Published in final edited form as:

J Sex Res. 2014 ; 51(1): 86–96. doi:10.1080/00224499.2012.710664.

Underestimating Protection and Overestimating Risk: Examining Descriptive Normative Perceptions and Their Association with Drinking and Sexual Behaviors

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Abstract

Individuals who engage in risky sexual behavior face the possibility of experiencing negative consequences. One tenet of social learning theory is that individuals engage in behaviors partly based on observations or perceptions of others' engagement in those behaviors. The present study aimed to document these norms–behavior relationships for both risky and protective sexual behaviors, including alcohol-related sexual behavior. Gender was also examined as a possible moderator of the norms–behavior relationship. Undergraduate students ($n = 759$; 58.0% female) completed a Web-based survey, including various measures of drinking and sexual behavior. Results indicated that students underestimate sexual health-protective behaviors (e.g., condom use and birth control use) and overestimate the risky behaviors (e.g., frequency of drinking prior to sex, typical number of drinks prior to sex, and frequency of casual sex) of their same-sex peers. All norms were positively associated with behavior, with the exception of condom use. Furthermore, no gender differences were found when examining the relationship between normative perceptions and behavior. The present study adds to the existing literature on normative misperceptions as it indicates that college students overestimate risky sexual behavior while underestimating sexual health-protective behaviors. Implications for interventions using the social norm approach and future directions are discussed.

Introduction

At the forefront of psychological inquiry into health behaviors is the prediction of both risky and protective behaviors (Huebner, Neilands, Rebchook, & Kegeles, 2011), and as such, an array of health behavior theories have been developed and tested. Most of these theories include subjective norms, which have been shown to be one of the strongest predictors of health behaviors (e.g., Neighbors, Lee, Lewis, Fossos, & Larimer, 2007). The subjective norm construct has been widely studied in the realm of both alcohol use and sexual behavior (e.g., Armitage & Conner, 2001). Given that college students engage in a number of personal health behaviors, both risk and protective, it is important to determine the potential role that normative perceptions play on engaging in such behaviors. The purpose of the present research was to examine same-sex descriptive normative perceptions of both risk and protective behaviors and their relationship with an individual's own risk and protective behaviors. Furthermore, we aimed to evaluate gender as a possible moderator of the norms-behavior relationship.

Sexual Behavior among College Students

Sexual experience is common among young adults, with approximately 80% of unmarried young adults and college students being sexually active (Mosher, Chandra, & Jones, 2005). Moreover, research has shown that many young adults have had multiple sexual partners (Grello, Welsh, & Harper, 2006; Lyons, 2009; Mosher et al., 2005). Despite these high rates of sexual behavior, less than 40% report using condoms consistently (Chandra, Martinez, Mosher, Abma, & Jones, 2005; Douglas et al., 1997; Martinez, Chandra, Abma, Jones, & Mosher, 2006). In addition, only about 57% of college students reported using any form of contraception during their last sexual encounter, including female devices or hormonal contraception, and only about 45% of these individuals reported use of male condoms in addition to a secondary birth control method (American College Health Association [ACHA], 2011b). These behavioral patterns can potentially lead to negative consequences, including unplanned pregnancies and sexually transmitted infections (Cooper, 2002; Weinstock, Berman & Cates, 2004). Commensurately, reported rates of these consequences are highest among individuals ages 18 to 24 compared to other segments of the U.S. population (Centers for Disease Control and Prevention, 2011; Chandra, Mosher, Copen, & Sionean, 2011; Finer & Henshaw, 2006; Weinstock et al., 2004).

While risky sexual behavior, often defined as having multiple or casual sexual partners and unprotected sexual activity, is a public health concern in its own right, studies have also examined the cross-section of alcohol use and risky sexual behavior in college students. Alcohol use can expose individuals to various health risks (Hingson, Edwards, Heeren, & Rosenbloom, 2009; Perkins, 2002), including sex-related negative consequences. Alcohol consumption prior to intercourse can also contribute to a greater engagement in sex with a casual or not-well-known partner (e.g., Cooper, 2002; Patrick & Maggs, 2009; White, Fleming, Catalano, & Bailey, 2009), less discussion of risk information (e.g., Cooper, 2002), and greater likelihood of unprotected sex with a casual partner (Brown & Venable, 2007; Kiene, Barta, Tennen, & Armeli, 2009). Alcohol use has also been associated with increased number of lifetime sexual partners (Santelli, Brener, Lowry, Bhatt, & Zabin, 1998; Stanton

et al., 1999). As such, researchers and clinicians have called for an examination of when and why individuals are likely to use protective behaviors to guard against possible negative sex-related consequences.

Normative Perceptions

Decisions regarding personal health behaviors are often made within the context of the perceived risk behavior of others. According to social learning theory (Bandura, 1969, 1977) and later extended to social cognitive theory (Bandura, 1986), people's acquisition and maintenance of behaviors, including but not limited to health and risk behaviors, are dependent upon the interrelationships among behavior, environmental factors, and personal factors (cognitive, affective, and biological events). In particular, Bandura (1986) proposed that the acquisition of behavior can occur through observation of others or by communication with others. In other words, not only will direct reinforcement increase the likelihood of engaging in a behavior, but vicarious learning (e.g., seeing someone else reinforced) or modeling of a behavior will also increase the likelihood of the behavior. Thus, individuals first learn how to engage in various behaviors and then form expectations for reward and punishment related to these behaviors, through observation of proximal (e.g., parents, peers) and distal (e.g., media) models. The impact of this learning becomes evident when individuals actually engage in the behavior. For example, alcohol use may be initiated and maintained when faced with new social situations if a person perceives that alcohol enhances social skills or decreases inhibitions in others. Likewise, safer sexual practices may be avoided if a person perceives that these practices have negatively impacted others' intimate relationships.

Consistent with social learning theory, individuals' personal health behaviors are also influenced by their observations of the prevalence of risk and protective behaviors. That is, the potential for reward is inferred from perceptions of how common or uncommon a behavior is among others. However, these observations tend to be selective (i.e., focused on proximal peers who typically engage in similar risk or protective behaviors) and biased toward extreme cases (i.e., students who engage in heavy drinking or promiscuous behavior), contributing to overestimated or underestimated normative perceptions. A wealth of research has reliably demonstrated that college students tend to *overestimate* peer norms related to alcohol use (e.g., Baer, Stacy, & Larimer, 1991; Lewis & Neighbors, 2004; Perkins & Wechsler, 1996) and risky sexual behavior (e.g., Lewis, Lee, Patrick, & Fossos, 2007; Martens et al., 2006; Page, Hammermeister, & Scanlan, 2000; Scholly, Katz, Gascoigne, & Holck, 2005). These misperceptions are associated with *greater* engagement in these risk behaviors (Lewis et al., 2007; Lewis & Neighbors, 2004; Martens et al., 2006; Neighbors et al., 2007).

Conversely, research has begun to demonstrate that students tend to *underestimate* peer norms for protective drinking behaviors, such as limiting consumption and pouring their own drinks (e.g., Benton, Downey, Glider, & Benton, 2008; Lewis, Rees, & Lee, 2009), and protective sexual behaviors, such as condom use (e.g., Chernoff & Davison, 2005; Lynch, Mowrey, Nesbitt, & O'Neill, 2004; Scholly et al., 2005). Similar to risk behaviors, protective behaviors, while underestimated, are positively associated with engagement in the behavior

(Lewis, Rees, & Lee, 2009). In addition to research in college student populations, research has shown that men in a South African township overestimated risky drinking and sexual behaviors (e.g., number of sexual partners, drinking before sex, meeting sexual partners in shebeens) but underestimated protective behaviors (e.g., condom use; Carey et al., 2011). All descriptive normative perceptions were positively associated with behavior, including condom use. While research has examined risk and protective factors associated with drinking and sexual behavior among various populations, research has yet to examine both risk and protective behaviors associated with risky sexual behavior, including alcohol-related risky sexual behavior, in a college student sample. Thus, the present study will expand the findings of Carey and colleagues (2011) by determining whether college students overestimate risk and underestimate protection for both risk and protective behaviors associated with risky sexual behaviors.

Gender

Research has shown that the degree of normative misperception varies by the personal relevance of the reference group (Borsari & Carey, 2003; Larimer et al., 2009). That is, the strength of the association between a person's own behavior and his or her perception of others' behavior increases as the normative reference group becomes more similar to the individual (Borsari & Carey, 2003; Larimer et al., 2009; Lewis & Neighbors, 2004; Lewis, Rees, & Lee, 2009). As gender differences exist with respect to alcohol use and sexual behavior, consideration of same-sex norms related to personal risk behaviors may be important. Specifically, relative to women, significantly more men than women report having had six or more lifetime sexual partners (ACHA, 2011a; Douglas et al., 1997; Mosher et al., 2005), report greater condom use and greater consistency of condom use (ACHA, 2011a; Chandra et al., 2005; Martinez et al., 2006; Siegel, Klein, & Roghmann, 1999). In terms of alcohol, men report more frequent and greater consumption of alcohol, and more alcohol-related consequences and psychopathology; in addition, a greater percentage of men report heavy episodic consumption than do women (Ham & Hope, 2003; Nolen-Hoeksema, 2004; Wechsler, Lee, Kuo, & Lee, 2000; Wilsnack, Vogeltanz, Wilsnack, & Harris, 2000). Although a great deal is known about gender differences in both drinking and sexual behavior, little is known about the moderating role of gender when it comes to both risk and protective sexual behaviors. Research that has examined gender as a moderator of normative perceptions for risk behaviors has presented inconsistent findings, such that gender moderates the norms–behavior relationship for drinking (Lewis & Neighbors, 2004) but not for risky sexual behavior (Lewis et al., 2007). As such, a secondary goal of the present study was to examine gender as a moderator of hypothesized norm–behavior relationships for both risk and protective behaviors.

The Present Study

The present study adds to this growing literature by examining same-sex normative perceptions of both protective and risky sexual behaviors among college students and their relation to students' actual behavior. Gender was examined as a possible moderator of the norms–behavior relationship. It was expected that these associations would be present even when controlling for relevant covariates, such as typical weekly drinking and frequency of

sexual behavior (ACHA, 2011a; Ham & Hope, 2003; Wilsnack et al., 2000). The study intended to test the following hypotheses:

H1: It was predicted that students would underestimate peers' use of condoms and birth control and would overestimate peers' number of casual sexual partners, frequency of drinking alcohol prior to sex, and the number of drinks consumed prior to sex.

H2: It was predicted that normative perceptions would be positively associated with behavior.

Method

Participants

A total of 3,224 randomly selected undergraduate students ages 18 to 25 were invited to participate in a larger study on alcohol consumption and risky sexual behaviors in college. Of the invited sample, 1,468 (45.5%) agreed to participate and 1,388 (94.6%) completed the screening assessment. Recruitment rates were comparable to other large-scale studies within the college population (e.g., Marlatt et al., 1998; McCabe, Boyd, Couper, Crawford, & D'Arcy, 2002). Ethnicity of the sample was 61.0% Caucasian, 23.2% Asian, 9.4% multiracial, and 6.4% other. A small proportion of the sample identified as Hispanic (5.6%). The mean age for participants was 19.9 years ($SD = 1.52$). The majority of students (63.1%) reported that they were not currently in a monogamous relationship, and 94.4% identified as heterosexual. The majority of the sample was sexually experienced, with 68% of participants reporting having had sex at least once. Participants (759 students; 58.0% female) in the final analyses included only those students who reported having had sex at least once in the past three months.

Procedures

A list of randomly selected undergraduate students was requested from the university registrar's office, and 3,224 students were e-mailed and then mailed an invitation to take a 20-minute Web-based screening survey for a larger study on alcohol consumption and risky sexual behaviors. E-mail invitations were sent first, followed by a letter invitation two days later for those who had not yet completed the survey. Invitations provided a description of the study and instructed interested participants to go to the Web address provided and log in by entering a personal identification number (PIN). E-mail invitations comprised two e-mails: one contained the survey Web address; another contained the participant's PIN. Once participants logged in, they were directed to the study's information statement, containing all elements of informed consent. Those who agreed to participate were then routed to the screening survey. Participants who completed the survey were paid \$10 for their time. A federal certificate of confidentiality (AA-006-2008) was obtained, and all study procedures were approved by the university's institutional review board.

Measures

Items assessing all sexual behavior and all related items assessing normative misperceptions were adapted from those used by Lewis and colleagues (2007).

Frequency of sexual behavior—Frequency of sexual behavior was assessed with the following item: “How many times have you had sexual intercourse in the past 3 months?” Response options ranged from 0 = *None* to 25 = 25 + *times*.

Frequency of drinking prior to sex—Alcohol use in conjunction with sex was measured by the following question: “You said you had sex ____ time(s) in the past 3 months. Of the ____ time(s), how many times did you consume alcohol before or during the sexual encounter?” Response options ranged from 0 = *None* to 25 = 25 + *times*.

Perceived frequency of drinking prior to sex—To address perceptions of same-sex college peers' frequency of alcohol use prior to sex, participants were asked, “You said the typical male/female [university name] student had sex ____ time(s) in the past 3 months. Of the ____ time(s), how many times do you think the typical male/female [university name] student consumed alcohol before or during the sexual encounter?” Response options included from 0 = *None* to 25 = 25 + *times*.

Typical number of drinks prior to sex—The number of drinks consumed prior to sex was examined using the following question: “You said you had consumed alcohol before or during sex ____ time(s) in the past 3 months. During the ____ time(s), how many drinks on average did you consume?” Response options ranged from 0 = *None* to 25 = 25 + *drinks*.

Perceived typical number of drinks prior to sex—Estimates for the number of drinks their same-sex college peers consumed prior to sex was assessed with the following question: “You said the typical male/female [university name] student consumed alcohol before or during sex ____ time(s) in the past 3 months. On average, how many drinks?” Response options included from 0 = *None* to 25 = 25 + *drinks*.

Frequency of casual sexual intercourse—The frequency of casual sexual intercourse was indexed by asking, “How many times have you had sex with casual partners during the last 3 months?” Casual partners were defined as “a sexual partner with whom you are not in a committed relationship” or “someone you just met.” Sexual intercourse was defined as penile–vaginal, penile–anal, and oral intercourse. Response options ranged from 0 = *None* to 25 = 25 + *times*.

Perceived frequency of casual sexual intercourse—The question “How many times do you think has the typical male/female [university name] student had sex with casual partners during the last 3 months?” was used to determine the frequency of casual sexual intercourse for their same-sex college peers. Response options included 0 = *None* to 25 = 25 + *times*.

Frequency of condom use—Condom use was assessed by this question: “You said you had sex ____ time(s) in the past 3 months. Of the ____ time(s), how many times did you use a condom?” Response options ranged from 0 = *None* to 25 = 25 + *times*.

Perceived frequency of condom use—Participants were then asked to report their estimate of condom use for their same-sex college peers. Participants were asked: “You said

the typical male/female [university name] student had sex ____ time(s) in the past 3 months. Of the ____ time(s), how many times do you think the typical male/female [university name] student used a condom?" Response options ranged from 0 = *None* to 25 = 25 + *times*.

Frequency of birth control use—In order to determine other birth control use, participants were asked, "Of the ____ time(s) you had sex in the past 3 months, how many times did you (or your partner) use any method of birth control (i.e., the pill, IUD, Depo-Provera, Norplant, and sterilization), other than a condom?" Response options ranged from 0 = *None* to 25 = 25 + *times* and also included *Don't know* as an option.

Perceived frequency of birth control use—Finally, estimates for their same-sex college peers' use of other birth control methods were reported with this question: "You said the typical male/female [university name] student had sex ____ time(s) in the past 3 months. Of the ____ time(s), how many times do you think the [typical male (university name) student's partner/typical female (university name) student] used any method of birth control (i.e., the pill, IUD, Depo-Provera, Nor-plant, and sterilization), other than a condom?" Response options ranged from 0 = *None* to 25 = 25 + *times*.

Typical drinks per week—Typical number of drinks consumed per week during the last three months was assessed with a modified version of the Daily Drinking Questionnaire (DDQ; Collins, Parks, & Marlatt, 1985). Participants were provided the following definitions for the size and contents of a standard alcoholic drink: a 12-ounce beer, a 10-ounce wine cooler, 4 ounces of wine, a cocktail with 1 ounce of 100-proof liquor or 1-1/4 ounces of 80-proof liquor. Participants were asked: "Consider a typical week during the last three months. How much alcohol, on average (measured in number of drinks), do you drink on each day of a typical week?" A response table with each day of the week was presented, and participants filled in how much they typically drank on each day of the week. Scores were computed by summing the number of drinks on each day of the typical week.

Results

Descriptive Information

Zero-order correlations are presented in Table 1. Findings indicated that all normative perceptions were positively associated. Thus, individuals tend to have higher normative perceptions across risk and protective behaviors for their typical same-sex college peers. Findings also indicated that frequency of actual condom use was positively correlated with frequency of drinking prior to sex and frequency of casual sexual intercourse, which is likely due to the greater frequency of sex providing more opportunities for condom use. When examining risk behaviors (i.e., frequency of drinking prior to sex, typical number of drinks prior to sex, frequency of casual sexual intercourse), findings suggested that having greater normative perceptions was associated with more frequent risk behavior. However, when examining protective behaviors (i.e., frequency of condom use, frequency of birth control), there were no significant correlations between normative perceptions and actual behavior.

Perceived Descriptive Normative Perceptions by Sexual Risk Behavior

To determine whether students perceived that others engaged in risky sexual behavior more than they actually do, a series of repeated-measures multivariate analysis of covariances (MANCOVAs) was conducted. The primary dependent variables were frequency of drinking prior to sex, typical number of drinks prior to sex, frequency of casual sex, condom use frequency, and birth control use frequency. Personal behavior and perceived behavior (i.e., perceived male/female student drinking behavior) were entered as within-subject factors. Gender and frequency of sex in the past three months were entered as covariates.

For MANCOVA results, partial eta squared (η_p^2) describes the proportion of total variability of the dependent variable(s) attributable to an effect, with values of .01 for a small effect; .06 for a medium-sized effect; and .14 for a large effect (Cohen, 1988). Table 2 presents estimated marginal means and standard errors of personal behavior and perceived behavior for men and women.

Univariate findings (see Table 2) indicated there was a main effect for perceived and actual behavior (i.e., repeated measures) where men and women perceived others as drinking prior to sex more frequently, having more drinks prior to sex, and greater frequency of casual sex than they actually did. In addition, tests revealed a significant difference between perceptions of condom use and actual condom use. Individuals routinely underestimated condom use by same-sex peers. A similar pattern emerged for birth control use. Participants also underestimated the frequency of which same-sex students used any birth control method other than condoms. To evaluate if these perceptions were similar for women and men, we examined the relationship between repeated measures and gender. Findings indicated that there was an interaction between gender and misperceptions for frequency of drinking prior to sex (Wilks's $\Lambda = 0.99$, $F(1,715) = 3.89$; $p < .05$, $\eta_p^2 = .005$), such that females displayed greater misperceptions. No interactions between gender and misperceptions were found for typical number of drinks prior to sex and frequency of casual sex. However, interactions emerged where males displayed greater misperceptions relating to condom use than did females (Wilks's $\Lambda = .98$, $F(1,715) = 13.10$, $p < .001$; $\eta_p^2 = .02$), as well as greater misperceptions of birth control use (Wilks's $\Lambda = 0.98$, $F(1,704) = 7.53$, $p < .01$, $\eta_p^2 = .01$).

Predicting Behavior from Perceived Descriptive Norms

Hierarchical multiple regression analyses were conducted to determine whether same-sex normative perceptions regarding perceived peer sexual risk and protective behaviors were uniquely related to an individual's own behavior. Frequency of drinking prior to sex, frequency of casual sexual intercourse, frequency of condom use, and frequency of birth control use were examined separately. Hierarchical multiple regression was utilized to determine the unique association between normative perceptions and personal behavior above and beyond variables related to demographics and risky health behaviors relevant to the current sample (i.e., participants' gender, frequency of sex in the last three months, and typical drinks per week). Finally, we evaluated whether the relationship between perceived same-sex peer behavior and an individual's own behavior varied by gender. Main effects were entered at Step 1 and interaction terms were entered at Step 2. All predictors were

mean centered to facilitate interpretation of parameter estimates (Aiken & West, 1991; Cohen, Cohen, West, & Aiken, 2003). Effect sizes (Cohen's d) were calculated using the formula $d = 2t / \sqrt{df}$ (Rosenthal & Rosnow, 1991). Small, medium, and large effects are generally considered to be in the 0.2, 0.5, and 0.8 ranges, respectively (Cohen, 1992).

Frequency of drinking prior to sex—Results of a regression analysis indicated that, controlling for gender, frequency of sexual behavior in the past three months, and typical weekly drinking, there was a significant main effect of perceived norms for frequency of drinking prior to sex. Perceptions of peer frequency of drinking prior to sex was positively associated with a participant's own frequency of drinking prior to sex (see Table 3).

Typical number of drinks prior to sex—Similar analyses were run for typical number of drinks prior to sex. Findings indicated a significant main effect of perceived norms for typical number of drinks prior to sex. Believing that other same-sex peers consumed more drinks prior to sex was positively related to greater reports of respondents' own number of drinks prior to sex (see Table 3).

Frequency of casual sexual intercourse—Similar to frequency of drinking prior to sex and typical number of drinks prior to sex, results showed a significant main effect of perceived frequency of sex with casual partners where believing that other same-sex peers have sex with greater numbers of partners predicted the respondents' own reporting of having more frequent sex with casual partners (see Table 3).

Frequency of condom use—Unlike findings for frequency of drinking prior to sex and casual sex, results indicated there was no effect of perceived frequency of condom use by others on reports of the respondents' own condom use (see Table 3).

Frequency of birth control use—Finally, when examining frequency of birth control use, there was a significant main effect of perceived norms for birth control frequency. Perceiving that other same-sex peers used birth control frequently was positively associated with greater reports by the respondents of their own birth control use (see Table 3).

Discussion

The present study makes an important contribution to the social norms literature. While several studies have documented overestimated normative perceptions for risk behaviors, only a handful of studies has demonstrated underestimated normative perceptions for protective behaviors. Moreover, few studies have examined how underestimated normative perceptions for protective behaviors relate to actual behavior. Thus, to our knowledge, this study is the first to demonstrate that college students overestimate risk *and* underestimate protection for drinking and sexual behavior, as well as demonstrating how normative perceptions for risk and protection relate to actual drinking and sexual behavior. Findings from the present study support our hypotheses: students overestimate the normative perceptions of risky sexual behaviors and underestimate the normative perceptions of protective sexual behaviors. Specifically, we found that students overestimated the frequency of drinking prior to sex, typical number of drinks prior to sex, and frequency of

casual sex, and that they underestimated condom use and use of birth control methods other than condoms. Thus, students believed other same-sex students engaged in more risk behavior and less protective behavior than was actually the case. Furthermore, we found that all normative perceptions were positively associated with actual behavior, with the exception of condom use, which was not significant. Finally, findings indicated few gender differences when examining normative perceptions and no gender differences when examining gender as a moderator of the norms–behavior relationship.

These findings are largely consistent with other studies of social norms and health behaviors in college students (e.g., Borsari & Carey, 2003; Kilmer et al., 2006; Lewis & Neighbors, 2006; Lewis, Rees, & Lee, 2009). Specifically, these findings are consistent with research examining social norms regarding risky sexual behaviors (e.g., Chernoff & Davison, 2005; Hamilton & Mahalik, 2009; Hittner & Kennington, 2008; Huebner et al., 2011; Lewis et al., 2007; Martens et al., 2006; Miner, Peterson, Welles, Jacoby, & Rosser, 2009; Seal & Agostinelli, 1996). Furthermore, while previous studies using college student samples have shown over-estimation of risky sexual behaviors and underestimation of sexual protective behaviors (Chernoff & Davison, 2005; Lewis et al., 2007; Martens et al., 2006; Seal & Agostinelli, 1996), research has yet to examine how both overestimated and underestimated normative perceptions relate to actual sexual behavior. Thus, the present study extends previous research by showing that all normative perceptions, regardless of overestimation or underestimation, were positively associated with behavior, with the exception of condom use, among a heterosexual sample of college students. It is also important to note that the present study highlights that effect sizes for normative perceptions and their association with behavior was smaller for sexual behavior and drinking in relation to sexual behavior than previous studies examining only drinking (e.g., Neighbors et al., 2007).

The current findings broaden our knowledge about overestimation of risky sexual behavior and underestimation of protective sexual behaviors in gay and bisexual men and among men in a South African township (Carey et al., 2011; Huebner et al., 2011) by replicating and extending these findings in a sample of heterosexual college students in the United States. Of particular interest, our finding that normative perceptions for condom use was not associated with actual condom use was consistent with a 2011 study by Huebner and colleagues; in their study, they found that perceived descriptive norms regarding risky sexual behaviors related to unprotected anal sex cross-sectionally but not longitudinally in a sample of gay and bisexual men. Our finding was also consistent with Carey and colleagues' 2011 study, in which descriptive normative perceptions were found to be related to actual behavior, with the exception of condom use, among men in a South African township. Thus, across several studies and several differing populations, research has indicated that individuals overestimate risk and underestimate protection. Moreover, these studies show that normative perceptions are associated with actual behavior, except for condom use in the current study.

As previously indicated, the pattern of results regarding condom use diverged from the other behaviors of interest. There are a number of reasons why perceived norms would not be predictive of condom use among college students, because there are many different factors contributing to condom use. For example, an individual may perceive others to use condoms

often and desire to do so but lack sufficient condom negotiation skills or self-efficacy to employ them (e.g., Noar, Morokoff, & Harlow, 2002). In addition, many college students, women in particular, do not carry condoms or have them available; thus they may not have a condom when it is needed in a sexual situation (Lewis, Logan, & Neighbors, 2009).

Gender

Findings from the present study demonstrated gender differences in normative perceptions. When examining risk behaviors, there were gender differences only for frequency of drinking prior to sex, such that women had greater normative perceptions compared to men. However, when examining protective behaviors, there were gender differences for both outcomes (condom use, birth control use), with men displaying greater normative perceptions than women. It is interesting that women overestimated same-sex peer drinking prior to sex more often than did men. In the United States, social norms have diverged for men and women, and because our behavior is regulated by these social norms it is plausible for men and women to have differences in expected sexual behavior (Crawford & Popp, 2003; Marks & Fraley, 2005; Milhausen & Herold, 2001; Sprecher, McKinney, & Orbach, 1987). This difference may lead to women believing that alcohol is a necessary precursor to sex—especially sex outside of a relationship. As for protective behaviors, perhaps there were greater misperceptions for birth control for men than women because birth control is often viewed as a female behavior (i.e., men do not actually take the birth control pill, and other alternative female birth control methods, such as IUDs and diaphragms, are relatively covert; therefore, men do not know how often birth control other than condoms is actually used). As for condom use, men may have displayed greater normative perceptions than women because there is a general perception in the United States by men that condoms decrease physical pleasure, decrease sexual mood, and fit poorly (Conley & Collins, 2005; Hill, Amick, & Sanders, 2011; Kennedy, Nolen, Applewhite, Waiters, & Vanderhoff, 2007; Noar, Morokoff, & Redding, 2001; Reece, Herbenick, & Dodge, 2009). Therefore, it may be believed that men use condoms less often than they actually do. Finally, findings are consistent with previous research examining normative perceptions for sexual behavior such that gender did not moderate the relationship between normative perceptions and behavior (Lewis et al., 2007).

Clinical Implications

Social norms interventions, which include social norms marketing and personalized normative feedback (PNF), have been used to reduce many high-risk behaviors across various populations (e.g., Chernoff & Davison, 2005; Cunningham, Koski-Jännes, Wild, & Cordingley, 2002; Lewis & Neighbors, 2006; Perkins, Linkenbach, Lewis, & Neighbors, 2010). For example, Chernoff and Davison (2005) implemented an intervention for risky sexual behaviors in college students that included both PNF and goal-setting components. They found that for college men, the intervention increased condom use, and for women, the intervention decreased sexual partners. Findings from Chernoff and Davison (2005) provide encouraging results, suggesting interventions that include social norms components for sexual risk behavior can effectively change sexual risk behavior in college students. Although Chernoff and Davison (2005) found increases in condom use for college men, they did not conduct mediation analyses to examine whether changes in normative perceptions

for condom use led to changes in behavior. Thus, it could have been the goal-setting component that led to changes in condom use rather than the normative information.

The present findings suggest that further investigation of utilizing social norms specific to condom use is warranted, as normative perceptions for condom use were underestimated and did not associate with actual condom use. Specifically, research has shown that reducing overestimation of risk behaviors has led to reductions in relative behaviors (e.g., Neighbors, Larimer, & Lewis, 2004). However, research has yet to demonstrate that social norms interventions are efficacious at increasing underestimated protective behaviors and that these increases lead to higher engagement in the protective behavior. Prior to conducting intervention studies focused on increasing normative perceptions for underestimated protective behaviors, additional research is needed to see whether changing underestimated norms is necessarily a good thing. For example, Peterson and Bakeman (2006) found that, among men who have sex with men (MSM), believing HIV was less of a threat due to the availability of medical treatments was positively associated with risky sexual behavior with casual partners. Furthermore, injunctive norms for condom use mediated this relationship, such that believing HIV was less of a threat was associated with lower perceived approval of condom use and, in turn, associated with risky sexual behavior with casual partners. Although Peterson and Bakeman examined injunctive norms among MSM, this study suggests that future research is needed to examine these complex relationships. Finally, while there may be less support for focusing on underestimated protective behaviors in social norms interventions, condom use in particular, the current study does provide additional support for examining social norms interventions that focus on normative perceptions for risk behaviors, as these norms were overestimated and associated with actual behaviors.

Limitations/Future Directions

Our ability to make causal inferences is limited due to the cross-sectional nature of the present study. Because research has documented inconsistent findings regarding the longitudinal norms-behaviors relationship (e.g., Huebner et al., 2011; Neighbors, Dillard, Lewis, Bergstrom, & Neil, 2006), future research examining the relationships among drinking behaviors, sexual behavior, and social norms over time would be useful in evaluating causal precedence. Although the recruitment rates for this study were comparable to other large-scale studies in the college student population (e.g., Marlatt et al., 1998; McCabe et al., 2002), it is unclear how the present findings would generalize to all undergraduate college students. Furthermore, because this sample is limited to college students, additional research should replicate these findings in noncollege populations, adolescents, and other samples at high risk based on their drinking and sexual behavior. It is important to note that relationship status and partner coercion for unprotected sex were not accounted for in the present study. These two important variables should be examined in future research.

Conclusions

Findings indicate that students underestimate the healthy behaviors (i.e., condom use, birth control use) and overestimate the risky behaviors (i.e., frequency of drinking prior to sex,

frequency of casual sex) of their same-sex peers. All norms were positively associated with behavior, with the exception of condom use. Additional research is needed to empirically evaluate the use of personalized feedback interventions that utilize normative information for both risk and protective behaviors in efforts to decrease sexual risk-taking behaviors among college students.

Acknowledgments

Data collection was supported by National Institute on Alcohol Abuse and Alcoholism Grant K01AA016966. Manuscript preparation was supported by National Institute on Alcohol Abuse and Alcoholism Grants K01AA016966, T32AA007455, K99AA020869, and F31AA020134.

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Table 1
Zero-Order Correlations of Perceived Sexual Behaviors and Actual Sexual Behavior

Variable	1	2	3	4	5	6	7	8	9	10
1. Actual frequency of drinking prior to sex	—									
2. Perceived frequency of drinking prior to sex	.13**	—								
3. Actual typical number of drinks prior to sex	.46**	.01	—							
4. Perceived typical number of drinks prior to sex	.06	.27**	.33**	—						
5. Actual frequency of casual sex	.31**	.02	.21**	.01	—					
6. Perceived frequency of casual sex	.06	.63**	-.01	.23**	.12**	—				
7. Actual condom frequency	.19**	.04	.01	.03	.09*	.04	—			
8. Perceived condom frequency	.06	.71**	-.04	.12**	.01	.46**	.05	—		
9. Actual birth control frequency	-.02	-.04	-.01	.05	-.02	-.01	-.07	-.06	—	
10. Perceived birth control frequency	.087	.66**	-.01	.11**	-.01	.41**	-.05	.77**	-.04	—

*
 $p < .05$.

**
 $p < .01$.

Table 2

Estimated Marginal Means and Standard Errors

Variable	Overall		Males		Females		Results	
	Mean	SE	Mean	SE	Mean	SE	F(1,903)	Wilks's Λ
Frequency of drinking prior to sex							10.49***	0.99
Actual	2.72	0.28	2.88	0.32	2.56	0.29		
Perceived	3.97	0.29	3.75	0.34	4.20	0.31		
Typical number of drinks prior to sex							32.70***	0.96
Actual	3.20	0.21	3.65	0.25	2.78	0.22		
Perceived	4.46	0.15	4.80	0.18	4.13	0.16		
Frequency of casual sex							5.16*	0.99
Actual	1.77	0.36	1.94	0.42	1.60	0.38		
Perceived	2.74	0.28	2.80	0.33	2.68	0.30		
Condom frequency							7.50**	0.99
Actual	6.94	0.53	7.56	0.62	6.32	0.56		
Perceived	5.19	0.34	4.65	0.40	5.73	0.36		
Birth control frequency							33.20***	0.96
Actual	7.78	0.37	8.13	0.64	9.16	0.57		
Perceived	5.87	0.42	3.70	0.47	6.40	0.42		

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

Table 3
Hierarchical Regression Results

	<i>B</i>	β	<i>t</i> -value	<i>D</i>
<i>Frequency of Drinking Prior to Sex</i>				
Step 1				
Gender	−0.63	−0.08	−2.70**	−0.09
Frequency of sexual intercourse	0.20	0.44	15.67***	0.58
Typical drinks per week	0.20	0.51	17.90***	0.66
Perceived frequency of drinking prior to sex	0.06	0.06	2.21*	0.08
Step 2				
Perceived frequency of drinking prior to sex × Gender	−0.08	−0.05	−1.42	−0.05
<i>Typical Number of Drinks Prior to Sex</i>				
Step 1				
Gender	−0.07	−0.01	−0.41	−0.02
Frequency of sexual intercourse	0.01	0.01	0.31	0.01
Typical drinks per week	0.16	0.59	19.53***	0.72
Perceived typical number of drinks prior to sex	0.22	0.16	5.46***	0.20
Step 2				
Perceived typical number of drinks prior to sex × Gender	−0.14	−0.08	−1.74	−0.06
<i>Frequency of Casual Sex</i>				
Step 1				
Gender	−0.17	−0.02	−0.48	−0.01
Frequency of sexual intercourse	0.05	0.85	2.34*	0.08
Typical drinks per week	0.11	0.26	7.00***	0.26
Perceived frequency of sex with casual partners	0.13	0.10	2.87**	0.11
Step 2				
Perceived frequency of sex with casual partners × Gender	−0.12	−0.07	−1.38	−0.05
<i>Condom Use Frequency</i>				
Step 1				
Gender	1.32	0.09	2.49*	0.09
Frequency of sexual intercourse	0.36	0.42	12.09***	0.44
Typical drinks per week	−0.02	−0.02	−0.69	−0.03
Perceived condom use frequency	−0.04	−0.02	−0.70	−0.03
Step 2				
Perceived condom use frequency × Gender	0.12	0.04	1.02	0.04
<i>Birth Control Use Frequency</i>				
Step 1				
Gender	−0.90	−0.04	−1.62	−0.06
Frequency of sexual intercourse	0.78	0.69	26.24***	0.97
Typical drinks per week	0.04	0.04	1.61	0.06

	<i>B</i>	<i>β</i>	<i>t</i> -value	<i>D</i>
Perceived Birth control use frequency	0.15	0.08	2.92**	0.11
Step 2				
Perceived Birth control use frequency × Gender	0.12	0.04	1.15	0.04

*
 $p < .05$.

**
 $p < .01$.

 $p < .001$.