correct adolescents' and young adults' perceptions of social norms regarding a broad range of health risk behaviors. These programs have been most prevalent on college campuses, where campaigns have aimed to

correct students' perceptions of their peers' binge drinking attitudes and behaviors (see Prentice, 2008). Research also has supported the targeting of adolescents' social norms regarding sexual risk behaviors (Pedlow & Carey, 2004). Social norms campaigns are based on the idea that, rather than trying to stop the natural process of peer influence, preventionists should aim to change the norms that are transmitted among peers (see Prentice, 2008).

However, many re-norming campaigns have only met modest success, and Prentice (2008) proposed that these campaigns might not be targeting norms that are personally relevant to the audience. For example, college campus campaigns often seek to correct misperceptions about the behavior or attitudes of "the typical student" (see Prentice, 2008). "Typical" peers are likely not the most important reference groups for adolescents as they engage in social comparison and reflected appraisal processes. The current study findings indicate the importance of two types of peers: friends and popular peers. Note that whereas friends may influence peers in their immediate social circle, popular peers may influence a wider network of peers.

Descriptive data in this study revealed high perceptions of peers' numbers of sexual partners – especially in the case of girls' perceptions of popular peer norms. The current study did not directly examine whether adolescents' *perceptions* of their peers' sexual behaviors were significantly higher than those peers' self-reported behaviors. However, a study by Helms and colleagues (2014) tested this hypothesis by comparing perceptions of popular peers' risk behaviors (including numbers of sexual intercourse and oral sex partners) and those popular adolescents' own self-reported behaviors, and found that adolescents significantly overestimated their popular peers' behaviors. To the extent that adolescents are overestimating their popular peers' sexual behaviors and are then influenced by those misperceptions, a successful intervention campaign could involve re-norming.

Past work has demonstrated that such campaigns can be accomplished with inexpensive methods, using posters, leaflets, and other simple forms of media (see Prentice, 2008), but new prevention programs can also use advanced technologies with which adolescents are comfortable. A review of "eHealth" sexual health interventions indicated the potential utility of using a broad range of technologies to impact adolescents' and adults' sexual health, including interventions using social media sites, other Internet websites, and text messaging (Noar & Willoughby, 2012).

Programs using peer leaders. Peer leader programs constitute a second line of potential prevention efforts for which the current study findings may be useful. Many past studies have found the use of peer leaders to be effective in improving sexual health behaviors and outcomes (see Pedlow & Carey, 2004). The current findings suggest the potential value of considering which types of peers to employ as peer leaders. Specifically, findings suggest that the use of popular peers may be especially effective. Researchers have noted that popular peers may influence a broad network of peers; in fact, popularity, by definition, involves visibility, centrality, and influence in the peer network (Cillessen, Schwartz, & Mayeux, 2011). Popular peers are also likely to be leaders (Lansford, Killeya-Jones, Miller, & Costanzo, 2009). Such characteristics may make popular youth highly useful in sexual health education or prevention programs. Additionally, Pedlow and Carey (2004) have proposed that interventions may be most effective if they target multiple sources of influence. Interventions that use both popular peers and adolescents' specific friends might be especially powerful. One study found a sexual health intervention to be more efficacious when adolescents attended intervention sessions with their friends (Stanton et al., 1996b).

With regard to the content that such peer educator programs could convey, data from Study 1 point to several potential areas of focus. For example, given the finding that adolescents perceived peers to support later ages of coital compared to noncoital behaviors, and given the relatively lower risks associated with noncoital behaviors (e.g., Brady & Halpern-Felsher, 2007), interventions could use peer leaders to further promote the idea of delaying intercourse in particular. Additionally, given the finding that boys in this sample did not perceive more permissive peer attitudes toward sex than did girls, sexual health prevention efforts may aim to target early adolescent boys, in order to reduce the perception that sexual behavior will be rewarded by peers. These messages could also be transmitted through the re-norming campaigns mentioned above. Indeed, most prior interventions using peer leaders have targeted peer norms (see Pedlow & Carey, 2004), so the proposed ideas regarding peer leaders and re-norming are interrelated and can inform each other.

Communication interventions. Past research on sexual communication between peers indicates the potential value of peer-to-peer communication about sexual health. Although communication with peers can encourage risk behaviors, communication may also serve as a protective factor. For example, a past analysis of the current sample of early adolescents revealed that communication with peers about protective sexual behaviors (e.g., the practice of safer sex) was associated with communication with dating partners about such topics, which in turn was associated with increased condom use (Widman, Choukas-Bradley, et al., 2014). The descriptive statistics from Study 1 also indicate that some norm information communicated between friends may be health-promotive – such as the findings regarding the delay of intercourse relative to noncoital behaviors, discussed previously. Many interventions have focused on increasing adolescents' communication about safer sex between dating partners (see Pedlow & Carey,

2004), but increasing communication about sexual health between *friends* may be more practical, given the instability of dating relationships in adolescence. One study found that role-play exercises in which adolescents provided sexual health information to their friends led to an increase in skills and a longitudinal reduction in sexual risk behavior (St. Lawrence et al., 1995). One fruitful avenue for future intervention and prevention research could involve friend-to-friend communication via the technologies that adolescents frequently use, given evidence (from the same school district as the current sample) that adolescents are comfortable discussing sexual health via social media and text messaging (Widman, Nesi, Choukas-Bradley, & Prinstein, 2014).

Interventions to reduce peer conformity. A fourth potential focus of intervention programs involves susceptibility. The Study 1 findings suggest that, on average, boys are affected by peer norms, and thus boys in general could benefit from an intervention that strengthens resistance to conformity pressures. The Study 2 findings further indicate that there may be subgroups of boys who are especially susceptible to peer influences, and these boys might particularly benefit from such an intervention. Given the limitations of self-report measures commonly used to assess susceptibility (see Prinstein & Dodge, 2008), the chat room paradigm could be used to identify those boys who are especially susceptible to peer influences (Prinstein et al., 2011). However, note that there have only been limited tests of interventions that aim to improve adolescents' resistance to peer influences (see Pedlow & Carey, 2004); thus, this is a potentially important area for the development of further interventions.

Limitations and Future Directions

Throughout this General Discussion and the prior Study 1 Discussion, many limitations and future directions have been addressed. Some of the most important future directions include

the development and testing of developmentally appropriate interventions involving peers, the examination of susceptibility in a larger sample, and, broadly speaking, research that continues to unpack the complex roles of peer factors and gender in adolescents' development of sexual behavior. The questions about adolescent sexuality that remain unanswered (and even unasked) are too numerous to fully explore or even to mention in this paper. However, several additional, especially important methodological and conceptual considerations are addressed below.

Methodological limitations and considerations for future work. Several methodological issues in the current study bear mentioning, including issues related to missing data, alternative statistical approaches, alternative ways of examining the effects of norms, and limitations regarding the measurement of susceptibility. Each of these is discussed briefly below.

Alternative statistical approaches. The statistical methods used in the current study have a number of benefits, including that they allowed meaningful interpretations of how baseline perceived peer norms and susceptibility were associated with the count ratios of numbers of sexual partners at three annual time points. Alternative approaches could examine longitudinal trajectories of peer norms and susceptibility in conjunction with longitudinal trajectories of numbers of partners, such as with parallel process latent growth curve modeling (as in Helms et al., 2014). The latent growth curve modeling approach does not allow the examination of specific count ratios, but has the benefit of treating behavior, norms, and time as continuous underlying latent trajectories that give rise to observed data (Bollen & Curran, 2006). In the overarching study from which Study 1 and Study 2 data were drawn, susceptibility was only assessed at baseline, but norms were assessed at each time point; furthermore, data collection is still ongoing as the current sample advances through high school. Thus, a fruitful line of work

could involve the longitudinal modeling of more complex associations between peer norms and sexual behaviors, spanning from middle school through the end of high school.

The examination of individual norms versus combinations of norms. A key strength of Study 1 was the inclusion of all peer norms variables together in statistical models, as this allowed the examination of the *unique* predictive effects of particular norms, above and beyond the effects of other norms. Adolescents do not receive messages about sex from only one source in isolation, and thus, prior studies that have only focused on one specific type of norm (e.g., only friend descriptive norms) do not adequately reflect the phenomena of peer influence processes that adolescents experience. From a theoretical standpoint, the models tested in Study 1 are well specified. However, it also should be noted that most of the peer norms variables were significantly correlated with each other and with the sexual behavior variables, and that statistical issues related to multicollinearity may have influenced the pattern of results. An important next step in this line of research will be to examine different combinations of norms in statistical models – for example, to examine aggregate norms based on means of all injunctive norms (i.e., injunctive norms related to friend activity and intercourse, and popular peer activity and intercourse) or all friend norms (i.e., the injunctive and descriptive norms related to friends' activity and intercourse). Such analyses would allow additional testing of the patterns of findings suggested by Study 1, in which certain categories of norms appeared to be more relevant to sexual behavior than others.

The measurement of susceptibility. Performance-based measures of susceptibility have a number of significant advantages over self-report measures. However, the measurement and treatment of susceptibility in the current study involved a number of limitations that should be addressed in future work. First, as discussed previously, the girls' chat room conditions were

unique in their construction with regard to the ethnicity and peer status of the e-confederates, which may have affected the validity of the susceptibility measure among girls. Second, for both boys' and girls' models, data from the various chat room conditions were collapsed in order to increase statistical power. Although there were no significant differences in the mean levels of conformity across the conditions, it is possible that conformity in the different conditions would be associated with peer norms and sexual behavior in different ways. Studies of the chat room with larger samples should examine susceptibility data from the different conditions separately. Third, as has been the case in prior studies that used the chat room, there was by necessity a delay between the administration of the baseline measures and the administration of the chat room paradigm (in order to allow the construction of the chat room conditions; see Method section). However, in the case of this particular study, the baseline questionnaire measures were administered in the spring, and the chat room administration did not take place until the fall, when participants had begun a new school year (within the same schools). It is possible that this delay resulted in changes in adolescents' norms or other relevant factors. One or more of these three issues regarding the chat room methodology could possibly help explain the unexpected pattern of Study 2 findings among girls. These results should be interpreted with caution.

Missing data. A final key methodological issue concerned the significant amount of missing data. The vast majority of the missing data was related to peer norms variables, rather than sexual outcome variables or other measures. The high proportion of missing data may indicate that some adolescents did not feel capable of reporting their peers' attitudes and behaviors. Indeed, the vast majority of adolescents who did not provide valid responses to the peers norms measures selected the option "I don't know" rather than "I don't want to answer." With regard to how missing data may have affected the study results, it is possible that the

adolescents who did not provide complete Time 1 data may have differed from those who provided complete data in ways that were not captured in the study analyses (analyses revealed the only differences in the study variables were in complete-data participants' reporting significantly lower numbers of their own and their friends' sexual activity partners). For example, perhaps the adolescents who did not provide a usable response to the question regarding their popular peers' numbers of sexual intercourse partners (the majority of whom responded "I don't know") had lower access to information about those peers. In future work, it may be preferable not to provide this "I don't know" option for questions about peer norms; adolescents can never know for sure what their peers' behaviors and attitudes are, and the purpose of these norms items was to assess adolescents' *perceptions*.

Conceptual limitations and considerations for future work. In addition to the methodological limitations and alternative approaches discussed above, a number of conceptual considerations should be noted. In particular, the roles of parents, sexual orientation, and ethnicity are very important areas for consideration that were beyond the scope of the current dissertation. Additionally, although this study examined multiple types of sexual behavior, many other sexual outcomes should be studied in future work. Each of these areas is discussed briefly.

The role of parents. As noted above, adolescents do not receive messages about sex from individual sources in a vacuum. A notable gap in the current research involves norms related to parents. Thus, a future step in this line of work will be to examine whether parent norms predict sexual behavior above and beyond the effects of peer norms (and vice versa), and whether parent norms moderate associations between peer norms and behavior. It is possible that the *combination* of norms from parents or peers may be especially powerful in explaining variance in adolescents' numbers of sexual partners. Related to this point, a prior study of sexual

communication using the current sample found a significant interaction between communication about safer sex with parents and best friends; adolescents with high levels of sexual communication with both parents and friends had higher levels of communication with their dating partners, which in turn were associated with higher levels of condom use (Widman, Choukas-Bradley, et al., 2014). It also will be important to examine the effect of *conflicting* parent versus peer norms. Indeed, research suggests that, on average, peers accelerate adolescents' development of sexual behaviors, while parents and schools decelerate this development (L'Engle et al., 2006). It is likely that for many adolescents, there is a significant discrepancy between parents' and peers' attitudes about appropriate sexual behavior.

Gender differences will be particularly interesting to examine in this future line of work. Parents are more likely to communicate with their daughters about sex compared to their sons (e.g., Widman, Choukas-Bradley, et al., 2014) and their messages are more likely to be related to the negative consequences of sex (e.g., Kapungu et al., 2010). A recent, unpublished meta-analysis also indicates that the association between parent communication and adolescents' safer sexual behavior is significantly stronger for girls than for boys (Widman, Choukas-Bradley, Noar, Nesi, & Garrett, under review). As discussed previously, conflicting messages that girls receive about sex may have important implications for their sexual health, and may also have contributed to the current limited findings regarding peer norms among girls.

Consideration of sexual orientation. A key aspect of adolescent sexuality that was not addressed in this dissertation is sexual orientation. This study was not restricted to youth who identified as heterosexual; because noncoital as well as coital behaviors were examined, all sexually active youth were able to provide data reflecting their sexual experiences. However, future work should examine whether the role of peer norms differs among sexual minority youth

compared to heterosexual youth. More broadly, researchers have emphasized the need for more research that aims to understand the normative development of sexual behavior among gay, lesbian, bisexual, and transgender adolescents (e.g., Diamond & Savin-Williams, 2009). Unfortunately, due to concerns of the middle schools in the southern U.S. that participated in this study, adolescents' sexual orientation was not assessed until Time 3 (i.e., when all participants were in high school).

The role of ethnicity. A strength of this study was an ethnically diverse sample; the majority of studies of peer norms (related to sexual behavior and adolescent behavior more broadly) have used homogenous samples of Caucasian or ethnic minority adolescents. All analyses in the current study included ethnicity as a covariate. However, the role of ethnicity was not thoroughly examined in this dissertation, and remains a critical avenue for future research. Just as gender was found to moderate the associations between norms and behavior, ethnicity may also significantly interact with peer factors in the prediction of sexual behavior, even though it was not found to have significant main effects on sexual behavior above and beyond the effects of peer norms. Additionally, future work should examine within-ethnicity peer norms (e.g., assessing the norms of popular peers of one's own ethnic group), given theoretical and empirical support for the importance of peer norms that are most relevant to the specific individual (see Prinstein & Dodge, 2008). Interestingly, recent research from high school adolescents in the same school district as the current sample suggests that popularity is strongly associated with alcohol use among Caucasian adolescents, and moderately so among Latino adolescents, but not among African American adolescents; these findings provide indirect support for important social norms differences among different ethnic groups in heterogeneous school contexts (Choukas-Bradley, Giletta, Neblett, & Prinstein, 2015). A thorough examination of the role of

ethnicity was beyond the scope of the current dissertation, but remains a critical area for further investigation.

The consideration of multiple sexual behavior outcomes. A major strength of this study is the measurement of peer factors and sexual behavior that are developmentally normative for early adolescents. However, there are a multitude of other sexual behaviors that need to be examined in relation to peer norms in future work. First, within the broad construct of "noncoital behaviors," more specificity is needed; for example, norms related to breast touching versus genital touching versus oral sex should be examined. Additionally, number of sexual partners is a common and important adolescent sexual behavior to understand, but it is not the only outcome of developmental or clinical significance. Other outcome variables worthy of further examination in studies of peer norms include age of sexual initiation, the use of protective barriers against STIs and pregnancy, and the relational context of sexual behavior (e.g., in committed relationships versus casual "hookup" contexts). All of these variables were assessed in the overarching study from which Study 1 and Study 2 data were drawn (although most were not examined at Time 1). Thus, the current dataset is a rich source for future examinations of peer factors in adolescents' sexual behaviors over the middle and high school years.

Conclusion

This dissertation provides a picture of the complex roles of peer factors and gender in youths' sexual behavior over time, during the developmentally significant period of early adolescence. Study 1 provided valuable descriptive data regarding adolescents' perceptions of their friends' and popular peers' behaviors and attitudes related to coital and noncoital behaviors, and also examined associations between these norms and adolescents' own numbers of sexual partners over time, with attention to gender as a moderator. Results revealed that, overall,

adolescents' perceived peer norms were associated with their own numbers of coital and noncoital partners. The pattern of findings was generally stronger for boys than girls, however, and longitudinal associations were only found among boys. Additionally, findings suggested that descriptive norms may be more relevant for adolescents' sexual behavior than injunctive norms, and that norms were more predictive of adolescents' numbers of noncoital partners compared to coital partners. Study 2 paired an experimental paradigm with the longitudinal study design, and examined a performance-based measure of susceptibility as a moderator of the associations between peer norms and sexual behavior, in a subset of adolescents from Study 1. The majority of the models examined in Study 2 revealed non-significant interactions between susceptibility and peer norms, and no longitudinal associations were revealed. Among boys, some of the peer norms were more strongly associated with sexual behavior at higher levels of susceptibility, consistent with study hypotheses; the limited findings among girls were in an unexpected direction. Future research in this area will benefit from continued attention to developmentally normative peer influence processes and types of sexual behavior, with larger samples and increasingly sophisticated models of the intersecting sociocultural and interpersonal factors in adolescent boys' and girls' sexual development.

Table 1. Assessment Measures for Study 1 and Study 2

Construct	*Measures*	*Data Collection*
Predictors (Study 1, 2)		
Descriptive norms (perceptions of peers' numbers of sexual partners in past year)		
Perceptions of friends' number of sexual activity partners	Health Behaviors Inventory	T1-Q
Perceptions of friends' number of intercourse partners	Health Behaviors Inventory	T1-Q
Perceptions of popular peers' number of sexual activity partners	Health Behaviors Inventory	T1-Q
Perceptions of popular peers' number of intercourse partners	Health Behaviors Inventory	T1-Q
Injunctive norms (perceptions of peers' attitudes about appropriate age of sexual behavior initiation)		
Friends' attitudes about OK age to initiate sexual activity	Social Norms Scale	T1-Q
Friends' attitudes about OK age to initiate intercourse	Social Norms Scale	T1-Q
Popular peers' attitudes about OK age to initiate sexual activity	Social Norms Scale	T1-Q
Popular peers' attitudes about OK age to initiate intercourse	Social Norms Scale	T1-Q
Outcome measures (Study 1, 2)		
Number of past-year sexual activity partners	Health Behaviors Inventory	T1-Q, T2, T3
Number of past-year intercourse partners	Health Behaviors Inventory	T1-Q, T2, T3
Potential moderators (Study 1, 2)		
Susceptibility to peer influence (Study 2)	Calculated based on T1-Q and T1-CR measures	T1-Q, T1-CR
Gender (Study 1)	Demographic Information	T1-Q
Other covariates (Study 1, 2)		
Ethnicity (Study 1, 2)	Demographic Information	T1-Q

Age (Study 1, 2)	Demographic Information	T1-Q
Pubertal timing (Study 1, 2)	Pubertal Development Scale (standardized within gender & grade)	T1-Q
Behavioral endorsement pre-exposure to peer norms (Study 2)	Hypothetical Scenarios (questionnaires)	T1-Q
Used to create experimental manipulation (Study 2)		
Average response to sexual behavior scenarios	Hypothetical Scenarios	T1-Q
Popularity	Sociometric Assessment	T1-Q
Likeability	Sociometric Assessment	T1-Q
Friendship affiliations	Sociometric Assessment	T1-Q
Used to compute susceptibility scores (Study 2)		
Behavioral endorsement pre-exposure to peer norms	Hypothetical Scenarios (questionnaires)	T1-Q
Behavioral endorsement post-exposure to peer norms	Hypothetical Scenarios (during chat room)	T1-CR

Note. T1-Q = Time 1 questionnaire data collection (all participants, used in Study 1 and Study 2). T1-CR = Time 1 chat room data collection (subset selected to participate in chat room paradigm for Study 2).

Table 2. Study 1 Means (and Standard Deviations) for Sexual Behavior Outcome Variables at Times 1-3

	Full Sample		Girls		Boys		Tests of Gender Differences
	M (*SD*)	% with any behavior	*M* (*SD*)	% with any behavior	*M* (*SD*)	% with any behavior	*t* tests (comparing boys' and girls' numbers of partners)[b]
Time 1 Sexual Behavior							
Number of sexual activity partners	.91 (1.53)	36.3%	.98 (1.59)	37.7%	.81 (1.44)	34.4%	t (544) = 1.30
Number of sexual intercourse partners	.13 (.57)	7.0%	.13 (.57)	7.2%	.12 (.58)	6.6%	t (544) = .29
Time 2 Sexual Behavior							
Number of sexual activity partners	.74 (1.15)	43.3%	.76 (1.07)	48.1%[a]	.72 (1.25)	37.1%	t (474) = .34
Number of sexual intercourse partners	.27 (.73)	16.6%	.22 (.55)	17.2%	.33 (.91)	15.8%	t (321.91) = -1.68
Time 3 Sexual Behavior							
Number of sexual activity partners	.98 (1.27)	52.7%	1.01 (1.18)	57.3%[a]	.94 (1.36)	47.1%	t (459) = .59
Number of sexual intercourse partners	.45 (.89)	27.6%	.41 (.79)	28.0%	.50 (1.00)	27.2%	t (384.56) = -.98

Note. SI = sexual intercourse. SA = sexual activity. Number of partners = partner counts in last year. Scale ranges: number SI and SA partners, 0=0 partners to 5=5 or more partners. [a] Significant Wald's χ^2 test indicating significantly higher percentage of girls than boys had engaged in any sexual activity (specific test results provided in text). [b] None of the *t* tests indicated significant gender differences in numbers of partners.

Table 3. Study 1 Means (and Standard Deviations) for Peer Norms Variables at Time 1

	Full Sample	**Girls**	**Boys**	**Tests of Gender Differences**
	M (SD)	*M* (SD)	*M* (SD)	*t tests*
Descriptive Norms (perceptions of peers' behavior)				
Perceptions of friends' number of SA partners	1.11 (1.62)	1.22 (1.71)	.97 (1.51)	t (537.33) = 1.76
Perceptions of friends' number of SI partners	.27 (.85)	.28 (.81)	.26 (.91)	t (544) = .24
Perceptions of popular peers' number of SA partners	2.33 (1.92)	2.68 (1.89)	1.89 (1.88)	t (544) = 4.87***
Perceptions of popular peers' number of SI partners	.95 (1.45)	1.24 (1.56)	.58 (1.18)	t (542.92) = 5.68***
Injunctive Norms (perceptions of peers' attitudes)				
Perceptions of age friends think SA is OK	17.41 (3.34)	17.18 (3.32)	17.71 (3.35)	t (544) = -1.83
Perceptions of age friends think SI is OK	18.42 (2.81)	18.42 (2.78)	18.42 (2.85)	t (544) = .03
Perceptions of age popular peers think SA is OK	15.87 (3.29)	15.52 (3.22)	16.31 (3.33)	t (544) = -2.78**
Perceptions of age popular peers think SI is OK	16.73 (3.12)	16.37 (3.13)	17.18 (3.06)	t (544) = -3.01**

Note. SA = sexual activity. SI = sexual intercourse. Number of partners = partner counts in last year. Scale ranges: descriptive norms, 0=0 partners to 5=5 or more partners; injunctive norms: 11=age 11 or younger to 21=age 21 or older/after married/never. *p < .05, **p < .01, ***p < .001.

Table 4. Study 1 Bivariate Correlations Among Continuous Study Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
# Partners																
1. Time 1 SA	-	.54	.39	.43	.32	.30	.62	.24	.44	.24	-.54	-.50	-.42	-.35	.15	.12
2. Time 2 SA	.48	-	.60	.13	.53	.54	.48	.26	.26	.17	-.43	-.38	-.26	-.22	.12	.10
3. Time 3 SA	.34	.54	-	.20	.39	.73	.45	.25	.18	.05	-.34	-.26	-.20	-.17	.10	.17
4. Time 1 SI	.36	.31	.19	-	.28	.19	.30	.51	.21	.40	-.25	-.31	-.21	-.24	.01	.15
5. Time 2 SI	.39	.53	.34	.42	-	.47	.21	.15	.06	.11	-.19	-.25	-.08	-.11	.22	.20
6. Time 3 SI	.32	.42	.53	.35	.65	-	.24	.20	.11	.09	-.16	-.17	-.12	-.14	.13	.15
Peer Norms																
7. Des. F. SA	.68	.38	.28	.29	.31	.23	-	.45	.54	.27	-.55	-.50	-.39	-.30	.14	.16
8. Des. F. SI	.22	.22	.18	.54	.28	.28	.43	-	.19	.48	-.28	-.38	-.20	-.24	.07	.13
9. Des. P. SA	.51	.30	.22	.14	.18	.08	.50	.13	-	.51	-.55	-.50	-.60	-.50	.01	.14
10. Des. P. SI	.29	.21	.08	.19	.22	.06	.32	.28	.56	-	-.32	-.37	-.42	-.47	-.02	.17
11. Inj. F. SA	-.45	-.30	-.20	-.08	-.14	-.13	-.46	-.16	-.45	-.29	-	.86	.67	.56	-.13	-.20
12. Inj. F. SI	-.32	-.22	-.13	-.10	-.17	-.15	-.36	-.17	-.33	-.25	.74	-	.56	.61	-.18	-.18
13. Inj. P. SA	-.26	-.22	-.15	.01	-.05	.06	-.28	-.03	-.53	-.41	.52	.39	-	.86	-.03	-.16
14. Inj. P. SI	-.24	-.14	-.08	-.02	-.09	.02	-.25	-.08	-.46	-.52	.47	.45	.84	-	-.06	-.20
Covariates																
15. Age	.09	.11	.09	.19	.17	.20	.16	.11	.003	-.001	-.001	-.08	.07	.02	-	.13
16. Pub. Tim.	.17	.13	.04	.13	.08	-.06	.18	.09	.20	.19	-.19	-.13	-.19	-.16	.09	-

Note. Correlations for girls appear below the diagonal; correlations for boys appear above the diagonal. # Partners = number of past-year sexual partners. SA = sexual activity. SI = sexual intercourse. Des. = Descriptive norms (perceptions of peers' number of past-year SA or SI partners). Inj. = Injunctive norms (perceptions of the age at which peers would think it is OK to engage in SA or SI). F. = friend. P. = popular peers. Pub. Tim. = pubertal timing. All predictors and covariates measured at Time 1. All correlations with an absolute value > .14 are statistically significant at the level of $p < .05$. All correlations with an absolute value > .18 are statistically significant at the level of $p < .01$. All correlations with an absolute value > .24 are statistically significant at the level of $p < .001$. Correlations with absolute values between .11-.14 varied with regard to whether they were statistically significant. Correlations with absolute values between .16-.18 varied with regard to whether they were statistically significant at the level of $p < .05$ or $p < .01$. Correlations with absolute values between .19-.24 varied with regard to whether they were statistically significant at the level of $p < .01$ or $p < .001$.

Table 5. Study 1 Tests of Overall Effects of Predictors and Covariates on Numbers of Sexual Partners

	Sexual Behavior Outcome					
	Number of Sexual Activity Partners			Number of Sexual Intercourse Partners		
	DF	**Wald's χ^2**	**p-value**	**DF**	**Wald's χ^2**	**p-value**
Descriptive Norms (perceptions of peers' behavior)						
Perceptions of friends' number of SA partners	6	**41.32**	<.001	6	**13.22**	0.04
Perceptions of friends' number of SI partners	6	6.10	0.41	6	10.33	0.11
Perceptions of popular peers' number of SA partners	6	**25.51**	<.001	6	12.48	0.054
Perceptions of popular peers' number of SI partners	6	5.30	0.51	6	**14.15**	0.03
Injunctive Norms (perceptions of friends' attitudes)						
Perceptions of age friends think SA is OK	6	**17.54**	0.01	6	2.06	0.91
Perceptions of age friends think SI is OK	6	5.77	0.45	6	5.16	0.52
Perceptions of age popular peers think SA is OK	6	9.01	0.17	6	6.00	0.42
Perceptions of age popular peers think SI is OK	6	7.54	0.27	6	2.95	0.82
Covariates						
Age	1	3.36	0.07	1	**14.19**	<.001
Ethnicity	3	4.19	0.24	3	4.98	.18
Pubertal timing	1	0.15	0.70	1	1.65	.20

Note. SA = sexual activity. SI = sexual intercourse. Two models tested: one with number of sexual activity partners as the outcome, and one with number of sexual intercourse partners as the outcome. All models control for age, ethnicity, pubertal timing, and all types of norms. Significant Wald's χ^2 test result indicates a significant association between the predictor and at least one sexual activity/intercourse outcome (number of sexual activity or intercourse partners at Time 1, 2, or 3) for males and/or females. Test of effects of ethnicity included the set of dummy-coded variables. Specific differences by ethnic group were not examined further due to lack of significant overall Wald's χ^2 results in either model.

Table 6. Study 1 Estimates of Effects of Specific Peer Norms on Adolescents' Numbers of Sexual Activity Partners

	Girls			Boys		
Estimate	**Estimate of Effect (95% CI)**	**Wald's χ^2**	**p-value**	**Estimate of Effect (95% CI)**	**Wald's χ^2**	**p-value**
Descriptive friend activity norms (perceptions of friends' number of SA partners)						
Number of Time 1 SA partners	**1.32** (1.21-1.45)	35.56	<.001	**1.33** (1.19-1.48)	25.61	<.001
Number of Time 2 SA partners	1.09 (0.98-1.22)	2.74	0.10	**1.29** (1.11-1.50)	11.53	0.001
Number of Time 3 SA partners	1.07 (0.98-1.17)	2.19	0.14	**1.28**[a] (1.14-1.44)	17.66	<.001
Descriptive popular peer activity norms (perceptions of popular peers' number of SA partners)						
Number of Time 1 SA partners	**1.45**[a] (1.29-1.62)	39.39	<.001	1.03 (0.89-1.19)	0.14	0.71
Number of Time 2 SA partners	1.11 (0.97-1.27)	2.22	0.14	0.91 (0.76-1.08)	1.26	0.26
Number of Time 3 SA partners	1.08 (0.97-1.20)	1.95	0.16	0.92 (0.81-1.06)	1.32	0.25
Injunctive friend activity norms (perceptions of age friends think SA is OK)						
Number of Time 1 SA partners	**0.89** (0.82-0.96)	9.67	0.002	0.91 (0.78-1.05)	1.60	0.21
Number of Time 2 SA partners	0.95 (0.88-1.02)	2.15	0.14	**0.84** (0.72-0.98)	5.05	0.03
Number of Time 3 SA partners	0.98 (0.92-1.03)	0.72	0.39	**0.83**[a] (0.75-0.91)	13.87	<0.001

Note. SA = sexual activity. SI = sexual intercourse. Estimates only provided here for norms for which the overall Wald's χ^2 test result was significant (see Table 5). Significant Wald's χ^2 test result indicates count ratio is significantly different than 1. All models control for age, ethnicity, pubertal timing, and all types of norms. [a] Contrast test revealed significantly stronger association than the corresponding within-time association for the other gender.

Table 7. Study 1 Estimates of Effects of Specific Peer Norms on Adolescents' Numbers of Sexual Intercourse Partners

	Girls			Boys		
Estimate	**Estimate of Effect (95% CI)**	**Wald's χ^2**	**p-value**	**Estimate of Effect (95% CI)**	**Wald's χ^2**	**p-value**
Descriptive friend activity norms (perceptions of friends' number of SA partners)						
Number of Time 1 SI partners	1.19 (0.89-1.57)	1.40	0.24	**1.66** (1.13-2.42)	6.82	0.01
Number of Time 2 SI partners	1.16 (0.97-1.39)	2.72	0.10	**1.46** (1.13-1.90)	8.29	0.004
Number of Time 3 SI partners	1.08 (0.91-1.28)	0.77	0.38	**1.20** (1.00-1.44)	3.92	0.048
Descriptive popular peer intercourse norms (perceptions of popular peers' number of SI partners)						
Number of Time 1 SI partners	1.00 (0.70-1.42)	0.00	0.99	**1.66**[a] (1.22-2.26)	10.26	0.001
Number of Time 2 SI partners	1.17 (0.97-1.40)	2.80	0.09	**1.41** (1.14-1.75)	10.14	0.002
Number of Time 3 SI partners	0.95 (0.78-1.15)	0.29	0.59	1.00 (0.81-1.22)	0.00	0.98

Note. SA = sexual activity. SI = sexual intercourse. Estimates only provided here for norms for which the overall Wald's χ^2 test result was significant (see Table 5). Significant Wald's χ^2 test result indicates count ratio is significantly different than 1. All models control for age, ethnicity, pubertal timing, and all types of norms. [a] Contrast test revealed significantly stronger association than the corresponding within-time association for the other gender.

Table 8. Study 2 Means (and Standard Deviations) for Peer Norms Variables at Time 1 and Sexual Behavior Variables at Times 1-3

	Full Sample		Girls		Boys		Tests of Gender Differences
	M (SD)	N	*M* (SD)	N	*M* (SD)	N	*t* tests
Time 1 Descriptive Norms (perceptions of peers' behavior)							
Friends' number of SA partners	.80 (1.46)	279	.81 (1.49)	159	.80 (1.44)	120	*t* (277) = .03
Friends' number of SI partners	.22 (.78)	292	.21 (.70)	161	.23 (.86)	131	*t* (290) = -.20
Popular peers' number of SA partners	2.12 (1.90)	249	2.67 (1.88)	135	1.47 (1.72)	114	*t* (247) = 5.26***
Popular peers' number of SI partners	.86 (1.47)	252	1.28 (1.68)	132	.39 (1.01)	120	*t* (217.58) = 5.14***
Time 1 Injunctive Norms (perceptions of peers' attitudes)							
Age friends think SA is OK	17.91 (3.32)	286	17.68 (3.40)	158	18.19 (3.20)	128	*t* (284) = -1.30
Age friends think SI is OK	18.91 (2.75)	285	18.80 (2.85)	158	19.06 (2.61)	127	*t* (283) = -.81
Age popular peers think SA is OK	16.15 (3.49)	273	15.55 (3.43)	150	16.89 (3.43)	123	*t* (271) = -3.23**
Age popular peers think SI is OK	16.91 (3.31)	271	16.38 (3.44)	148	17.56 (3.04)	123	*t* (269) = -2.97**
Time 1 Sexual Behavior							
Number of sexual activity partners	.68 (1.33)	295	.77 (1.45)	163	.57 (1.17)	132	*t* (293.00) = 1.35
Number of sexual intercourse partners	.11 (.50)	297	.12 (.54)	163	.10 (.44)	134	*t* (295) = .44

Time 2 Sexual Behavior							
Number of sexual activity partners	.62 (1.08)	273	.62 (.96)	148	.62 (1.22)	125	t (271) = -.01
Number of sexual intercourse partners	.17 (.60)	275	.15 (.45)	150	.20 (.74)	125	t (273) = -.73
Time 3 Sexual Behavior							
Number of sexual activity partners	.89 (1.26)	266	.88 (1.18)	145	.89 (1.35)	121	t (264) = -.06
Number of sexual intercourse partners	.32 (.74)	264	.32 (.78)	145	.33 (.70)	119	t (262) = -.11

Note. SI = sexual intercourse. SA = sexual activity. Number of partners = partner counts in last year. Scale ranges: number SI and SA partners, and descriptive norms: 0=0 partners to 5=5 or more partners; injunctive norms: 11=age 11 or younger to 21=age 21 or older, after married, or never.

*$p < .05$, **$p < .01$, ***$p < .001$

Table 9. Study 2 Bivariate Correlations Among Continuous Study Variables

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
# Partners																		
1. Time 1 SA	-	.51	.32	.48	.24	.31	.58	.15	.38	.10	-.47	-.43	-.41	-.39	.08	.27	-.28	.54
2. Time 2 SA	.55	-	.63	.30	.41	.60	.46	.42	.07	.05	-.34	-.30	-.21	-.24	.11	.06	-.05	.33
3. Time 3 SA	.32	.60	-	.19	.35	.63	.49	.25	.11	-.02	-.40	-.24	-.26	-.28	.12	.10	-.14	.42
4. Time 1 SI	.43	.26	.20	-	.31	.42	.36	.24	.11	.15	-.18	-.28	-.10	-.20	.14	.29	-.24	.40
5. Time 2 SI	.37	.49	.31	.47	-	.53	.12	.17	-.05	.10	-.16	-.22	-.04	-.03	.25	.19	-.17	.37
6. Time 3 SI	.25	.41	.50	.35	.65	-	.37	.38	-.05	.05	-.16	-.20	-.08	-.17	.28	.19	-.05	.25
Peer Norms																		
7. Des. F. SA	.59	.48	.30	.21	.32	.22	-	.46	.44	.22	-.53	-.48	-.43	-.39	.19	.25	-.28	.45
8. Des. F. SI	.27	.34	.21	.27	.55	.40	.53	-	.12	.50	-.27	-.41	-.20	-.26	.16	.16	-.13	.25
9. Des. P. SA	.51	.28	.15	.20	.16	.06	.44	.21	-	.46	-.50	-.45	-.61	-.57	-.03	.10	-.23	.33
10. Des.P. SI	.33	.30	.13	.19	.31	.10	.30	.38	.54	-	-.28	-.46	-.39	-.47	-.01	.22	-.08	.19
11. Inj. F. SA	-.54	-.44	-.24	-.19	-.21	-.10	-.55	-.30	-.46	-.46	-	.85	.62	.55	-.12	-.29	.34	-.58
12. Inj. F. SI	-.41	-.26	-.18	-.25	-.22	-.11	-.41	-.25	-.34	-.34	.79	-	.51	.54	-.17	-.30	.34	-.58
13. Inj. P. SA	-.33	-.20	-.09	-.10	-.10	.09	-.33	-.07	-.56	-.42	.50	.42	-	.89	.05	-.13	.14	-.40
14. Inj. P. SI	-.30	-.14	-.09	-.14	-.15	.004	-.28	-.09	-.49	-.51	.45	.45	.86	-	-.01	-.14	.14	-.40
Covariates																		
15. Age	-.10	.08	.07	.10	.02	.11	.002	-.04	-.11	-.06	.09	.00	.11	.01	-	.35	-.12	.21
16. Pub. Tim.	.22	.20	.16	.17	.14	.02	.17	.09	-.06	.11	-.23	-.22	-.18	-.20	.15	-	-.25	.36
17. Suscep.	-.34	-.02	-.11	-.36	-.08	-.06	-.13	-.05	-.17	.02	.24	.23	.15	.18	-.01	-.02	-	-.58
18. Pre-score	.60	.35	.34	.39	.27	.19	.32	.16	.30	.20	-.52	-.48	-.28	-.31	-.04	.24	-.62	-

Note. Correlations for girls appear below the diagonal; correlations for boys appear above the diagonal. # Partners = number of past-year sexual partners. SA = sexual activity. SI = sexual intercourse. Des. = Descriptive norms (perceptions of peers' number of partners). Inj. = Injunctive norms (perceptions of the age at which peers would think it is OK to engage in SA or SI). F. = friend. P. = popular peers. Pub. Tim. = pubertal timing. Suscep. = Susceptibility to peer influence. Pre-score = pre-test score on hypothetical scenarios assessed at baseline (in private, before chat room). All predictors and covariates measured at Time 1 (T1-Q or T1-CR). All correlations with an absolute value > .14 are statistically significant at the level of $p < .05$. All correlations with an absolute value > .18 are statistically significant at the level of $p < .01$. All correlations with an absolute value > .24 are statistically significant at the level of $p < .001$. Correlations with absolute values between .11-.14 varied with regard to whether they were statistically significant. Correlations with absolute values between .16-.18 varied with regard to whether they were statistically significant at the level of $p < .05$ or $p < .01$. Correlations with absolute values between .19-.24 varied with regard to whether they were statistically significant at the level of $p < .01$ or $p < .001$.

Table 10. Study 2 Overall Tests of Interaction Terms on Adolescent Boys' Numbers of Sexual Partners, by Time Point

	Sexual Behavior Outcome					
	Number of Sexual Activity Partners			Number of Sexual Intercourse Partners		
	DF	χ^2	p-value	DF	χ^2	p-value
Descriptive Friend Activity Norms x Susceptibility						
Time 1	1	**10.20**	0.001	1	-	-
Time 2	1	3.42	0.06	1	-	-
Time 3	1	2.39	0.12	1	-	-
Descriptive Friend Intercourse Norms x Susceptibility						
Time 1	1	0.19	0.66	1	-	-
Time 2	1	3.92	0.05	1	-	-
Time 3	1	0.40	0.53	1	-	-
Descriptive Popular Activity Norms x Susceptibility						
Time 1	1	**6.08**	0.01	1	0.83	0.36
Time 2	1	2.19	0.14	1	0.76	0.38
Time 3	1	0.52	0.47	1	0.46	0.50
Descriptive Popular Intercourse Norms x Susceptibility						
Time 1	1	1.30	0.25	1	0.73	0.40
Time 2	1	0.89	0.35	1	0.16	0.69
Time 3	1	2.02	0.16	1	0.45	0.50

Injunctive Friend Activity Norms x Susceptibility						
Time 1	1	0.90	0.34	1	0.07	0.79
Time 2	1	0.07	0.79	1	1.16	0.28
Time 3	1	0.13	0.72	1	0.81	0.37
Injunctive Friend Intercourse Norms x Susceptibility						
Time 1	1	0.14	0.71	1	1.81	0.18
Time 2	1	0.33	0.57	1	0.03	0.86
Time 3	1	0.87	0.35	1	0.67	0.41
Injunctive Popular Activity Norms x Susceptibility						
Time 1	1	**6.24**	0.01	1	1.39	0.24
Time 2	1	0.37	0.55	1	2.75	0.10
Time 3	1	0.65	0.42	1	0.00	0.99
Injunctive Popular Intercourse Norms x Susceptibility						
Time 1	1	1.36	0.24	1	1.07	0.30
Time 2	1	0.15	0.70	1	1.12	0.29
Time 3	1	1.03	0.31	1	2.65	0.10

Note. SA = sexual activity. SI = sexual intercourse. Sixteen separate models were tested (i.e., with one of the eight peer norms variables as a predictor, and with number of sexual activity or intercourse partners as the outcome). [a] Significant Wald's χ^2 test result indicates a significant interaction effect between the peer norm and peer influence susceptibility at that time point, indicating significant differences in the estimates of numbers of sexual partners from level of the peer norm variable, conditioned on different levels of susceptibility. - Indicates the model would not converge.

Table 11. Study 2 Estimates of Effects of Specific Peer Norms, Conditioned on Susceptibility, on Adolescent Boys' Numbers of Sexual Activity Partners

	Estimate of Effect (95% CI)	Wald's χ^2	p-value
Descriptive Friend Activity Norms, Time 1			
Low Susceptibility	0.94 (0.70-1.27)	0.16	0.69
Medium Susceptibility	**2.03** (1.50-2.75)	20.97	<.001
High Susceptibility	**4.38** (2.00-9.58)	13.66	<.001
Descriptive Popular Activity Norms, Time 1			
Low Susceptibility	0.89 (0.65-1.20)	0.60	0.44
Medium Susceptibility	1.22 (0.98-1.53)	3.09	0.08
High Susceptibility	**1.69** (1.24-2.30)	10.88	0.001
Injunctive Popular Activity Norms, Time 1			
Low Susceptibility	1.01 (0.85-1.21)	0.01	0.91
Medium Susceptibility	**0.82** (0.72-0.94)	8.68	0.003
High Susceptibility	**0.67** (0.54-0.83)	13.71	<.001

Note. Estimates only provided here for norms for which the overall Wald's χ^2 test result was significant (see Table 10). Significant Wald's χ^2 test result indicates count ratio is significantly different than 1. Models examined separately for each type of norm. All models control for standardized chat room pre-test scores. Estimates shown here are without other covariates (ethnicity, pubertal timing, age), but pattern of results remained the same with covariates. No significant overall Wald's χ^2 test results were revealed for the interaction between any norm and susceptibility in the prediction of adolescent boys' numbers of sexual intercourse partners.

Table 12. Study 2 Overall Tests of Interaction Terms on Adolescent Girls' Numbers of Sexual Partners, by Time Point

	Sexual Behavior Outcome					
	Number of Sexual Activity Partners			Number of Sexual Intercourse Partners		
	DF	Wald's χ^2	p-value	DF	Wald's χ^2	p-value
Descriptive Friend Activity Norms x Susceptibility						
Time 1	1	0.80	0.37	1	-	-
Time 2	1	1.49	0.22	1	-	-
Time 3	1	0.05	0.81	1	-	-
Descriptive Friend Intercourse Norms x Susceptibility						
Time 1	1	2.74	0.10	**1**	1.99	0.16
Time 2	1	2.13	0.14	1	2.57	0.11
Time 3	1	0.85	0.36	1	**5.21**	0.02
Descriptive Popular Activity Norms x Susceptibility						
Time 1	1	0.60	0.44	1	1.57	0.21
Time 2	1	3.63	0.06	1	1.02	0.31
Time 3	1	**4.62**	0.03	1	1.64	0.20
Descriptive Popular Intercourse Norms x Susceptibility						
Time 1	1	2.00	0.16	1	0.10	0.76
Time 2	1	0.92	0.34	1	0.47	0.59
Time 3	1	0.27	0.61	1	0.41	0.52

Injunctive Friend Activity Norms x Susceptibility						
Time 1	1	2.89	0.09	1	0.99	0.32
Time 2	1	2.17	0.14	1	2.21	0.14
Time 3	1	0.91	0.34	1	0.43	0.51
Injunctive Friend Intercourse Norms x Susceptibility						
Time 1	1	0.94	0.33	1	0.74	0.39
Time 2	1	1.34	0.25	1	1.06	0.30
Time 3	1	2.72	0.10	1	1.01	0.31
Injunctive Popular Activity Norms x Susceptibility						
Time 1	1	1.84	0.18	1	1.42	0.23
Time 2	1	0.08	0.78	1	3.27	0.07
Time 3	1	0.29	0.59	1	0.05	0.82
Injunctive Popular Intercourse Norms x Susceptibility						
Time 1	1	0.42	0.52	1	2.53	0.11
Time 2	1	0.13	0.71	1	2.05	0.15
Time 3	1	0.01	0.91	1	3.66	0.06

Note. SA = sexual activity. SI = sexual intercourse. Sixteen separate models were tested (i.e., with one of the eight peer norms variables as a predictor, and with number of sexual activity or intercourse partners as the outcome). [a] Significant Wald's χ^2 test result indicates a significant interaction effect between the peer norm and peer influence susceptibility at that time point, indicating significant differences in the estimates of numbers of sexual partners from level of the peer norm variable, conditioned on different levels of susceptibility. - Indicates the model would not converge.

Table 13. Study 2 Estimates of Effects of Specific Peer Norms, Conditioned on Susceptibility, on Adolescent Girls' Numbers of Sexual Activity Partners

	Estimate of Effect (95% CI)	Wald's χ^2	p-value
Descriptive Popular Activity Norms, Time 3			
Low Susceptibility	1.13 (0.98-1.31)	2.98	0.08
Medium Susceptibility	0.97 (0.82-1.14)	0.17	0.68
High Susceptibility	0.82 (0.65-1.05)	2.46	0.12

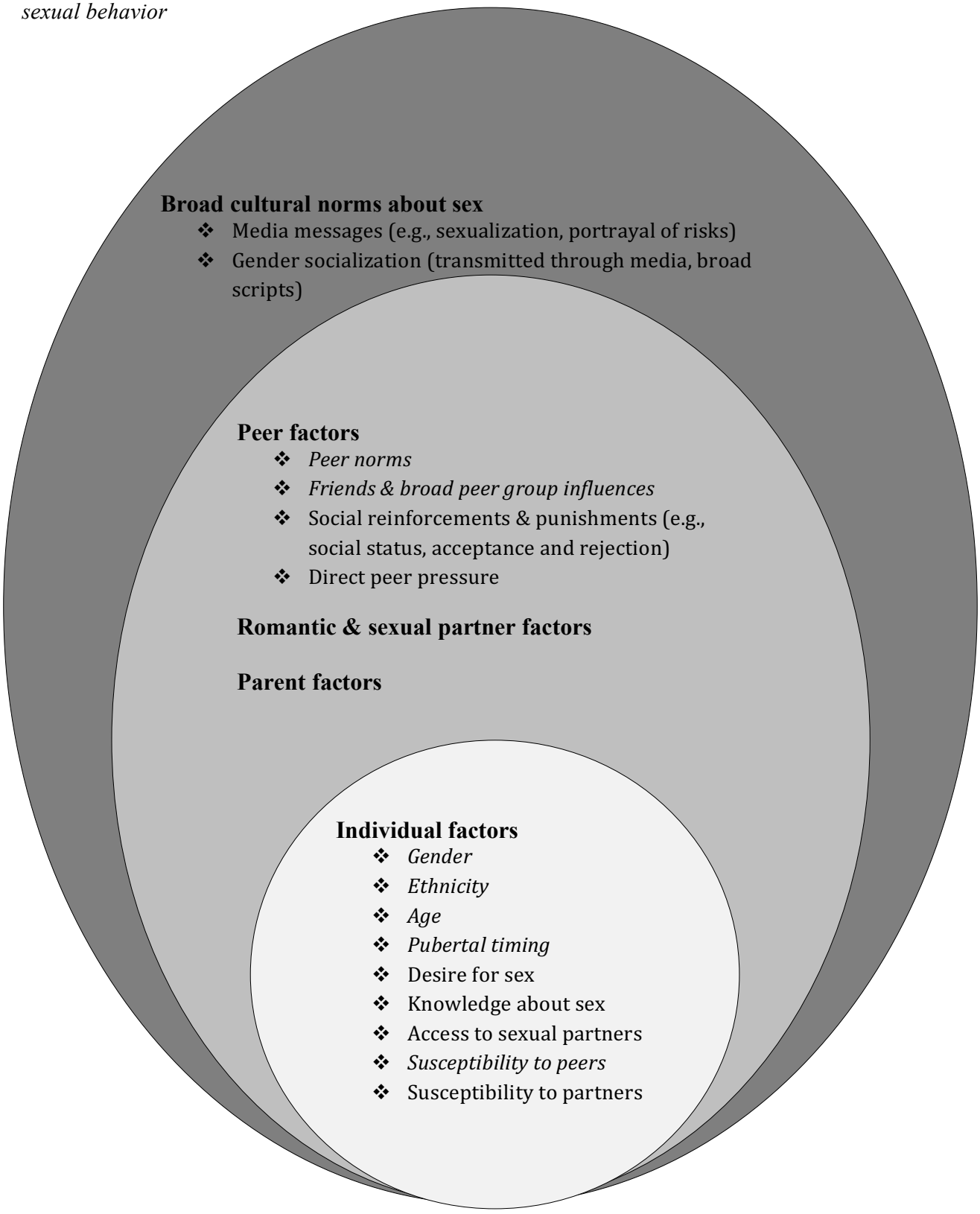
Note. Estimates only provided here for norms for which the overall Wald's χ^2 test result was significant (see Table 12). A significant Wald's χ^2 test result would indicate a count ratio that is significantly different than 1. Note, however, that although there was a significant overall interaction effect between descriptive popular activity norms and susceptibility on girls' numbers of sexual activity partners, none of the count ratios is significantly different from 1. Models examined separately for each type of norm. All models control for standardized chat room pre-test scores. Estimates shown here are without other covariates (ethnicity, pubertal timing, age), but pattern of results remained the same with covariates.

Table 14. Study 2 Estimates of Effects of Specific Peer Norms, Conditioned on Susceptibility, on Adolescent Girls' Numbers of Sexual Intercourse Partners

	Estimate of Effect (95% CI)	**Wald's χ^2**	**p-value**
Descriptive Friend Intercourse Norms, Time 3			
Low Susceptibility	**2.83** (1.92-4.16)	27.94	<.001
Medium Susceptibility	**1.72** (1.24-2.38)	10.65	0.001
High Susceptibility	1.04 (0.67-1.63)	0.03	0.85

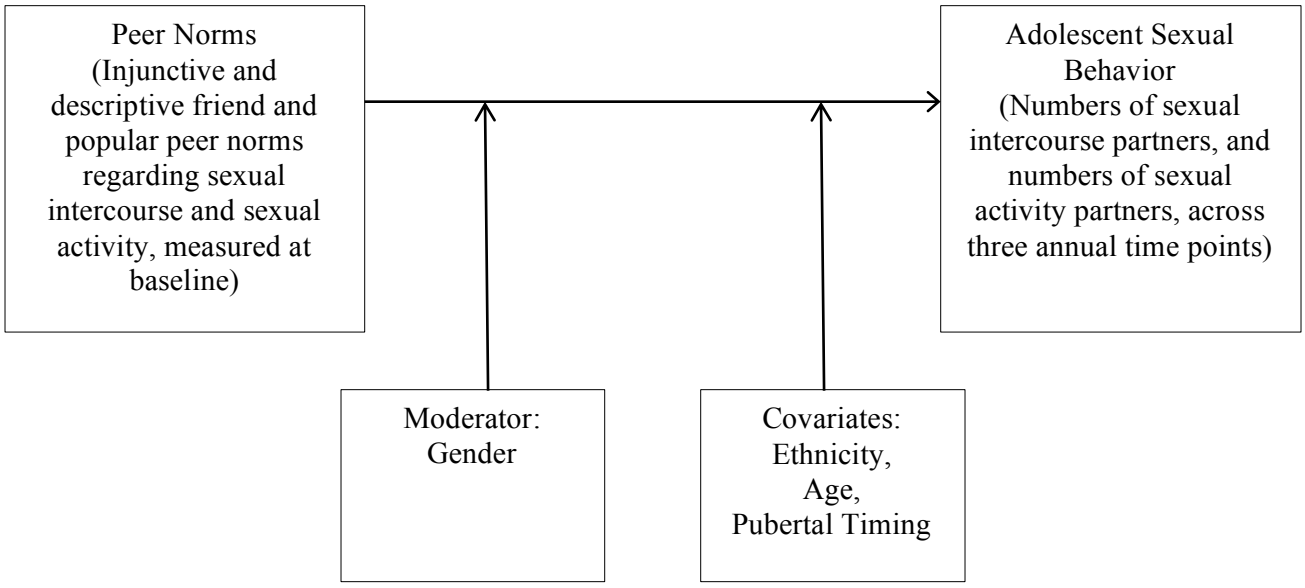
Note. Estimates only provided here for norms for which the overall Wald's χ^2 test result was significant (see Table 12). Significant Wald's χ^2 test result indicates count ratio is significantly different than 1. Models examined separately for each type of norm. All models control for standardized chat room pre-test scores. Estimates shown here are without other covariates (ethnicity, pubertal timing, age), but pattern of results remained the same with covariates.

Figure 1. *Theoretical ecological systems model of distal and proximal influences on adolescents' sexual behavior*



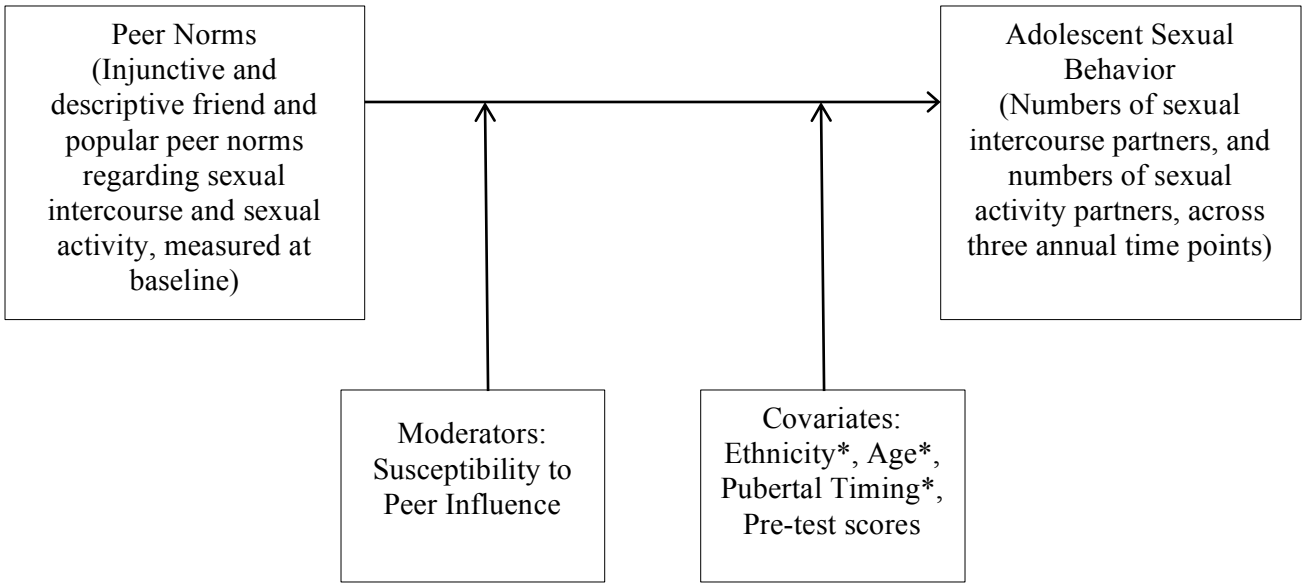
Note. Variables directly measured in the current study appear in italics.

Figure 2. *Model tested in Study 1*



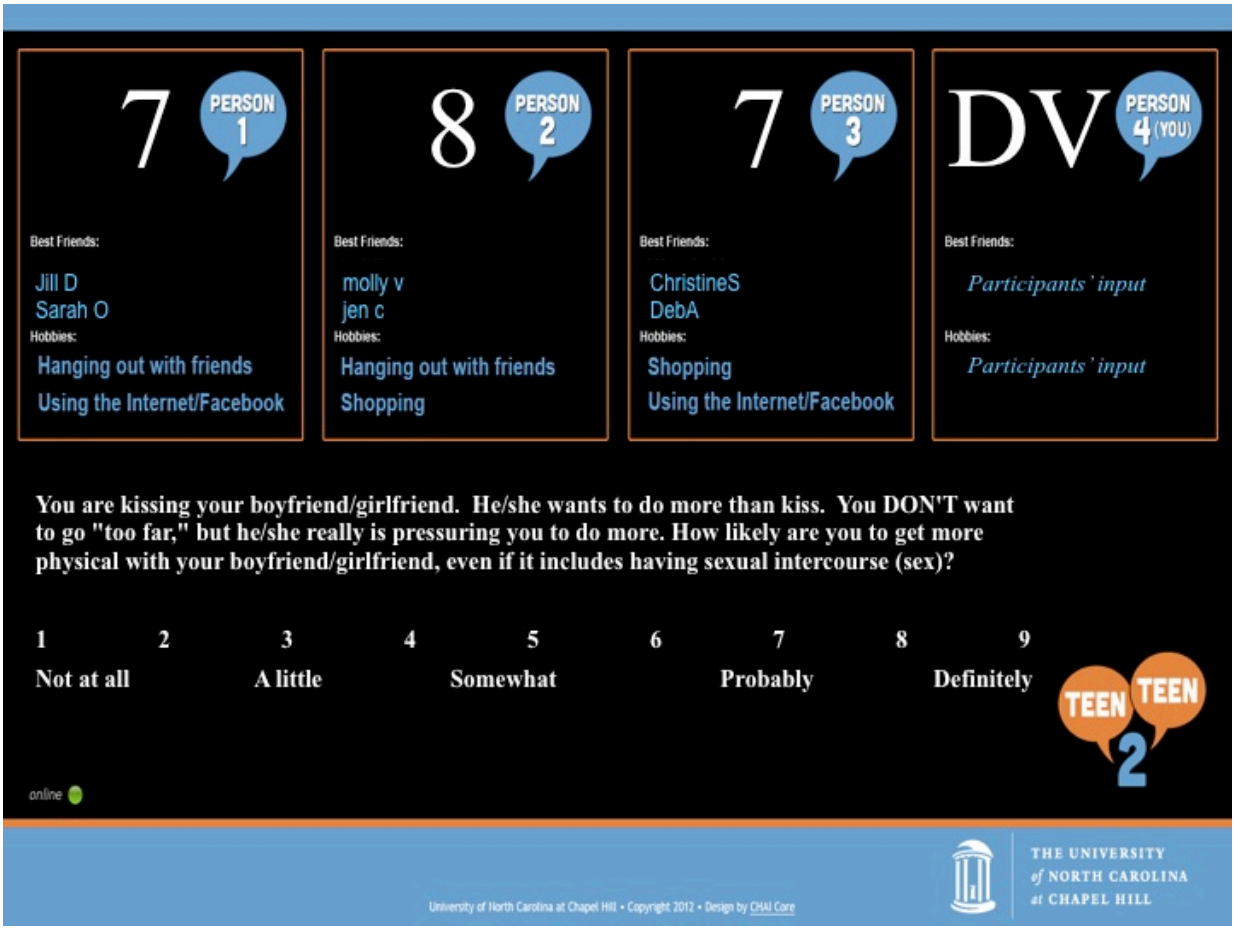
Note. Separate models examined for the prediction of numbers of sexual activity partners and numbers of sexual intercourse partners. Models tested using log linear analyses with Poisson distributions for the theoretical distribution of the error terms.

Figure 3. *Model tested in Study 2*



Note. Separate models examined for the prediction of numbers of sexual activity partners and numbers of sexual intercourse partners. Models run separately for boys and girls. Models tested using log linear analyses with Poisson distributions for the theoretical distribution of the error terms. *Some models tested without these covariates.

Figure 4. *Sample chat room screen for Study 2*



Note. "DV" would not appear on the screen, but rather represents the participant's 1-9 response (i.e., the dependent variable). All other stimuli would appear to participants as shown, with electronic confederate information varying by condition and school, constructed based on average participant responses.

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