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Evaluating Level of Specificity and Discrepancy of Normative Referents in Relation to Personal Condom Use Among College Students

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Abstract

Few evidence-based interventions have effectively increased college students' condom use. There is a large literature supporting the efficacy of alcohol normative feedback interventions, components of which may be useful for the development of condom promotion interventions. While normative feedback interventions traditionally provide feedback associated with a typical student referent, more socially proximal referents may exert a greater influence over behavior compared to distal referents. However, developing discrepancy between perceived and actual norms is also essential for such interventions, and the greatest discrepancy is generated when a distal referent is utilized. Therefore, the goal of this study was to determine which combination of referent proximity and width of discrepancy produces the greatest motivation to increase condom use among college students. We hypothesized that students who were provided feedback that produced a wide discrepancy between perceived and actual norms for a gender-matched referent would be most willing to increase condom use. A total of 212 sexually active college students (50.5% female) recruited via Amazon Mechanical Turk participated in on online experimental study that included four conditions: proximal referent wide discrepancy, proximal referent narrow discrepancy, distal referent wide discrepancy, distal referent narrow discrepancy. A three-way factorial analysis of covariance (ANCOVA) revealed a significant interaction between referent proximity and width of discrepancy such that the effect of proximity on willingness to use condoms was greater in the narrow, as compared to wide, discrepancy condition. Findings from this study suggest that it may be beneficial to assess students' perceptions of their peers' sexual behavior before selecting the referent to include in normative feedback.

Keywords: sexual risk behavior, condom use, college student, normative feedback

Evaluating Level of Specificity and Discrepancy of Normative Referents in Relation to

Willingness to Change Condom Use Among College Students

By

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Condom Use Among College Students

Condomless sex and associated consequences are a continuing concern on college

campuses. Although making up just over one quarter of the sexually active population,

adolescents and emerging adults account for approximately half of the 20 million new sexually

transmitted infections (STIs) each year, including 45% of Gonorrhea infections and 63% of

Chlamydia infections (Center for Disease Control and Prevention [CDC], 2017). While

consistent condom use has been identified as the most accessible and inexpensive STI prevention

strategy (Satterwhite et al., 2013), only 41% of college students who engaged in vaginal

intercourse in the past 30 days reported always consistently and correctly using a protective

barrier (American College Health Association [ACHA], 2020). As such, focused public health

interventions targeting condom promotion among college students are necessary.

College students experience unique developmental and contextual factors that influence

their risk of engaging in condomless sex. The life stage between age 18 and 25, defined as

emerging adulthood, represents a transitional period in which individuals have left the

dependency of childhood but not yet taken on the responsibilities associated with adulthood

(Arnett, 2014). During this period, emerging adults experience a newfound independence over

personal sexual health as sexual behavior becomes more normative and consistent condom use

becomes less frequent (Brodbeck et al., 2013; Capaldi et al., 2002; Fergus et al., 2007; Herbenick

et al., 2010; Pingel et al., 2012). Further, contextual factors associated with condomless sex such

as binge drinking (i.e., 4 [women] or 5 [men] or more alcoholic drinks over a 2-hour period;

Certain et al., 2009) permeate college campuses. Although college students are at increased risk

of engaging in condomless sex as a result of both developmental and contextual factors, post-

secondary institutions have not prioritized sexual health interventions as highly as other health concerns (e.g., alcohol use; Mastroleo & Logan, 2014).

Condom Promotion Interventions on College Campuses

No state legally mandates sexual health education at the post-secondary level and only 21 states require comprehensive sex education at the high school level (National Conference of State Legislatures, 2020). Consequently, over 40% of college students report never receiving information from their college regarding STI prevention (ACHA, 2020). Even though most colleges (86.3%) in the United States (U.S.) have implemented campus-wide condom distribution programs (Butler et al., 2014), the CDC recommends that such initiatives be coupled with supplemental behavioral interventions (CDC, 2015). While condom promotion interventions on college campuses have sought to raise awareness about the risks associated with condomless sex, very few have explicitly focused on increasing the behavior of condom use (Habel et al., 2015; Whiting et al., 2019), which is insufficient for STI prevention (Campbell & Mzaidume, 2002). Although there is a dearth of evidence-based condom promotion interventions for college students (Whiting et al., 2019), there are evidence-based alcohol interventions that can be used as a guide.

Alcohol Interventions on College Campuses

The National Institute on Alcohol Abuse and Alcoholism (NIAAA) recommends the Brief Alcohol Screening and Intervention for College Students (BASICS; Mastroleo & Logan, 2014). The BASICS intervention includes several educational and behavioral elements intended to reduce students' drinking; however, when compared with an intervention that solely utilized a single component of the intervention, normative feedback, both interventions performed similarly (LaBrie et al., 2013). Indeed, stand-alone normative feedback interventions have been

shown to significantly reduce college students' alcohol consumption levels, frequency of alcohol-related harms, and alcohol use prior to sex (Dotson et al., 2015; Lewis et al., 2014), suggesting that exclusively correcting misperceptions of peers' alcohol-related behavior may be as efficacious as more exhaustive interventions. Many of the underlying theoretical components of normative feedback interventions are applicable to the modification of other health-related behaviors, indicating potential for translation to condom use behavior.

Theoretical Framework of Normative Feedback Interventions

According to Social Norms Theory, behavior is influenced by perceptions of how peers think and act (Perkins & Berkowitz, 1986). Normative perceptions are formed via selective and biased observations of visible risk behaviors (e.g., public drunkenness, causal "hookups" at a party; Perkins & Berkowitz, 1986). Misperceived observations generate a discrepancy between what is viewed as the typical standard in a group (i.e., perceived norm) and the real beliefs or actions of a group (i.e., actual norm). Inaccurate beliefs about the frequency of peer engagement in health-compromising behaviors are predictive of personal engagement in such behaviors (Dotson et al., 2015). Thus, correcting erroneous normative perceptions via feedback is the proposed mechanism of behavioral change in normative feedback interventions (Perkins & Berkowitz, 1986). Normative feedback interventions challenge misperceptions by drawing attention to discrepancies between perceived and actual peer behavior through informational feedback (Dempsey et al., 2018). Interventions utilizing normative feedback are especially well-suited for populations that tend to be influenced by peers' behaviors and overestimate peers' engagement in health-compromising behaviors, such as college students (Kinard & Webster, 2010; Neal & Carey, 2004). Interventions with personalized feedback have demonstrated substantial success at reducing alcohol-related behaviors among college students (Dotson et al.,

2015). Such success may also be demonstrated in normative feedback interventions for condom use.

Normative Feedback Interventions for Condom Promotion

While condomless sex is not as visible a risk behavior as alcohol consumption; precursors to condomless sex (e.g., kissing and fondling on the dance floor) are highly observable and prevalent on college campuses, particularly those that have proximal near-campus parties or bar scenes (Bogle, 2008). Further, college students tend to misperceive the sexual behaviors of their peers such that they overestimate their peers' engagement in sexual risk behaviors (e.g., number of sexual partners) and underestimate their peers' engagement in protective sexual behaviors (e.g., condom use; Chernoff & Davison, 2005; Lewis et al., 2007; Scholly et al., 2005). Although few studies have examined the efficacy of normative feedback for condom promotion among college students, elevated normative perceptions of peers' sexual behaviors have been shown to predict students' own sexual behavior, suggesting that correcting elevated perceived norms may elicit changes in behavior (Bon et al., 2001; Lewis et al., 2007; Lewis, Litt, et al., 2014; Martens et al., 2006; Mashegoane et al., 2004; Trafimow, 2001). Some studies have incorporated normative feedback for condom promotion as a component of a larger skills-based STI risk reduction intervention (Dermen & Thomas, 2011; Jaworski & Carey, 2001; Kiene & Barta, 2006); however, only two studies have evaluated the efficacy of a stand-alone normative feedback intervention for condom promotion among emerging adults (Chernoff & Davison, 2005; Lewis et al., 2019), and of these two studies, only one utilized a college student sample (Chernoff & Davison, 2005).

Briefly, in a sample of emerging adults who reported inconsistent condom use during vaginal or anal sex after drinking in the past month, normative feedback targeting sexual activity

significantly reduced number of casual sex partners, likelihood of alcohol consumption prior to sex, and number of alcohol-related negative consequences at one-month follow-up (Lewis et al., 2019). Condom use remained unchanged, perhaps a result of the different contextual factors influencing non-matriculated emerging adults' condom use compared to college students (Bogle, 2008; Holman & Sillars, 2012; Paul & Hayes, 2016). Conversely, Chernoff and Davison (2005) assessed the efficacy of a stand-alone normative feedback intervention for condom promotion specifically tailored to college students. There was a significant group X gender interaction for condom use such that men in the intervention group significantly increased their condom use at 30-day follow-up (from 64.3% to 76.7%), whereas men in the control group decreased their condom use at follow-up (from 48.5% to 38.6%). Condom use remained the same for women in both groups at pre- and post-intervention. One hypothesis for the differential effects of the intervention for men compared to women was that the intervention was efficacious at only changing behaviors over which participants had more direct control. For example, men may have been more inclined to increase condom use compared to women because they have more unilateral control over this behavior, whereas women may have been more willing to reduce their number of sexual partners as a risk reduction strategy. Further, the mixed efficacy may be explained, in part, by the decision to utilize a generic typical student as the feedback reference group, which may not have been perceived as a salient peer (Lewis & Neighbors, 2006a).

The role of reference group proximity in normative feedback interventions

Inconsistencies in findings across normative feedback interventions may be partially attributed to the frequent use of a generic reference group (Borsari & Carey, 2003; Lewis & Neighbors, 2006a; Prentice & Miller, 1993). The typical college student is predominately perceived as White and male, yet most normative feedback interventions utilize the "typical

college student" as a referent (Lewis & Neighbors, 2006b). According to Social Comparison Theory (Festinger, 1954), socially proximal referents are more relevant and have a greater influence over personal attitudes, beliefs, and behaviors compared to socially distal referents. Thus, utilizing reference groups that are more demographically similar to respondents, such as providing feedback for a referent matched for gender, may enhance the efficacy of normative feedback interventions. Indeed, a gender-matched referent group may be particularly relevant for normative feedback interventions targeting sexual behavior given the discrepancies in reported sexual behavior and risk-reduction strategies among male and female college students (ACHA, 2020; Chernoff & Davison, 2005; Fehr et al., 2017; Grady et al., 1996; Jaworski & Carey, 2001; Myers & Clement, 1994). Yet, the empirical evidence is inconclusive.

Several studies have found that perceived norms of socially proximal referents are more predictive and influential of personal health behaviors compared with distal referents (Carey et al., 2010; Larimer et al., 2009; Lewis et al., 2007; Lewis & Neighbors, 2006a); however, LaBrie and colleagues (2013) found that normative feedback for the typical student referent was, in fact, most efficacious in reducing college students' alcohol consumption. It was hypothesized that the typical student referent was most efficacious at modifying drinking behavior because students were able to project characteristics they perceived as most salient and prototypical of a heavy-drinking college student onto the non-descriptive generic referent (LaBrie et al., 2013). This resulted in the typical student referent being associated with the heaviest alcohol consumption, subsequently generating the *greatest discrepancy* between students' normative perception of peers' alcohol consumption and peers' actual reported alcohol consumption. In support of the primary assumption of normative feedback interventions, drawing attention to the large

discrepancy between perceived and actual peer behavior resulted in the greatest reduction in weekly drinking.

The role of discrepancy in normative feedback interventions

Developing discrepancy between normative perceptions and actual norms is an essential component of normative feedback interventions. According to the Self-Regulation Theory (Kanfer, 1986), experiencing a sufficiently high level of discrepancy between personal attitudes, beliefs, and behaviors and an external source's (e.g., peer) attitudes, beliefs, and behaviors can evoke negative affect and a desire to reduce the discrepancy. While it remains unclear what level of discrepancy is necessary to produce motivation to change personal behavior, the normative feedback literature suggests that utilizing a typical student referent produces the greatest discrepancy between perceived and actual norms (Larimer et al., 2011). This is likely because students' perceptions of peers' behaviors become more distorted for groups they know less well (Perkins, 1997), and estimates for proximal reference groups may be more factually based than estimates for distal reference groups (Bosari & Carey, 2003). As such, only the efficacy of socially proximal reference groups that produce a narrow discrepancy between perceived and actual norms has previously been examined.

The evidence presented thus far indicates that *both* reference group proximity and width of discrepancy between perceived and actual norms independently influence the efficacy of normative feedback interventions. Normative feedback that utilizes socially proximal referents is perceived as more salient to respondents and more predictive of personal behavior, and a wide discrepancy between perceived and actual norms has demonstrated greater behavioral change than a narrow discrepancy. However, it remains unclear in the literature how social proximity of referent and width of discrepancy between perceived and actual norms interact to influence motivation for behavioral change, specifically in the context of college students' condom use.

Therefore, this study aims to address this gap in the literature by exploring the combination of reference group proximity and width of discrepancy that produces the greatest willingness to increase protective sexual behavior (i.e., condom use) in a sample of college students.

Purpose of the Present Study

The current study used an experimental framework to explore factors that may influence the degree of intervention efficacy of normative feedback interventions targeting sexual behavior among college students. Research evaluating normative feedback interventions among college students has primarily focused on alcohol consumption. While there is evidence in the alcohol use literature that social proximity of reference groups is an influential component of such interventions, few studies have attempted to replicate these findings in the context of college students' sexual behavior. **Therefore, the first aim of this study** was to extend findings regarding social norms from the alcohol use literature by examining if perceived norms for condom use and number of sexual partners varied based on level of reference group specificity (i.e., gender-neutral peer vs gender-matched peer; LaBrie et al., 2013; Larimer et al., 2009; Lewis & Neighbors, 2006a). Consistent with previous findings, **we hypothesized that** students would underestimate the frequency of condom use and overestimate number of sexual partners for both reference groups. Further, we predicted that estimates of condom use for gender-neutral referents would be lower compared to estimates of condom use for gender-matched referents and the inverse for estimates of number of sexual partners.

The second aim of this study was to extend findings from the alcohol use literature by examining if normative perceptions for a socially proximal peer (i.e., gender-matched referent) were more strongly correlated to personal sexual behavior compared to normative perceptions for a socially distal peer (i.e., gender-neutral referent). **We hypothesized that** perceived norms

for a gender-matched referent would be more strongly correlated to personal sexual behavior compared to perceived norms for a gender-neutral referent.

Finally, the third aim of this study was to examine the extent to which reference group proximity and width of discrepancy between perceived and actual norms interacted to influence motivation for increasing personal condom use. While this study utilized sham normative data as part of the experimental manipulation instead of actual norms, we retain the term "actual norm" for consistency, as it is commonly described as such in the normative feedback literature. **We hypothesized that the interaction between reference group specificity and width of discrepancy would differ by gender. For women**, we hypothesized an interaction between referent proximity and width of discrepancy such that participants who were provided with sham feedback that produced a wide discrepancy between perceived and actual norms for a gender-matched referent would be most willing to increase their personal condom use and participants who were provided with sham feedback that generated a narrow discrepancy between perceived and actual peer norms for a gender-neutral referent would be least willing to increase their personal condom use. **For men,** we expected the referent proximity manipulation to exert less influence on participants' motivation to increase personal condom use given that the typical student is already perceived as male (Lewis & Neighbors, 2006b); therefore, we predicted a main effect of referent proximity on willingness to increase condom use such that those who received feedback for a proximal referent would be more willing to increase condom use compared to those who received feedback for a distal referent. We also predicted a main effect of width of discrepancy on willingness to increase condom use such that those who received feedback that generated a wide discrepancy between perceived and actual norms would be more willing to

increase personal condom use than those who received feedback that generated a narrow discrepancy between perceived and actual norms.

Given that a reduction in number of sexual partners was the primary sexual risk reduction strategy implemented by female participants in the Chernoff & Davison (2005) study, as an **exploratory aim**, this study also examined the extent to which referent proximity and width of discrepancy between perceived and actual norms interacted to influence motivation for reducing number of sexual partners. **We hypothesized** the same interaction between reference group specificity and width of discrepancy as for condom use; however, since women may be more prone to select a reduction in number of sexual partners as a risk reduction strategy, and the proximity manipulation may exert a stronger influence on women's motivation to decrease sexual risk behavior compared with men, we hypothesized that the interaction would be of greater magnitude for women.

Methods

Overview

The study proceeded in two phases. In phase one, pilot studies were conducted to examine if participants perceived the reference group proximity and width of discrepancy manipulations as intended. In phase two, a 2 (proximity) X 2 (width of discrepancy) X 2 (gender) randomized-factorial experiment was conducted to examine the influence of referent proximity and width of discrepancy between perceived and actual norms on motivation to increase condom use. Consistent with prior research (Chernoff & Davison, 2005), , heterosexual, sexually active college students were recruited in each phase to participate in an internet-based survey via SONA, a research study participant pool for students completing the introductory psychology course, and Amazon Mechanical Turk (MTurk), an online labor market in which individuals are

paid to complete online tasks and surveys. MTurk provides a cost-effective means of collecting valid and reliable data from a demographically diverse population (Buhrmester et al., 2011). Researchers have been able to successfully replicate established psychological effects using samples from MTurk (Crump et al., 2013; Paolacci, 2010) and some research has found that MTurk workers are as likely or even more likely to pass instructional manipulation checks compared to traditional undergraduate samples (Casler et al., 2013; Hauser & Schwarz, 2016). Eligibility criteria for all study phases were as follows: between the ages of 18 and 25 (i.e. emerging adults); self-identified heterosexual; sexually active (i.e., having two or more partners with whom they have had sexual intercourse in the last year; Chernoff & Davison, 2005), English-speaking, and able to provide informed consent. An equal number of male and female participants were enrolled. All questionnaires were administered online via Research Electronic Data Capture (REDCap), an internet-based, data-collection system that allows for secure computerized collection and storage of data as well as stratified randomization algorithms (https://projectredcap.org/). All study procedures were approved by the Syracuse University Institutional Review Board.

Measures

      Individual-Difference Measures. In order to account for potential confounding effects, the following individual-difference characteristics were measured as potential covariates and incorporated into the data analysis plan.

      Screening Measures. Participants provided their age, gender identity, sexual orientation, and number of sexual partners in the past year as part of an electronic pre-screening questionnaire.

Sample Demographics. A demographic questionnaire was administered to collect information on participant age, class year, gender identity, sexual orientation, race, ethnicity, campus residence (i.e., living on or off campus), and current relationship status (i.e., single, in a monogamous relationship, in a non-monogamous relationship). Students were also asked to report if they received sexual health education in elementary, middle, and/or high school and if proper condom use techniques were taught (e.g., how to put on and take off a male condom). To assess for any possible regional differences in the type of sexual health education received at the primary or secondary school level, students were asked to report the state/s in which they attended school prior to college.

Sexual Behavior Questionnaire. Sexual behavior was assessed using a questionnaire adapted from interview and assessments regarding sexual experiences of college students (Maisto et al., 2004; Martens et al., 2006; Stappenbeck et al., 2013). Respondents were asked to report on their lifetime, past year, and past 3-month sexual partners. Additionally, participants were asked how many times in the past 3-months and past 30-days they engaged in oral, vaginal, and anal sex. Participants were also provided a list of common STIs and asked to check any that they have been diagnosed with during their lifetime, past year, and past 3-months. Last, three questions adapted from Chernoff and Davison (2005) relating to consuming alcohol and/or other drugs prior to sex and talking with a sexual partner about condom use prior to sex were included in the survey.

Condom Use Self-Efficacy. High levels of condom-use self-efficacy have been linked to decreased likelihood of condomless sex among college students (French & Holland, 2013). The Condom Use Self-Efficacy Scale (CUSES; Brafford & Beck, 1991) is a 28-item scale that was developed to measure self-efficacy in purchasing, applying and removing condoms, and

negotiating condom use with partners. A shortened, 16-item version of this scale (MCUSES) has demonstrated excellent internal consistency (α = .89) in assessing behavioral performance of condom use and discussion of condom use (Woolf-King & Maisto, 2015), and was used in the present study. In the experimental study, the mean score of the MCUSES was 3.45 (*SD* = .54), which is over two standard deviations below the mean score of a university-recruited college sample (N = 259, *M* = 5.08, *SD* = .70; French & Holland, 2013), indicating that participants in this study reported significantly lower condom use self-efficacy compared to non-MTurk recruited sample. The scale demonstrated high internal consistency (α = .90), and the distribution of scores did not indicate skewness (*z*-score = -.56) or kurtosis (*z*-score = .514).

Alcohol Consumption. The Alcohol Use Disorders Identification Test-Consumption (AUDIT-C; Bush et al., 1998) was used to characterize the drinking behavior of the sample. Consistent with studies that have used the AUDIT-C with college student samples (Campbell & Maisto, 2018; Demartini & Carey, 2012) cut-off scores for at-risk drinking of 5 for females and 7 for males were used in this study. In the experimental study, 51% of male students and 73% of female students screened positive for at-risk drinking. The scale demonstrated acceptable internal consistency (α = .72) and the distribution of scores did not indicate skewness (*z*-score = .41) or kurtosis (*z*-score = -.20).

Drinking Motives Questionnaire. The Drinking Motives Questionnaire (DMQ) contains 20 items assessing reasons people might be motivated to consume alcohol (Cooper, 1994). The measure yields four scale scores reflecting different motives for consuming alcohol: social, coping, enhancement, and conformity. Unlike university recruit samples (Grant et al., 2009), participants in this study reported higher drinking motives for all four subscales. In the experimental study, the mean of each scale score was as follows: social (*M* = 3.03; *SD* = 0.75),

coping (M = 2.45; SD = 0.43), enhancement (M = 2.78; SD = 0.66), and conformity (M = 4.80; SD = 0.39). The scale demonstrated high internal consistency (α = .95), and the distribution of scores did not indicate skewness (z-score = .03) or kurtosis (z-score = -.21).

Sexual Sensation Seeking. The 11-item Sexual Sensation Seeking Scale (SSSS) assesses inclination for diverse and new sexual experiences, and willingness to take risks for the purpose of enhancing sexual sensations (Gaither & Sellbom, 2003; Kalichman et al., 1994). Higher scores indicate a greater propensity to engage in novel sexual experiences. Consistent with previous research that has examined college students' sexual sensation seeking (Gaither & Sellbom, 2003), the mean of the SSSS was 2.35 (SD = 0.42), the scale demonstrated high internal consistency (α = .86), and the distribution of scores did not indicate skewness (z-score = .24) or kurtosis (z-score = -.13).

Sex Motives Questionnaire. Personal motivations for engaging in sexual risk may influence normative perceptions of peers' engagement in similar behaviors (Kenney et al., 2013). To characterize the sexual motivations of this sample, the Sexual Motives Questionnaire (SMQ) was used (Cooper et al., 1998). Six discrete motives for sex were assessed: enhancement, intimacy, coping, self-affirmation, partner approval, and peer approval. In the experimental study, the mean of each domain of the SMQ was as follows: enhancement (M = 4.11; SD = .97), intimacy (M = 3.86; SD = 1.12), coping (M = 2.10; SD = 1.19), self-affirmation (M = 2.36; SD = 1.34), partner approval (M = 2.08; SD = 1.23), and peer approval (M = 2.08; SD = 1.31). Similar to studies that have examined sex motives in university recruited samples (Blayney et al., 2018; Cooper et al., 1998), enhancement and pleasure were the most endorsed motives for engaging in sexual activity in this sample. The scale demonstrated acceptable internal consistency (α = .67), and the distribution of scores did not indicate skewness (z-score = .83) or kurtosis (z-score = .85).

Emerging Adulthood. The adapted 8-item Inventory of Dimensions of Emerging Adulthood (IDEA-8) was used to assess four factors associated with emerging adulthood: experimentation, negativity, identity exploration, and feeling in between (Baggio et al., 2015). In comparing the full-scale IDEA with the 8-item short form, the IDEA-8 yielded good psychometric properties, high convergence with the initial scale, and strong empirical validity (Baggio et al., 2015; Faas et al., 2018). In the experimental study, the means of the IDEA-8 subscales were as follows: experimentation ($M = 3.17$; $SD = 0.54$), negativity ($M = 3.07$; $SD = 1.10$), identity exploration ($M = 3.24$; $SD = 0.89$), and feeling in between ($M = 3.37$; $SD = 0.77$). The scale demonstrated acceptable internal consistency ($\alpha = .78$), and the distribution of scores did not indicate skewness (z-score = -.54) or kurtosis (z-score = .11).

Perceived Descriptive Norms. Participants were asked questions related to their perceptions of their peers' sexual behavior for the following groups: typical university student, typical male university student, and typical female university student. Adapted from Chernoff & Davison (2005), participants were asked to estimate the percentage of students who had engaged in the following sexual behaviors in the past three months: abstinence from all sexual activity, sexual intercourse with one sexual partner, sexual intercourse with two or more sexual partners, used a condom all or most of the time, never used a condom, talked with their sexual partner about using a condom before or during intercourse, consumed alcohol in conjunction with all or most of their sexual encounters, and used cannabis or other drugs in conjunction with all or most of their sexual encounters.

Dependent Measures. Research suggests that there are three critical components of motivation for behavioral change: willingness, readiness, and ability (Miller & Rollnick, 2002). Willingness refers to the extent that an individual wants, desires, or wills to change whereas

readiness represents an individual's relative priorities to change. Last, motivation depends on an individual's confidence in their ability to change (W.R. Miller & Rollnick, 2002).

Primary Outcome Measure: Willingness to change condom use. To assess how willing participants were to modify their condom use behavior, a single item scale adapted from Chernoff and Davison (2005) asked participants, "On an 11-point scale ranging from "not at all" (0) to "extremely" (10), how willing are you to increase your condom use over the next three months?"

Secondary Outcome Measures: Readiness to change, decisional balance, and sexual health information seeking. The Condom Use Ruler was used to assess participants' readiness to adopt, maintain, and/or increase condom use (LaBrie et al., 2005). Participants were asked to rate their readiness to change their condom use by selecting the position on the ruler that best described them. Response choices on the Condom Use Ruler ranged from 0 to10, with the following anchors: 0 = *Never think about safe sex*; 3 = *Sometimes I think about using condoms more*; 5 = *I have decided to use condoms more often*; 7 = *I am already trying to use condoms more during sex*; 10 = *My condom use has changed to use always*. The Condom Use Ruler has demonstrated high concurrent validity with multidimensional readiness to change measures (e.g., Readiness to Change Risky Sexual Behavior scale, $r(95) = .771$, $p < .01$; LaBrie et al., 2005).

The decisional balance measure assessed individuals' positive and negative attitudes towards behavior change. A 5-item perceived benefit scale and 5-item perceived barrier scale were used to assess participants' perceptions of the benefits of and barriers to condom use (Grimley et al., 1997). Each item was measured on a 5-point Likert-type scale ranging from 1 (not important) to 5 (extremely important). Higher scores represented more perceived benefits or barriers to condom use (Tung et al., 2009).

Although intentions are a key antecedent of condom use behavior (Albarracín et al., 2001; Fishbein, 2008), some people who intend to use condoms do so successfully, while others do not follow through with their intentions (Abraham et al., 1999). Given that intentions to use condoms may not always predict future condom use, a behavioral task relating to condom use was incorporated into the study. Participants were informed at the end of the online survey to click on a link if they were interested in learning more about sexual health resources. The link directed participants to Planned Parenthood's Sexual Health page (https://plannedparenthood.org /learn) which contains information on how to have sex safely, pleasurably, and with consent, as well as the different sexual health services available nationwide.

Exploratory Outcome Measure: Willingness to reduce number of sexual partners. To assess how willing participants were to modify their number of sexual partners, a single item scale adapted from Chernoff and Davison (2005) asked participants, "On an 11-point scale ranging from "not at all" (0) to "extremely" (10), how willing are you to reduce your number of sexual partners over the next three months?"

Manipulation Checks.

Identification with Reference Group. To assess for differences in perceived social proximity of the reference groups (i.e., gender-neutral referent, gender-matched referent), the Inclusion of Other in the Self (IOS) scale (Aron et al., 1992; Tropp & Wright, 2016) was administered. Participants were presented with a series of seven Venn diagrams ranging from 1 to 7, with 1 representing completely non-overlapping circles (i.e., very low identification) and 7 representing nearly complete overlapping circles (i.e., very high identification). Participants were asked to select the diagram which best represented their level of identification with the peer provided in the feedback condition. The IOS scale has demonstrated good test-retest reliability,

and adequate concurrent, discriminant, and construct validity in assessing group identification (Tropp & Wright, 2016).

  Identification of Discrepancy. To assess for differences in perceived width of discrepancy between perceived norms and the norms provided in the sham feedback, participants were asked the following question: "Describe the width of discrepancy between your perception of your peers' [condom use or average number of sexual partners] in the past 3-months and your peers' actual reported [condom use or average number of sexual partners] in the past 3-months on an 11-point scale ranging from 0 (no discrepancy) to 10 (large discrepancy)."

  Perceived Realism of Width of Discrepancy. Participants were asked to report on how realistic the discrepancy between their perceived norms and the reported norms was on a 4-point Likert-type scale ranging from 1 (not realistic) to 4 (very realistic). Participants were also asked to describe what would have been a more realistic discrepancy (open-ended question).

  Typical Student Profile. To elucidate any potential gender differences in perceptions of the referent proximity manipulation, participants were asked to complete a demographic questionnaire representing the profile of the perceived typical university student. Participants were given the following instructions adapted from Lewis and Neighbors (2006): "Think about the typical college student at your university. Please fill in the following demographic information for your perception of the typical college student at your university." Requested information included gender, race, ethnicity, age, residence status, Greek affiliation, and student athlete affiliation. Additionally, after students received the sham feedback, they were asked to generally describe who they were thinking about in relation to the reference group provided in the feedback (i.e., "The feedback you received mentioned the health behaviors of a specific

group of students on campus. Please generally describe who were you thinking about when you received this feedback.").

Attention to Manipulations. To assess participants' level of attention to the proximity and discrepancy manipulations, they were asked the following questions: "Who was the reference group mentioned in the feedback you received?", "What percentage of college students at your university reported always using a condom during sexual intercourse in the past 3-months?", and "What percentage of college students at your university reported having multiple partners in the past 3-months?" Additional validity checks were included throughout the survey to ensure high-quality data collection, such as "Please select the second option for this question" and "Please select the option blue" (Keith et al., 2017).

Procedures

Recruitment. Twenty pilot participants were recruited via SONA (N = 20) and the remaining pilot participants (N = 16) and primary study participants (N = 212) were recruited through mTurk. Prior to enrollment, participants completed the pre-screening questionnaire to determine eligibility and an electronic consent form.

Experiment. All study sessions took place online, in a location of the participants' choosing, via an internet-administered REDCap survey. Upon signing up for the study, eligibility criteria were confirmed and an electronic informed consent was administered. Participants first completed the individual-difference measures and were then randomized, stratified by gender, to one of four sham feedback conditions: (1) gender-neutral, wide discrepancy referent, (2) gender-neutral, narrow discrepancy referent, (3) gender-matched, wide discrepancy referent or (4) gender-matched, narrow discrepancy referent.

Feedback was manipulated by the proximity of the referent and the width of discrepancy generated between perceived and actual norms. Referents were a gender-neutral university student (i.e., distal condition) or a gender-matched university student (i.e., proximal condition). While there is no consensus in the literature regarding what level of discrepancy is necessary to produce motivation to change personal behavior, previous research that has utilized normative feedback to promote condom use among college students has found that a discrepancy as small as 12.4% is sufficient to increase willingness to use condoms (Chernoff & Davison, 2005). In the alcohol use literature, the average discrepancy between perceived and actual norms necessary for alcohol-related behavioral change ranges from 20-25% (Larimer et al., 2011; Lewis & Neighbors, 2006a). Based on these findings, a wide discrepancy was defined as a positive difference of 20% between the perceived and actual norm for condom use and a negative difference of 20% between the perceived and actual norm for number of sexual partners. A narrow discrepancy was defined as a positive difference of 5% between the perceived and actual norm for condom use and a negative difference of 5% between the perceived and actual norm for number of sexual partners (Mata, 2011).

Feedback for condom use followed the general format: "You stated that [perceived norm of condom use as a percentage] of [reference group] use a condom all or most of the time during sexual intercourse in the past three months. In fact, [width of discrepancy] of [reference group] use a condom all or most of the time during sexual intercourse in the past three months. You underestimated the [reference group's] condom use by [width of discrepancy]." Feedback for number of sexual partners followed a similar format: "You stated that [perceived norm of percentage of students with multiple partners] of [reference group] have had sex with multiple partners in the past three months. In fact, [width of discrepancy] of [reference group] have had

sex with multiple partners in the past three months. You overestimated the [referent group's] number of partners by [width of discrepancy]." Reference Appendix F for example feedback.

Immediately following completion of the feedback component of the study, participants were asked to complete several outcome measures related to their motivation for behavioral change in addition to the manipulation check questionnaires. Once all self-report measures were completed, participants were informed to click on a link if interested in learning more about resources specific to sexual health (https://www.plannedparenthood.org/learn). Last, participants were provided with a debriefing statement that included the following: (1) an overview of the study procedures, (2) a statement explaining that the provided feedback contained inaccurate data, (3) a graph of national rates of condom use and average number of sexual partners among college students, and (4) a list of resources (e.g., Planned Parenthood; see Appendix I). Compensation (0.5 SONA credits or $0.50 for mTurk participants) was awarded upon completion of the study.

Pilot Studies

Pilot testing occurred in two phases with a total of 36 participants. The goal of the pilot studies was to test the feedback manipulations and refine the procedures that would be used in the primary experiment. The referent proximity manipulation was considered successful if participants perceived the gender-matched referent as significantly more proximal compared to the gender-neutral referent. The width of discrepancy manipulation was considered successful if participants perceived the wide discrepancy feedback as significantly wider compared to the narrow discrepancy feedback. Secondary goals of the pilot study were to collect preliminary ratings on the perceived realism of the discrepancy manipulation and gather descriptive demographics for the perceived typical university student profile.

Phase 1 Overview

A total of 20 undergraduate college students recruited from SONA (*n* = 13 females)

participated in Phase 1.

Phase 1: Results

Proximity Manipulation Check. As illustrated in Table 1, participants who received

feedback for a gender-matched referent did not perceive the referent as significantly more

socially proximal (*M* = 3.92, *SD* = 1.58) compared to participants who received feedback for a

gender-neutral referent (*M* = 4.55, *SD* = 1.74; *t*(18) = 0.87, *p* = 0.19).

Width of Discrepancy Manipulation Check. As illustrated in Table 2, participants in

the wide discrepancy condition perceived the width of discrepancy between perceived and actual

norms for condom use (*M* = 5.83, *SD* = 2.54) as significantly wider than those in the narrow

discrepancy condition (*M* = 2.15, *SD* = 1.72; *t*(18) = 3.76, *p* < 0.01). Overall, the discrepancy

manipulation was perceived as realistic across conditions (*M* = 3.05, *SD* = 0.69) and participants

did not differ in ratings of perceived realism across discrepancy conditions (*t*(18) = 1.68 , *p* =

0.17). Two participants reported that lower self-reported condom use would increase the

perceived realism of the feedback.

Typical Student Profile. The typical university student was perceived as a 19-year-old,

single, White, female, sophomore, living on campus as a member of Greek life. These

demographic characteristics differ from Lewis and Neighbors (2006b) finding that the typical

university student was perceived as White and male.

Phase 1: Discussion

Several changes were made to address the failure of the proximity manipulation: 1) Each

feedback page was presented twice to increase the time participants were exposed to the

manipulations; 2) Participants were required to use the text-to-speech function for the feedback to prevent them from quickly skipping past the feedback page; 3) Text relating to both manipulations was modified to red, bold font to direct participants' attention to the aspects of the feedback that were manipulated (i.e., reference group, percentages); and 4) Reference groups for the IOS scale Venn diagrams were revised for clarification (i.e., "self" and "peer" changed to "you" and "[reference group]").

Phase 2 Overview

The revised feedback was tested in phase 2. Perceived realism of the discrepancy manipulation and the perceived typical student profile were also re-evaluated. A total of 16 undergraduate college students ($n = 8$ females) recruited from mTurk participated in Phase 2.

Proximity Manipulation Check. As illustrated in Table 1, participants who received feedback for a gender-matched referent perceived the referent as significantly more proximal ($M = 6.38$, $SD = 0.74$) compared to participants who received feedback for a gender-neutral referent ($M = 3.00$, $SD = 2.00$; $t(14) = 4.47$, $p < 0.001$).

Width of Discrepancy Manipulation Check. As illustrated in Table 2, participants in the wide discrepancy condition perceived the width of discrepancy between perceived and actual norms for condom use ($M = 6.75$, $SD = 2.38$) as significantly wider than those in the narrow discrepancy condition ($M = 3.00$, $SD = 2.14$; $t(14) = 3.30$, $p < 0.01$). Overall, the discrepancy manipulation was perceived as realistic across conditions ($M = 2.69$, $SD = 0.79$) and participants did not differ in ratings of perceived realism across discrepancy conditions ($t(14) = 0.94$, p = 0.36).

Typical Student Profile. The typical university student was perceived as a 20-year-old, single, White, female, junior, living off-campus, and not affiliated with Greek life. This profile matches closely with the profile obtained in Phase 1 of pilot testing.

After presenting the pilot findings to the committee, it was determined that the feedback was sufficiently developed for use in the primary experiment. No further modifications were made to the experiment procedures.

<p style="text-align:center">Primary Experiment</p>

Procedures

A total of 212 students participated in the primary experiment. Feedback procedures described as part of phase 2 of the pilot study were identical to those used in the primary experiment. A flow diagram of the experimental session procedures is presented in Figure 1.

Data Analysis Plan

All analyses were conducted using the Statistical Package for Social Sciences (SPSS) versions 23 (SPSS, 2012) and Microsoft Excel (2016). Bonferroni correction was conducted to account for familywise error rate and the criterion for statistical significance was set to an alpha level of 0.01.

Preliminary Analyses. Three participants were screened out from analyses for completing the survey in under five minutes. An additional 15 participants were screened out for failing to accurately respond to the validity checks ($n = 10$) and attention checks ($n = 5$), resulting in a sample of 212 participants for the primary analyses. Univariate normality was assessed via indices of skewness and kurtosis, as well as through visual inspections of histograms. Using cutoff values of ± 2.00 for measures of skewness and kurtosis indicative of normal distribution (Tabachnick & Fidell, 2018), all continuous predictor variables, covariates,

and outcome variables were reasonably normally distributed. Given the roughly equal sample sizes for each condition, the assumption of homogeneity of variance did not need to be satisfied to proceed with analyses (Tabachnick & Fidell, 2018). Examination of scatterplots revealed similar regression slopes between potential covariates and outcome variables across experimental conditions, demonstrating adequate homogeneity of regression slopes (Tabachnick & Fidell, 2018). Fewer than 5% of cases ($n = 9$) had missing values and separate variance t-tests revealed no systematic relationship between missingness of any variables, suggesting that the values were missing at random. Based on the recommendations of Pepinsky (2018), a multiple imputation method was utilized to account for missing values as it is more efficient and less biased than listwise case deletion when values are missing at random. The data were examined to identify univariate outliers. For predictor variables, covariates, and outcome variables, univariate outliers were identified as unstandardized scores greater than three standard deviations above the mean. There were 2 outliers across the MCUSES total scores that were tested as a potential covariate to be included in the ANOVA models. Outliers were replaced with the unstandardized score for which $Z = 3$ (Tabachnick & Fidell, 2018).

Descriptive statistics were used to summarize study variables. For continuous variables, means, medians, standard deviations, percentiles, and ranges were generated; frequencies and proportions were used for categorical and ordinal variables. Chi-square analyses and Analyses of Variance (ANOVA) were conducted to test for differences in participant characteristics by condition to determine if randomization was successful.

Power Analysis. An *a priori* power analysis was conducted to determine the number of participants needed to detect an interaction between referent proximity, width of discrepancy, and gender on motivation to increase personal condom use. G-power statistical power software

was used to conduct a power analysis for a three-way ANCOVA (Erdfelder et al., 1996). Given the medium effect sizes observed in previous studies with normative feedback components in the alcohol use literature (Dotson et al., 2015), the power to detect a 'medium' effect size was considered sufficient for this study. Results of the power analyses suggested that a sample of $N = 210$ would provide a power of .95 to detect a 'medium' effect size ($f = .25$) at α equal to 0.05 for a three-way interaction. In a separate analysis, the calculated sample size remained the same with the addition of covariates ($N = 210$); providing the target number of participants that were enrolled in this experiment.

Manipulation Checks. Consistent with the pilot studies, *t*-test analyses were used to determine the efficacy of the referent proximity and width of discrepancy manipulations. Additionally, descriptive statistics were utilized to describe perceived demographic characteristics of the typical university student and frequencies and proportions were used to assess participants' level of attention to the proximity and discrepancy manipulations.

Primary Analyses.

Aim 1. Hypothesis 1a. Students will underestimate the frequency of condom use and overestimate the number of sexual partners for both reference groups. First, a *t*-test analysis was conducted to determine if participants underestimated the frequency of their peers' condom use and overestimated the average number of their peers' sexual partners. Actual normative behavior for past 3-month condom use and number of sexual partners was calculated using data collected from the sexual behavior questionnaire. Preliminary checks were conducted to ensure there were no violations in the assumptions of normality. Using a *t*-test analysis, we examined if there was a significant difference between actual past 3-month frequency of condom use and

number of sexual partners and perceived past 3-month frequency of condom use and number of sexual partners for both referents.

Aim 1. Hypothesis 1b. Estimates of gender-neutral students' condom use will be lower than estimates for gender-matched students' condom use and the inverse for number of sexual partners. A *t*-test analysis was conducted to determine if participants perceived that distal peers engaged in more condomless sex than both proximal peers and themselves. We tested this hypothesis by calculating the mean difference scores between actual and perceived condom use for the gender-neutral and gender-matched peers, and then comparing the mean difference score for the gender-neutral peer with the mean difference score for the gender-matched peer. This set of analyses was repeated with past 3-month number of sexual partners as the dependent variable.

Aim 2. Hypothesis 2. Perceived norms for gender-matched referents will be more strongly correlated to self-reported personal sexual behavior compared to perceived norms for gender-neutral referents. Bivariate correlations were utilized to assess if perceived norms for a more proximal referent were more strongly correlated with personal condom use than perceived norms for a more distal referent. Preliminary checks were conducted to ensure there were no violations in the assumptions of normality and homoscedasticity. First, Pearson correlation coefficients were obtained by comparing self-reported condom use with perceived condom use for a gender-neutral and a gender-matched referent. Each correlation coefficient was then converted into a *z*-score using Fisher's *r*-to-*z* transformation (Lee & Preacher, 2013). A *t*-test analysis was conducted between both *z*-scores. This set of analyses was repeated with past 3-month number of sexual partners as the dependent variable.

Aim 3. Hypothesis 3. The interaction between reference group specificity and width of discrepancy will differ by gender. A three-way factorial analysis of covariance (ANCOVA) was

used to examine the effects of referent proximity, width of discrepancy, and gender on motivation to increase personal condom use. Based on significant bivariate correlations with the primary outcome measure, past 3-month condom use was included as an additional covariate. Preliminary checks were conducted to ensure there were no violations in the assumptions of normality, homogeneity of variances, homogeneity of regression slopes, and adequate consistency and reliability of covariate measures. The same set of analyses was conducted for the secondary dependent variables (i.e., readiness to change condom use, perceived benefits of condom use, and perceived barriers of condom use).

Since the sexual health information seeking behavioral task was a dichotomous outcome, a binary logistic regression was conducted to examine if referent group proximity, width of discrepancy, and gender influenced whether participants sought sexual health information. Covariates significant with sexual health information seeking at the bivariate level were entered in Step 1, and referent group proximity, width of discrepancy, gender, and their interaction terms were entered in Step 2 as predictor variables.

Exploratory Aim. To examine the extent to which referent proximity and width of discrepancy between perceived and actual norms interacted to influence willingness to reduce number of sexual partners, a three-way factorial ANCOVA was conducted. The independent variables were the same as those utilized in the primary analyses and the dependent variable was willingness to reduce number of sexual partners. The same preliminary checks and approach to addressing violations utilized in the primary analyses were employed. Based on significant bivariate correlations with the dependent variable, residence and condom use self-efficacy were included as additional covariates.

Results

Participants and Descriptive Analyses

Table 3 displays descriptive demographic statistics of participants in the experimental study. Participants were primarily non-Hispanic White (70.4%), college seniors (44.6%) with a mean age of 22.09 years ($SD = 2.09$). Half (50.5%) of the sample was female, and most participants attended universities in the Southeast (31.9%) or West (21.6%), with 19.2% identifying as international students. Fifty percent of participants endorsed being in a monogamous relationship, whereas the remainder reported being in non-monogamous relationships or single/dating. Three quarters of participants (75.1%) reported receiving formal instruction about sexual health at the primary or secondary school level. Of those who received sexual health education in school, half (50.7%) indicated that formal instruction provided information about proper condom use techniques.

Participants reported an average of 4.86 ($SD = 8.33$) lifetime sex partners and 2.22 ($SD = 4.61$) past year partners (see Table 4). Most participants (77%) reported engaging in vaginal sex in the past 3-months, yet, consistent with national averages (ACHA, 2020a) only 24.9% of the sample endorsed consistent condom use over that timeframe. Past month condom use levels were slightly lower, with only 19.7% of participants reporting consistent condom use. Men and women did not differ in self-reported condom use ($\chi^2 = 6.41$, $p = .17$). A majority of participants (64.8%) had consumed alcohol or cannabis (44.6%) prior to sex at least once in the past 3-months. Men, compared to women, endorsed more frequent alcohol ($\chi^2 = 16.48$, $p < .01$) and cannabis use prior to sex ($\chi^2 = 16.26$, $p < .01$). ANOVA (continuous variables) and Chi-square (categorical variables) analyses comparing demographic characteristics of participants in each

experimental condition revealed that there were no significant differences ($p > .05$) between participants on any baseline variables —indicating that randomization was successful.

Manipulation Checks

It took participants an average of 19.27 minutes ($SD = 7.21$) to complete the entire survey. Manipulation checks revealed that participants who received feedback for a gender-matched referent perceived the referent as significantly more socially proximal ($M = 5.23$, $SD = 1.50$) compared to participants who received feedback for a gender-neutral referent ($M = 2.69$, $SD = 1.54$, $t = -12.10$, $p < .001$). Further, participants in the wide discrepancy condition perceived the width of discrepancy between perceived and actual norms for condom use as significantly wider ($M = 5.79$, $SD = 2.48$) compared to those in the narrow discrepancy condition ($M = 4.44$, $SD = 2.46$, $t = -3.96$, $p < .001$). Overall, the discrepancy manipulation was perceived as realistic across conditions ($M = 2.64$, $SD = .97$) and participant ratings of realism did not differ across discrepancy conditions, ($t = 1.04$, $p = .30$). Last, the typical university student was perceived as a non-Hispanic White (75.1%), single (46.9%), male (50.7%), junior (31.0%) who was not affiliated with Greek life (56.8%).

Covariates

Bivariate correlation coefficients for key study variables are shown in Table 5. All individual difference measures were explored as potential covariates. Additionally, race, ethnicity, age, relationship status, residence (living on-campus vs. off-campus), and sexual health education were examined as potential covariates given the relationship between these demographic characteristics and condom use in the literature (Civic, 2000; Dinger & Parsons, 1999; Gurman & Borzekowski, 2004; Hall et al., 2019; Vasilenko et al., 2018). Significant bivariate correlations for each dependent variable are described next.

Willingness to change condom use. Past 3-month condom use ($r = .19$, $p = .007$) was the only variable significantly correlated with willingness to change condom use, and was thus included as a covariate in the primary analyses.

Readiness to change condom use. Race ($r = -.15$, $p = .031$), residence ($r = -.15$, $p = .030$), past 3-month condom use ($r = .41$, $p = .000$), and sexual sensation seeking ($r = -.15$, $p = .031$) were all significantly correlated with willingness to change condom use. Since sexual sensation seeking and self-reported condom use are highly correlated in the literature (Kalichman et al., 1994), sexual sensation seeking was not included as a covariate in the primary analyses to avoid potential multicollinearity (Tabachnick & Fidell, 2018). Thus, only race, residence, and past 3-month condom use were retained as covariates in the primary analyses.

Perceived benefits of condom use. Identification with emerging adulthood ($r = .34$, $p = .000$), past 3-month condom use ($r = .16$, $p = .020$), and condom use self-efficacy ($r = .23$, $p = .001$) were significantly correlated with perceived benefits of condom use. When we examined correlations among significant covariates, past 3-month condom use was significantly correlated with condom use self-efficacy ($r = .28$, $p = .000$). Thus, to limit multicollinearity among covariates included in this model, only identification with emerging adulthood and past 3-month condom use were retained as covariates in the primary analyses (Tabachnick & Fidell, 2018).

Perceived barriers to condom use. Ethnicity ($r = -.17$, $p = .013$), sex motives ($r = .39$, $p = .000$), sexual sensation seeking ($r = .32$, $p = .000$), condom use self-efficacy ($r = -.16$, $p = .019$), and drinking motives ($r = .35$, $p = .000$) were significantly correlated with perceived barriers to condom use. Among the covariates, sexual sensation seeking was significantly correlated with sex motives ($r = .56$, $p = .000$), condom use self-efficacy ($r = .14$, $p = .042$), and drinking motives ($r = .56$, $p = .000$). Drinking motives were significantly correlated with sex

motives ($r = .56$, $p = .000$). Based on the recommendations of Tabachnick and Fidell (2018) to reduce multicollinearity and remain consistent with the other models, only ethnicity and sexual sensation seeking were retained as covariates in the primary analyses to improve interpretability.

Sexual health information seeking. Drinking motives ($r = -.25$, $p = .000$) was the only variable significantly correlated with sexual health information seeking, and was thus included as a covariate in the primary analyses.

Willingness to reduce number of sexual partners. Residence ($r = -.14$, $p = .047$) and condom use self-efficacy ($r = -.14$, $p = .047$) were significantly correlated with willingness to reduce number of sexual partners, and therefore were included as covariates in the primary analysis.

Primary Study Results.

Aim 1. Contrary to our hypotheses, participants *overestimated* the frequency of a gender-neutral ($t = -3.74$, $p = .000$) and gender-matched ($t = -4.32$, $p = .000$) peers' condom use. However, consistent with our hypothesis, participants overestimated the average number of sexual partners of a gender-neutral ($t = -6.25$, $p = .000$) and gender-matched ($t = -6.37$, $p = .000$) peer. Participants did not perceive that gender-neutral peers utilized condoms less frequently ($t = -1.36$, $p = .174$) or had more sexual partners ($t = -0.69$, $p = .945$) compared to gender-matched peers.

Aim 2. Contrary to our hypotheses, perceived norms for a gender-matched referent were not more strongly correlated to personal condom use ($r = .19$) compared to perceived norms for a gender-neutral referent ($r = .24$, $p = .28$). Similarly, perceived norms for a gender-matched referent were not more strongly correlated to personal number of sexual partners ($r = -.05$ compared to perceived norms for a gender-neutral referent ($r = -.05$, $p = 0.47$).

Aim 3. Means, medians, and standard deviations stratified by experimental condition and gender for each outcome are presented in Tables 6 and 7, respectively.

Primary Outcome: Willingness to change condom use. The results of the ANCOVA, controlling for past 3-month condom use, are displayed in Table 8. Results of this analysis revealed a significant main effect of referent proximity, such that participants who received feedback for a proximal referent ($M_{Proximal} = 7.45$, $SD = 2.68$) endorsed greater willingness to increase condom use compared to participants who received feedback for a distal referent ($M_{Distal} = 4.94$, $SD = 2.97$; $F = 60.38$, $p < .001$, $\eta^2_p = .23$). There was also a significant main effect of width of discrepancy, such that participants who received feedback that produced a wide discrepancy ($M_{Wide} = 7.44$, $SD = 2.53$) were more willing to increase condom use compared to participants who received feedback that produced a narrow discrepancy ($M_{Narrow} = 5.20$, $SD = 3.16$; $F = 46.70$, $p < .001$, , $\eta^2_p = .19$). There was no significant effect of gender on willingness to increase condom use ($M_{Male} = 6.41$, $SD = 2.91$; $M_{Female} = 6.12$, $SD = 3.25$; $F = 1.28$, $p = .260$, $\eta^2_p = .01$). Past 3-month condom use was significantly associated with willingness to increase condom use, such that greater past 3-month condom use was associated with greater willingness to increase condom use ($F = 7.84$, $p = .006$, $\eta^2_p = .04$). The main effects of referent proximity and width of discrepancy were qualified by a significant referent group * discrepancy interaction ($F = 7.88$, $p = .005$, $\eta^2_p = .04$), such that the effect of proximity on willingness to use condoms was greater in the narrow discrepancy condition compared to the wide discrepancy condition (Figure 2). We probed this interaction with discrepancy-stratified analyses. For the wide discrepancy condition, there was a statistically significant main effect for referent proximity ($M_{Proximal} = 8.30$, $SD = 1.77$; $M_{Distal} = 6.60$, $SD = 2.91$; $F = 73.67$, $p < .001$, $\eta^2_p = .12$), such that willingness to increase condom use was greatest when a proximal referent was provided in the feedback. For

the narrow discrepancy condition, there was a similar, but stronger main effect for referent proximity ($M_{Proximal}$ = 6.79, SD = 3.11; M_{Distal} = 3.18, SD = 1.75; F = 53.72, p < .001, η^2_p = .33) on willingness to increase condom use.

Secondary Outcome: Readiness to change condom use. The results of the ANCOVA, controlling for race, residence, and past 3-month condom use, are displayed in Table 9. Results of this analysis did not reveal a significant main effect of gender (M_{Male} = 6.48, SD = 2.75; M_{Female} = 6.14, SD = 3.27; F = 0.85, p = .359, η^2_p = .00), referent proximity ($M_{Proximal}$ = 6.23, SD = 3.11; M_{Distal} = 6.39, SD = 2.93; F = 0.02, p = .899, η^2_p = .00), or width of discrepancy (M_{Wide} = 6.61, SD = 2.85; M_{Narrow} = 6.04, SD = 3.16; F = 1.27, p = .260, η^2_p = .01) on readiness to increase personal condom use. Past 3-month condom use (F = 33.00, p = .000, η^2_p = .14) was significantly associated with readiness to use condoms, such that greater past 3-month condom use was associated with greater readiness to use condoms. None of the interactions were statistically significant.

Secondary Outcome: Perceived benefits of condom use. The results of the ANCOVA, controlling for identification with emerging adulthood and past 3-month condom use, are displayed in Table 10. Results of this analysis did not reveal a significant main effect of gender (M_{Male} = 20.37, SD = 4.68; M_{Female} = 20.73, SD = 4.72; F = 0.00, p = .987, η^2_p = .00), referent proximity ($M_{Proximal}$ = 20.36, SD = 4.79; M_{Distal} = 20.78, SD = 4.25; F = 0.15, p = .700, η^2_p = .00), or width of discrepancy (M_{Wide} = 20.73, SD = 4.18; M_{Narrow} = 20.40, SD = 4.85; F = 0.00, p = .954, η^2_p = .00). Past 3-month condom use (F = 5.49, p = .020, η^2_p = .03) and identification with emerging adulthood (F = 22.40, p = .000, η^2_p = .10) were significantly associated with perceived benefits of condom use, such that greater past 3-month condom use and greater

identification with emerging adulthood were associated with more perceived benefits of condom use. None of the interactions were approaching statistical significance.

Secondary Outcome: Perceived barriers to condom use. The results of the ANCOVA, controlling for ethnicity and sexual sensation seeking, are displayed in Table 11. Results of this analysis revealed a significant main effect of gender, such that male participants endorsed greater perceived barriers to condom use compared to female participants (M_{Male} = 14.83, SD = 4.69; M_{Female} = 12.83, SD = 4.42; F = 4.41, p = .037, η^2_p = .02). There were no significant main effects of referent proximity ($M_{Proximal}$ = 14.32, SD = 4.93; M_{Distal} = 13.21, SD = 4.26; F = 1.60, p = .207, η^2_p = .01) or width of discrepancy (M_{Wide} = 13.34, SD = 4.06; M_{Narrow} = 14.20, SD = 5.11; F = 1.12, p = .291, η^2_p = .01) on perceived barriers to condom use. Sexual sensation seeking (F = 11.22, p = .001, η^2_p = .06) was significantly associated with perceived barriers to condom use, such that greater sexual sensation seeking was associated with more perceived barriers to condom use. None of the interactions were approaching statistical significance.

Secondary Outcome: Sexual health information seeking. Frequency of endorsement of sexual health information seeking, stratified by experimental condition and gender, is presented in Table 14. Given the small sample size within each data cell, we conducted an exact logistic regression using Stata 16 software (StataCorp, 2019), as it can provide more reliable statistical interference when there is a small number of participants within each data cell compared to a standard logistic regression (Wilson & Lorenz, 2015). Results of the exact logistic regression assessing the influence of referent proximity, width of discrepancy, gender, and their interaction terms on participants' sexual health information seeking behavior, while controlling for drinking motives, are displayed in Table 15. Results revealed that there was no main effect of referent proximity (adjusted odds ratio [aOR] = 0.77, 95% CI: 0.41-1.45, p = .481), width of discrepancy

(aOR = 0.83, 95% CI: 0.44-1.55, *p* = .721), or gender (aOR = 1.30, 95% CI: 0.70-2.45, *p* = .772) on sexual health information seeking. There was a main effect of drinking motives (aOR = 0.97, 95% CI: 0.95-0.99, *p* = .002), such that participants who endorsed greater drinking motives were less likely to seek sexual health information.

  Exploratory Outcome: Willingness to reduce number of sexual partners. The results of the ANCOVA, controlling for residence and condom use self-efficacy, are displayed in Table 12. Results of this analysis did not reveal a significant main effect of gender (*M* $_{Male}$ = 5.46, *SD* = 2.98; *M* $_{Female}$ = 5.12, *SD* = 3.36; *F* = 0.15, *p* = .697, η^2_p = .00), referent proximity (*M* $_{Proximal}$ = 5.45, *SD* = 3.24; *M* $_{Distal}$ = 5.11, *SD* = 3.10; *F* = 0.76, *p* = .386, η^2_p = .00), or width of discrepancy (*M* $_{Wide}$ = 5.30, *SD* = 3.13; *M* $_{Narrow}$ = 5.28, *SD* = 3.23; *F* = 0.05, *p* = .822, η^2_p = .00). Condom use self-efficacy was significantly associated with willingness to reduce number of sexual partners, such that lower condom use self-efficacy was associated with greater willingness to reduce number of partners (*F* = 4.10, *p* = .045, η^2_p = .02). None of the interactions were approaching statistical significance.

Post-hoc Analyses.

  Three of the five dependent variables (willingness to increase condom use, readiness to increase condom use, and perceived benefits of condom use) were highly correlated (range *r* = .25 to .37, *p* < .01) and therefore combined to create an index of "intentions to increase condom use" in which a higher score on the index indicated greater intentions to increase condom use (possible range of scores 6-45). Post-hoc analyses were conducted to examine the effect of gender, referent proximity, and width of discrepancy on intentions to increase condom use. Identification with emerging adulthood (*r* = .24, *p* = .001), past 3-month condom use (*r* = .32, *p* < .001), and condom use self-efficacy (*r* = .17, *p* = .015) were significantly correlated with

intentions to increase condom use, and therefore were included as covariates in the post-hoc analysis. The results of the ANCOVA, controlling for identification with emerging adulthood, past 3-month condom use, and condom use self-efficacy, are displayed in Table 13.

Results of the analysis revealed a significant main effect of referent proximity, such that participants who received feedback for a proximal referent ($M_{Proximal}$ = 34.06, SD = 8.33) endorsed greater intentions to increase condom use compared to participants who received feedback for a distal referent (M_{Distal} = 32.01, SD = 7.46; F = 6.12, p = .014, η^2_p = .03). There was also a significant main effect of width of discrepancy, such that participants who received feedback that produced a wide discrepancy (M_{Wide} = 34.80, SD = 7.40) endorsed greater intentions to increase condom use compared participants who received feedback that produced a narrow discrepancy (M_{Narrow} = 31.64, SD = 8.21; F = 7.20, p = .008, , η^2_p = .04). There was no significant effect of gender on intentions to increase condom use (M_{Male} = 33.20, SD = 7.94; M_{Female} = 33.01, SD = 8.07; F = 0.69, p = .409, η^2_p = .00). Identification with emerging adulthood (F = 9.84, p = .002, η^2_p = .05) and past 3-month condom use (F = 19.72, p < .001, η^2_p = .09) were significantly associated with intentions to increase condom use, such that greater identification with emerging adulthood and past 3-month condom use were associated with greater intentions to increase condom use. None of the interactions were approaching statistical significance.

Discussion

This study was a 2 (proximity) X 2 (width of discrepancy) X 2 (gender) randomized-factorial experiment designed to examine the influence of referent proximity and width of discrepancy between perceived and actual norms on willingness to increase condom use. As hypothesized, college students overestimated their peers' engagement in behaviors associated with higher STI risk (i.e., multiple sexual partners), perceiving that distal peers (gender-neutral)

had more sexual partners compared to proximal peers (gender-matched). Inconsistent with our hypotheses, the effect of referent proximity on willingness to use condoms varied depending on the width of discrepancy between participants' perceived and actual norms, such that referent proximity had a greater impact on willingness to use condoms when feedback generated a narrow, as compared to wide, discrepancy between perceived and actual norms. Our hypotheses that students would underestimate their peers' condom use, and perceived norms for a proximal peer would be more strongly correlated to personal condom use compared to perceived norms for a distal peer were also not supported. Additionally, manipulating components of the feedback provided to participants did not influence students' readiness to increase condom use, perceived advantages and disadvantages of condom use, sexual health information seeking, or willingness to reduce number of sexual partners.

Students in this study did not underestimate their peers' condom use, which is inconsistent with previous findings (Chernoff & Davison, 2005; Lewis, Litt, et al., 2014; Scholly et al., 2005). One potential explanation for this discrepant finding may relate to the unique socialization environment that occurs in the early years of college. Participants in this sample perceived the typical student as a 20-year old junior, yet data from a nationally representative longitudinal study suggest that rates of condom non-use are highest during the early years of college (ages 18-19), and subsequently decrease in the later years of college (Vasilenko et al., 2018). Since participants perceived their peers' academic standing as being in the later years of college, it is possible that they perceived their peer as engaging in more protective sexual behavior that is characteristic of later emerging adulthood (Vasilenko et al., 2018). Additionally, participants in this sample perceived the typical student's relationship status as non-monogamous, which has been linked with greater condom use compared to those in

monogamous relationships (Fielder & Carey, 2010; Lewis et al., 2012). Thus, participants may have overestimated their peers' condom use because they perceived their peers as single, upper-level students engaging in more frequent, albeit more protected, casual sex (sexual activity between people who are not established sexual partners; Fielder & Carey, 2010). Future research could consider implementing normative feedback interventions with younger college student populations (18-19 years old) who may perceive their same-aged peers as engaging in more frequent condomless sex or matching referent groups to age and academic standing. Additionally, students' perceptions of their peers' sexual behavior should be assessed prior to the implementation of a normative feedback intervention in order to determine if normative feedback is most appropriate for a particular population compared to other, more skills-based condom promotion interventions.

Inconsistent with the hypothesis for our second aim, perceived norms for a socially proximal peers' condom use were not more strongly correlated to personal condom use compared to perceived norms for a socially distal peer. Lewis and colleagues (2014) reported similar findings in an examination of college students' substance use and sexual behavior in which normative perceptions were associated with actual behavior for every outcome (e.g., frequency of drinking prior to sex, frequency of casual sex), with the exception of condom use. Other studies that have examined the purported link between perceived norms and sexual behavior among college students did not investigate how perceive norms may uniquely influence protective sexual behavior, such as condom use (Lewis et al., 2007; Martens et al., 2006; Trafimow, 2001). Furthermore, our finding aligns with studies conducted with non-college student populations (Carey et al., 2011; Huebner et al., 2011), suggesting that perceived norms for condom use may not be as influential over personal behavior as previously hypothesized.

One potential explanation for this pattern of results is that additional individual- and partner-level factors may contribute to condom use behavior more so than other sexual behaviors. For example, an individual may perceive that others use condoms often and desire to do so but lack sufficient condom negotiation skills or self-efficacy to employ such skills (Noar et al., 2002). Or an individual may have the skills necessary to consistently use condoms, but not be able to implement those skills when under the influence of alcohol or other drugs (Mola et al., 2016). However, the relationship between perceived norms and condom use behavior, and explanations for why this relationship may look different compared to other sexual behavior, remains relatively unclear in the literature, and thus warrants further investigation.

Findings for our third aim varied across outcome measures. For our primary outcome, results indicated that the effect of referent proximity on willingness to use condoms varied depending on the width of discrepancy between participants' perceived and actual norms. Specifically, referent proximity had a greater impact on willingness to use condoms when feedback generated a narrow, as compared to wide, discrepancy between perceived and actual norms. This finding suggests that providing feedback for a demographically similar referent may be necessary for motivating behavioral change among students who report more accurate perceived norms. Yet, as students' perceptions of their peers' behavior become less accurate, the influence of the specificity of the referent subsequently decreases. Although previous studies have demonstrated that behavior is more closely influenced and modeled on more socially proximal reference groups (Lewis et al., 2007; Scholly et al., 2005), this is the first study to demonstrate that the importance of selecting socially proximal referents may be dependent on the accuracy of students' perceptions. As such, it may be beneficial to assess students' perceptions of their peers' sexual behavior before selecting the referent to include in normative feedback.

Conversely, there were no significant effects of referent proximity or width of discrepancy on the other outcome measures. This may be, in part, explained by the significant correlation between several of these outcome variables and our primary outcome measure. When three of the most correlated outcome variables were combined to create a single index of intentions to increase condom use, both referent proximity and width of discrepancy significantly influenced participants' intentions to use condoms in the expected direction. Consistent with the literature (LaBrie et al., 2013; Lewis et al., 2007), participants who received feedback for a proximal referent, and those who received feedback that generated a wide discrepancy between perceived and actual norms, reported greater overall intentions to increase condom use. Unlike the other outcome variables, sexual health information seeking was not correlated with intentions to increase condom use and may not have been the most sensitive method for examining a proxy of actual condom use behavior. Indeed, most college students are already familiar with the benefits of condom use for STI risk reduction (Subbarao & Akhilesh, 2017) and the majority of students in this sample reported having received sex education during adolescence, suggesting that they may have not felt as though they would learn any new information from clicking on the resource link. A more sensitive behavioral proxy for condom use intentions in future studies may be whether students indicate that they would like to receive condoms delivered in the mail after completion of the intervention (Butler et al., 2014). Last, findings from our exploratory analysis revealed that manipulating the referent proximity and width of discrepancy of normative feedback did not significantly influence students' willingness to reduce their number of sexual partners. These findings are consistent with a meta-analysis conducted by Smoak et al. (2006) in which 174 sexual risk reduction interventions (including condom education/promotion programs) were examined and, in general, there were no significant impacts of such

interventions on number of sexual partners. It may have been difficult to detect significant changes in willingness to reduce number of sexual partners because the average number of sexual partners in the past year for this sample was low ($M = 2.22$), and half the sample endorsed being in a monogamous relationship. Importantly, number of sexual partners may not be a high-risk behavior if condoms are used correctly and consistently, and perhaps increased willingness to use condoms may have promoted more permissive attitudes towards number of sexual partners. Future research should consider the usefulness of targeting number of sexual partners in sexual risk reduction interventions versus focusing resources on promoting condom use.

Some individual-difference characteristics were significantly associated with the primary and secondary outcomes of interest. Specifically, individuals who reported using condoms frequently also reported greater intentions to increase condom use behavior. This is consistent with general theoretical models of behavior (Ouellette & Wood, 1998) and theories specific to sexual behavior and condom use (Albarracín et al., 2001) that suggest past-behavior is one of the strongest predictors of future behavior. In addition, participants who endorsed lower levels of condom use self-efficacy endorsed greater willingness to reduce number of sexual partners. While sexual safety is often treated as a single behavior, such as condom use, it can also be conceptualized as resulting from multiple sexual risk reduction strategies. Different methods of preventing STIs — reducing number of partners, agreeing to be monogamous — may be combined in patterns that make other methods (e.g., condom use) seem less necessary and lead to their nonuse or cessation (Masters et al., 2015). Notably, identification with emerging adulthood was significantly associated with perceived benefits of condom use. Sexual activity among emerging adults is well-documented; however, less is known regarding the developmental features of emerging adulthood that drive sexual activity among this population. Consistent with

previous research (McMahan & Olmstead, 2020), greater agreement that emerging adulthood is a time of experimentation, instability, identity exploration, and feeling in between were all significantly associated with perceived benefits of condom use. Further investigation into the components of emerging adulthood that influence engagement in sexual behavior, particularly behavior that incurs the risk of STI transmission, would provide insight into the ways in which condom promotion interventions can be developmentally informed. Taken together, these constructs may be helpful predictors to consider when determining the best population to receive sexual risk reduction interventions.

Interpretations of these findings must be made in light of national events that occurred during the time of data collection. Data for this study were collected during the implementation of nationwide mitigation efforts to reduce the spread of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), the virus that causes coronavirus disease (COVID-19). In response to the COVID-19 pandemic, most states closed non-essential workplaces, limited the movement and gathering of people, and restricted social activities (CDC, 2020). Similarly, universities cancelled residential instruction and required students residing in campus housing to return to their primary home residence (CDC, 2020). As a result of social isolation guidelines (e.g., shelter-in-place) seen during this pandemic, most students in this sample reported a decrease in opportunities to have sex (55.2%) and in frequency of sexual activity (57.5%; Firkey et al., 2020). Although condom access and use remained relatively unchanged for most (63.2% and 65.1%, respectively; Firkey et al., 2020), students may have perceived their peers as engaging in more frequent condom use to limit the spread of COVID-19. Despite uncertainty regarding the potential for sexual transmission of COVID-19 (Cipriano et al., 2020), almost half (48.6%) of college students perceive themselves as susceptible to acquiring COVID-19 (ACHA,

2020), which may have influenced both their own sexual behavior during the time of data collection and their perceptions of peers' sexual behavior. Consequently, these data may not accurately depict college students' typical behavior or perceptions of their peers' behavior prior to the COVID-19 pandemic.

Study Strengths and Limitations

Several strengths and limitations should be taken into account when interpreting findings from this study. First, the extensive piloting process conducted prior to the primary experiment was a strength of the current study. The pilot studies allowed for the development of normative feedback that could successfully induce the intended referent proximity and width of discrepancy manipulations for each experimental condition (Perdue & Summers, 1986). Pilot testing also revealed the feasibility of conducting a web-based normative feedback intervention. Web-based methods provide a promising avenue for delivering interventions, as they are inexpensive to implement and accessible to large numbers of students (Elliott et al., 2008; Jaffe et al., 2018). Further, the transition from residential instruction to online learning as a result of the COVID-19 pandemic and response has required universities to adapt existing prevention and intervention approaches to be web-based. As evidenced by this study, in which 92% of participants correctly completed the attention checks and 96% of participants correctly completed the validity checks, students can be fully engaged with intervention material even when presented online. Additionally, the online format of this study allowed for data to be collected from students residing in every region of the U.S. Although condom use behaviors vary nationwide as a result of geographic differences in condom availability and accessibility (Shacham et al., 2016), the geographic diversity of this sample suggests that normative feedback may be efficacious for students regardless of geographic region.

There are several limitations to this study. First, while an association between condom use intentions and sexual behavior has been consistently supported in the literature (Albarracín et al., 2001; Fishbein, 2008; Sheeran & Orbell, 1998; Widman et al., 2013), findings from a meta-analysis that quantified the relationship between intentions and behavior in prospective studies of condom use revealed a moderate correlation ($r = .44$; Sheeran & Orbell, 1998) indicating that condom use intentions are not a perfect predictor of condom use behavior. While we incorporated sexual health information-seeking as a behavioral measure in this study, it became apparent that this outcome was not a sensitive proxy for condom use behavior. Future research may consider using a condom use delivery system as a more sensitive behavioral proxy for condom use (Butler et al., 2014), in addition to longitudinally accessing condom use at a designated follow-up time. Alternatively, a more sensitive assessment of the sexual health information seeking measure may have been the amount of time participants spent viewing the resource link. Second, the limited inclusion criteria for this study hindered our ability to generalize our findings to students at high-risk for STI acquisition. While the study eligibility criteria required that participants had been sexually active within the past year, participants did not have to endorse recent sexual risk behavior, such as inconsistent condom use. As a result, 24.9% of participants endorsed consistent condom use. Those who endorsed engaging in safer sexual behavior at the time of data collection may have been less willing to increase personal condom use, as they were already employing various sexual risk reduction strategies.

Third, normative feedback in this study did not elaborate on the role of intoxication as a barrier to risk reduction in sexual situations. Not only is alcohol use prevalent on college campuses (Hingson et al., 2009), but most participants (64.8%) in this sample had consumed alcohol prior to sex at least once in the past 3-months. There is compelling support in the

literature that acute alcohol intoxication causes greater intentions to engage in condomless sex (Scott-Sheldon et al., 2016), and previous studies have sought to reduce college student alcohol-related condomless sex with normative feedback interventions (Lewis et al., 2019; Lewis, Patrick, et al., 2014). Since the feedback provided in this study did not explicitly state the context in which peers engaged in condom use (e.g., 50% of your peers report using a condom while drinking), it is not possible to determine if students perceived the feedback as relating to their peers' condom use while intoxicated, sober, or both. Students' willingness to increase their own condom use may have been reflected in how they interpreted the context of the feedback. For example, a student who perceived the feedback as relating to their peers' condom use while sober may have been more willing to increase their own condom use due to a greater sense of condom use self-efficacy when sober as compared to intoxicated. Whereas the opposite may hold true for a student who perceived the feedback as relating to condom use while intoxicated. Additionally, this study was limited by using the alcohol literature as a guide for the conceptualization of normative feedback for condom use. While drinking is a patterned activity among college students, sexual behavior is not to the same degree (Hoeppner et al., 2012). Although some students may have sex on a regular basis with regular partners, other students may only have sex occasionally (Fielder & Carey, 2010). The lack of regularity with which sexual activity occurs for some students may have limited their willingness to modify their behavior. As such, the findings from this study may have been weakened by the nature of the behavior being targeted.

Only one level of referent specificity was utilized in this study, yet prior research suggests that multiple, increasing levels of referent specificity (e.g., gender, ethnicity, residence) are most predictive of personal health behaviors (Larimer et al., 2009, 2011). Gender was chosen

as the demographic characteristic used to establish social proximity of the reference group in this study since men and women often utilize different sexual risk reduction strategies (Chernoff & Davison, 2005); however, differences in sexual risk behavior have been found across race (Hall et al., 2019; Randolph et al., 2009), ethnicity (Gurman & Borzekowski, 2004), age (Vasilenko et al., 2018), relationship status (Civic, 2000; LaBrie et al., 2005), living situation (on-campus vs. off-campus; Dinger & Parsons, 1999), and Greek life affiliation (Scott-Sheldon et al., 2008). Utilizing one level of referent specificity may have limited the perceived social proximity of the reference group, and thus reduced the extent to which participants were motivated to endorse behavioral change. Future research should examine how the incorporation of additional levels of referent proximity influences students' willingness to increase condom use.

Finally, of the 30 million emerging adults in the United States, only 41% are currently enrolled in an institution of higher education and nearly half (45%) of all undergraduate students attend two-year, public institutions (i.e., community colleges; National Center for Education Statistics, 2020). As a result, much research investigating behavioral patterns and interventions for sexual risk reduction during this developmental period is not inclusive of the majority of the emerging adult population (Lewis et al., 2019). While explorations in sexual behavior and substance use may be more common for individuals who attend 4-year residential colleges (Lefkowitz, 2005), research suggests that non-college attending emerging adults and community college students endorse less condom use compared to 4-year college-attenders, including inconsistent condom use, multiple sexual partners, and casual sex with non-monogamous partners (Bailey et al., 2008; Patrick et al., 2012; Scull et al., 2020; Trieu et al., 2011; Vasilenko et al., 2018). Thus, adapting sexual risk reduction interventions, such as personalized normative feedback interventions, to the behavioral needs of non-college attending emerging adults and

community college students warrants greater attention in the literature. Specifically, consideration must be given to the reference group utilized in feedback for non-college attenders and community college students, as peer norms may exert a lesser influence on personal behavior among these populations (Lewis et al., 2019). Given that the intervention literature is relatively sparse for non-college attending and community college populations (Habel et al., 2016; Scull et al., 2020), future research should aim to fill this gap by developing interventions to fit the needs of this population and identifying settings within which to implement selected prevention strategies.

Future Research Directions and Clinical Implications

Findings from this line of research can inform the delivery of future normative feedback interventions for sexual risk reduction that specifically target college students. First, the relationship between referent proximity and width of discrepancy suggests that selection of a reference group for a normative feedback intervention should be contingent on the accuracy of students' perceptions. For those who have accurate perceptions of their peers' sexual behavior, a more socially proximal referent may be necessary, whereas those with less accurate perceptions may benefit from feedback with any referent regardless of proximity. Such intervention tailoring has not previously been emphasized in the normative feedback literature yet might be most effective for eliciting positive behavioral change. Future research should examine accessible and feasible ways to integrate this type of intervention tailoring through the use of automated algorithms (Dijkhuis et al., 2018). For example, if a female participant perceives that students at her university use condoms 20% of the time (fairly inaccurate), she may be directed to feedback that informs her that the *typical student at her university* uses condoms 50% of the time. Feedback regarding a range of sexual behaviors, included alcohol-related condomless sex, can be

integrated into the intervention following a similar algorithm, and additional demographic characteristics (e.g., race, academic standing) can be utilized to engender greater social proximity to the referent.

A promising modality for delivering brief normative feedback interventions for condom promotion to college students through university health centers or similar campus initiatives is web-based or mobile technologies (i.e., eHealth, mHealth; Bailey et al., 2010). eHealth and mHealth-based interventions have some unique advantages, such as their ease of use, low price, scalability from smaller populations to larger populations, ability to be quickly disseminated, modifiability, and anonymous access (Bailey et al., 2010). They also have clear advantages in terms of remote delivery, a feature that has taken on added importance during the COVID-19 pandemic. Such interventions may be particularly well-perceived by college students given their elevated use and familiarity with technology compared to the general population (Villanti et al., 2017). Moreover, college students frequently utilize online sources for accessing health information (Kanuga & Rosenfeld, 2004; Richman et al., 2014). eHealth or mHealth-based interventions can be programed with algorithms to provide participants with feedback dependent on the accuracy of their normative perceptions. The flexibility and ease with which personalized normative feedback for condom promotion can be delivered to college students via technology-based modalities presents a promising avenue for university administrations to pursue in addressing their students' sexual health needs.

Conclusion

The present study was the first to examine the influence of *both* referent proximity and width of discrepancy between perceived and actual norms on the efficacy of normative feedback interventions for condom promotion. The results demonstrated a significant interaction between

referent proximity and width of discrepancy such that effect of referent proximity was contingent on the accuracy of students' perceptions. Findings from this study suggest that it may be beneficial to assess students' perceptions of their peers' sexual behavior before selecting the referent to include in normative feedback. College health centers represent an auspicious resource for delivering web-based normative feedback interventions given their ability to screen health behaviors for large numbers of students and disseminate brief interventions to those who endorse low levels of condom use.

Table 1.

Differences in Inclusion of Other in the Self Scores between Gender-matched and Gender-neutral Referents in the Context of a Personalized Normative Feedback Intervention

	Gender-matched Referent		Gender-neutral Referent		
	M	*SD*	*M*	*SD*	*t*-test
Phase 1 IOS score	3.92	1.58	4.55	1.74	0.87
Phase 2 IOS score	6.38	0.74	3.00	2.00	4.47***

Note. Phase 1 N = 20; Phase 2 N = 16; IOS = Inclusion of Other in the Self

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

Table 2.
Differences in Perceived Width of Discrepancy Scores between Perceived and Actual Peer
Condom Use in the Context of a Personalized Normative Feedback Intervention

	Wide Discrepancy Condition		Narrow Discrepancy Condition		
	M	SD	M	SD	t-test
Phase 1 Width of Discrepancy score	5.83	2.45	2.15	1.72	3.76**
Phase 2 Width of Discrepancy score	6.75	2.38	3.00	2.15	3.30**

Note. Phase 1 N = 20; Phase 2 N = 16; IOS = Inclusion of Other in the Self

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

Table 3.
Participant Demographic Characteristics by Experimental Condition

	Proximal, wide discrepancy [a]	Proximal, narrow discrepancy [b]	Distal, wide Discrepancy [c]	Distal, narrow Discrepancy [d]	ANOVA/ Chi-square
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*F (df)*
Age (in years)	22.39 (2.19)	21.67 (2.12)	21.59 (2.02)	21.31 (2.27)	2.20 (211)
	n (%)	*n (%)*	*n (%)*	*n (%)*	χ^2 *(df)*
Gender					0.56 (3)
Male	23 (46.0)	30 (38.4)	27 (52.9)	25 (51.0)	
Female	27 (54.0)	32 (51.6)	24 (47.1)	24 (49.0)	
Race					19.06 (15)
White	42 (84.0)	40 (64.5)	33 (64.7)	35 (71.4)	
Black	1 (2.0)	8 (12.9)	6 (11.8)	1 (2.0)	
Asian	5 (10.0)	10 (16.1)	7 (13.7)	9 (18.4)	
Mixed/other	1 (2.0)	3 (4.8)	4 (7.8)	3 (6.1)	
Ethnicity					1.66 (3)
Hispanic or Latino	6 (12.0)	11 (17.7)	11 (21.6)	8 (16.3)	
Non-Hispanic or Latino	44 (88.0)	51 (82.3)	40 (78.4)	40 (81.6)	
Academic standing					13.04 (9)
Freshman	7 (14.0)	8 (12.9)	3 (5.9)	5 (10.2)	
Sophomore	6 (12.0)	9 (14.5)	8 (15.7)	13 (26.5)	
Junior	15 (30.0)	11 (17.7)	20 (39.2)	10 (20.4)	
Senior	22 (44.0)	33 (53.2)	19 (37.3)	21 (42.9)	
Relationship status					6.19 (3)
Monogamous relationship	28 (56.0)	36 (58.1)	20 (39.2)	24 (49.0)	
Non-monogamous relationship	21 (42.0)	26 (49.9)	31 (60.8)	25 (51.0)	

Note: Total *N*s = 212. [a] N = 50; [b] N = 62; [c] N =51; [d] N = 49; M = Mean, SD = Standard Deviation. Percentages may not add up to 100% due to missing data (i.e., participants declining to respond to certain measures). [*]$p < .05$. [**]$p < .01$.

Table 4.

Participant Sexual Behavior by Experimental Condition

	Proximal, wide discrepancy [a]	Proximal, narrow discrepancy [b]	Distal, wide discrepancy [c]	Distal, narrow discrepancy [d]	ANOVA/ Chi-square
	M (SD)	*M (SD)*	*M (SD)*	*M (SD)*	*F (df)*
No. of sex partners past-year	1.45 (0.96)	3.36 (8.24)	2.06 (1.56)	1.71 (1.21)	1.94 (3)
No. of sex partners past 3-mo.	1.66 (4.72)	1.31 (1.68)	1.04 (0.63)	1.06 (0.92)	0.66 (3)
Alcohol before or during sex past 3-mo.[e]	2.22 (1.15)	2.15 (1.52)	2.22 (1.22)	2.41 (1.29)	0.45 (3)
Consistent condom use past 3-mo.[e]	2.80 (1.47)	2.73 (1.65)	3.14 (1.61)	2.61 (1.69)	1.00 (3)
	n (%)	*n (%)*	*n (%)*	*n (%)*	χ^2 *(df)*
No. of sex encounters past 3-ms.					20.44 (2)
Did not engage in this activity	9 (18.0)	15 (24.2)	11 (21.6)	14 (28.6)	
1-10 times	25 (51.0)	34 (54.8)	29 (56.9)	22 (44.9)	
11 or more times	15 (30.0)	13 (21.0)	11 (21.6)	12 (24.5)	

Note: Total Ns = 212. [a] N = 50; [b] N = 62; [c] N =51; [d] N = 49; [e] Based on a Likert scale ranging from 1 (never) to 5 (always); M = Mean, SD = Standard Deviation. Percentages may not add up to 100% due to missing data (i.e., participants declining to respond to certain measures).
[*]$p < .05$. [**]$p < .01$.

Table 5.
Bivariate Correlations among Select Study Variables

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.
1. Willingness	–																
2. Readiness	.365**	–															
3. Benefits	.247**	.362**	–														
4. Barriers	.001	-.161*	-.080	-													
5. Info Seeking	.012	.013	.003	-.144*	–												
6. # of Partners	.330**	.327**	.215**	.197**	-.133	–											
7. AUDIT-C	-.079	-.083	-.063	.097	-.087	-.022	–										
8. IDEA-8	.089	.061	.335**	-.106	.008	-.104	.049	–									
9. SMQ	-.013	-.064	.008	.387**	-.109	.069	.113	-.031	–								
10. SSSS	.030	-.149*	-.075	.322**	-.135	.051	.235**	.072	.556**	–							
11. MCUSES	.000	.132	.227**	-.164*	.008	-.137*	-.013	.417**	.053	.140*	–						
12.Condom Use	.185**	.411**	.164*	-.076	-.023	.041	.017	.034	.192**	.112	.276**	–					
13. Age	.099	-.103	-.057	.111	.088	.015	-.022	-.093	.225**	.286**	-.064	.041	–				
14. Race	.004	-.149*	-.101	.087	.985	-.070	.068	-.121	-.056	-.069	-.106	.068	.106	–			
15. Ethnicity	.040	-.015	.117	-.173*	.003	-.058	.002	.102	-.222**	-.164*	.066	.010	-.075	.067	–		
16. Residence	-.068	-.151*	-.044	-.069	-.096	-.137*	-.001	.088	-.243**	-.132	.062	.182**	.037	.144*	.148*	–	
17. Rel Status	.035	.016	-.047	-.111	-.025	-.051	-.065	-.007	.022	-.051	.001	-.034	.020	.068	.010	.182**	–

Note. r = Pearson product-moment (continuous variables), Spearman's rho (categorical/ordinal variables). AUDIT-C = Alcohol Use Disorder Identification Test – Consumption, IDEA-8 = Inventory of Dimensions of Emerging Adulthood, SMQ = Sexual Motives Questionnaire, SSS = Sexual Sensation Seeking, MCUSES = Modified Condom Use Self-Efficacy, Condom Use = Frequency of condom use in the past 3-months
*p < .05. **p < .01.

Table 6.

Mean, Median, and Standard Deviation of Each Outcome Variable by Experimental Condition

	Proximal, wide discrepancy [a]		Proximal, narrow discrepancy [b]		Distal, wide discrepancy [c]		Distal, narrow discrepancy [d]	
	M (SD)	*Median.*	*M (SD)*	*Median*	*M (SD)*	*Median*	*M (SD)*	*Median*
Willingness [e]	8.24 (1.77)	8.00	6.81 (3.11)	7.00	6.65 (2.91)	7.00	3.16 (1.75)	3.00
Readiness [f]	6.47 (2.92)	7.00	6.03 (3.30)	7.00	6.74 (2.80)	7.00	6.04 (3.04)	6.00
Benefits [g]	20.89 (3.97)	22.00	19.95 (5.34)	22.00	20.57 (4.42)	22.00	21.00 (4.11)	22.00
Barriers [g]	13.46 (4.36)	14.00	15.02 (5.28)	16.00	13.22 (3.79)	13.00	13.20 (4.74)	14.00
# of Partners [e]	5.54 (3.35)	5.00	5.37 (3.20)	5.00	5.06 (2.90)	5.00	5.16 (3.33)	5.00

Note. Total Ns = 212. [a] N = 50; [b] N = 62; [c] N =51; [d] N = 49; [e] Based on a Likert scale ranging from 1 (not at all willing) to 10 (very willing); [f] Based on a Likert scale ranging from 1 (Never think about safe sex) to 10 (My condom use has changed to use always); [g] Total score of 5-items measured on a Likert scale ranging from 1 (not important) to 5 (extremely); M = Mean, SD = Stand Deviation

Table 7.
Mean, Median, and Standard Deviation of Each Outcome Variable by Experimental Condition and Gender

	Proximal, wide discrepancy [a]				Proximal, narrow discrepancy [b]				Distal, wide discrepancy [c]				Distal, narrow discrepancy [d]			
	Male		Female		Male		Female		Male		Female		Male		Female	
	M (SD)	*Med.*	*M (SD)*	*Med.*	*M (SD)*	*Med.*	*M (SD)*	*Med.*	*M (SD)*	*Med.*	*M (SD)*	*Med.*	*M (SD)*	*Med.*	*M (SD)*	*Med.*
Willingness [e]	8.04 (1.67)	8.00	8.41 (1.86)	9.00	7.20 (2.87)	7.50	6.44 (3.32)	7.00	6.96 (2.64)	7.00	6.29 (3.21)	6.50	3.36 (1.85)	3.00	2.96 (1.65)	3.00
Readiness [f]	6.82 (2.46)	7.00	6.19 (3.30)	6.00	6.73 (2.86)	7.00	5.38 (3.53)	5.00	7.31 (2.53)	7.50	6.13 (3.00)	6.50	5.00 (2.65)	5.00	7.13 (3.10)	7.50
Benefits [g]	20.90 (3.37)	21.00	20.90 (4.43)	22.00	20.48 (5.55)	22.00	19.47 (5.18)	22.00	19.92 (4.92)	21.00	21.32 (3.75)	22.50	20.25 (4.46)	20.50	21.74 (3.66)	23.00
Barriers [g]	14.48 (3.97)	14.00	12.67 (4.56)	14.00	16.07 (5.94)	16.00	14.10 (4.52)	15.00	13.68 (3.72)	14.00	12.75 (3.88)	11.50	14.88 (4.46)	15.00	11.35 (4.42)	12.00
# of Partners [e]	6.17 (2.90)	6.00	5.00 (3.65)	5.00	5.70 (3.10)	5.00	5.06 (3.30)	5.00	5.42 (2.70)	5.00	4.67 (3.11)	5.00	4.56 (3.12)	4.00	5.79 (3.50)	6.00

Note. Total Ns = 212. [a] N = 50; [b] N = 62; [c] N = 51; [d] N = 49; [e] Based on a Likert scale ranging from 1 (not at all willing) to 10 (very willing); [f] Based on a Likert scale ranging from 1 (Never think about safe sex) to 10 (My condom use has changed to use always); [g] Total score of 5-items measured on a Likert scale ranging from 1 (not important) to 5 (extremely); M = Mean, SD = Stand Deviation

Table 8.

Analysis of Covariance on the Influence of Gender, Referent Proximity, and Width of Discrepancy on Willingness to Change Condom Use

Source	Sum of Squares	df	Mean Square	F	Significance	η^2
			ANCOVA			
Corrected Model	758.55	8	94.82	15.44	.000**	.378
Intercept	1462.01	1	1462.01	238.07	.000**	.540
Past 3-month Condom Use	48.14	1	48.14	7.84	.006**	.037
Gender	7.84	1	7.84	1.28	.260	.006
Referent Proximity	286.79	1	286.79	46.70	.000**	.187
Width of Discrepancy	370.83	1	370.83	60.38	.000**	.229
Gender * Proximity	3.11	1	3.11	0.51	.478	.002
Gender * Discrepancy	2.62	1	2.62	0.43	.515	.002
Proximity * Discrepancy	48.40	1	48.40	7.88	.005**	.003
Gender * Proximity * Discrepancy	3.90	1	3.90	0.64	.426	.000
Error	1246.65	203	6.14			
Total	10324.00	212				

Note. N = 212

*p < .05. **p < .01

Table 9.

Analysis of Covariance on the Influence of Gender, Referent Proximity, and Width of Discrepancy on Readiness to Change Condom Use

			ANCOVA			
Source	Sum of Squares	df	Mean Square	F	Significance	η^2
Corrected Model	425.41	10	42.54	5.70	.000**	.224
Intercept	235.10	1	235.10	31.51	.000**	.138
Race	7.05		7.05	0.95	.332	.005
Residence	4.12	1	4.12	0.55	.458	.003
Past 3-month Condom Use	245.88	1	245.88	33.00	.000**	.143
Gender	6.30	1	6.30	0.85	.359	.004
Referent Proximity	0.12	1	0.12	0.02	.899	.000
Width of Discrepancy	9.50	1	9.50	1.27	.260	.006
Gender * Proximity	15.62	1	15.62	2.10	.149	.011
Gender * Discrepancy	`8.73	1	18.73	2.51	.115	.013
Proximity * Discrepancy	0.96	1	0.96	0.13	.720	.001
Gender * Proximity * Discrepancy	28.75		28.75	3.85	.051	.019
Error	1469.65	197	7.50			
Total	10196.00	208				

Note: N = 208
*p < .05. **p < .01

Table 10.
Analysis of Covariance on the Influence of Gender, Referent Proximity, and Width of Discrepancy on Perceived Benefits of Condom Use

			ANCOVA			
Source	Sum of Squares	df	Mean Square	F	Significance	η^2
Corrected Model	614.12	9	68.24	3.71	.000**	.142
Intercept	490.80	1	490.80	26.67	.000**	.122
Emerging Adulthood	412.33		412.33	22.40	.000**	.104
Past 3-month Condom Use	101.12	1	101.12	5.49	.020*	.028
Gender	0.01	1	0.01	0.01	.987	.000
Referent Proximity	2.74	1	2.74	0.15	.700	.001
Width of Discrepancy	0.06	1	0.06	0.01	.954	.000
Gender * Proximity	5.18	1	5.18	0.28	.596	.001
Gender * Discrepancy	1.89	1	1.89	0.10	.749	.001
Proximity * Discrepancy	35.33	1	35.33	1.92	.168	.010
Gender * Proximity * Discrepancy	0.05		0.05	0.00	.960	.000
Error	89490.00	192	18.41			
Total	4147.90	202				

Note: N = 202
*p < .05. **p < .01

Table 11.

Analysis of Covariance on the Influence of Gender, Referent Proximity, and Width of Discrepancy on Perceived Barriers to Condom Use

	ANCOVA					
Source	Sum of Squares	df	Mean Square	F	Significance	η^2
Corrected Model	692.47	9	76.94	4.05	.000**	.158
Intercept	681.83	1	681.83	35.89	.000**	.156
Ethnicity	72.04		72.04	3.79	.053*	.019
Sexual Sensation Seeking	213.07	1	213.07	11.22	.001*	.055
Gender	83.72	1	83.72	4.41	.037*	.022
Referent Proximity	30.45	1	30.45	1.60	.207	.008
Width of Discrepancy	21.33	1	21.33	1.12	.291	.006
Gender * Proximity	1.03	1	1.03	0.05	.817	.000
Gender * Discrepancy	22.08	1	22.08	1.16	.282	.006
Proximity * Discrepancy	9.07	1	9.07	0.50	.490	.002
Gender * Proximity * Discrepancy	18.61		18.61	0.98	.324	.005
Error	3685.18	194	19.00			
Total	43360.00	204				

Note: N = 204

*p < .05. **p < .01

Table 12.

Analysis of Covariance of the Influence of Gender, Referent Proximity, and Width of Discrepancy on Willingness to Reduce Number of Sexual Partners

	ANCOVA					
Source	Sum of Squares	df	Mean Square	F	Significance	η^2
Corrected Model	131.09	10	15.57	1.47	.160	.062
Intercept	476.65	1	476.65	48.22	.000**	.194
Residence	23.87		23.87	2.42	.212	.012
Condom Use Self-Efficacy	41.85	1	41.85	4.23	.041*	.021
Gender	1.50	1	1.50	0.15	.697	.001
Referent Proximity	7.46	1	7.46	0.76	.386	.004
Width of Discrepancy	0.50	1	0.50	0.05	.822	.000
Gender * Proximity	22.44	1	22.44	2.27	.133	.011
Gender * Discrepancy	18.87	1	18.87	1.91	.169	.009
Proximity * Discrepancy	1.04	1	1.04	0.11	.746	.001
Gender * Proximity * Discrepancy	8.81		8.81	0.89	.346	.004
Error	1976.89	200	9.88			
Total	2107.98	210				

Note: N = 210

*p < .05. **p < .01.

Table 13.

Analysis of Covariance of the Influence of Gender, Referent Proximity, and Width of Discrepancy on Intentions to Increase Condom Use

			ANCOVA			
Source	Sum of Squares	df	Mean Square	F	Significance	η^2
Corrected Model	2747.31	10	274.73	5.22	.000**	.216
Intercept	1392.08	1	1392.08	26.45	.000**	.122
Emerging Adulthood	517.80		517.80	9.84	.002**	.049
Past 3-month Condom Use	1037.89		1037.89	19.72	.000**	.094
Condom Use Self-Efficacy	2.61	1	2.61	0.05	.824	.000
Gender	36.08	1	36.08	0.69	.409	.004
Referent Proximity	322.27	1	322.27	6.12	.014*	.031
Width of Discrepancy	378.98	1	378.98	7.20	.008**	.037
Gender * Proximity	23.69	1	23.69	0.45	.503	.002
Gender * Discrepancy	2.00	1	2.00	0.04	.846	.000
Proximity * Discrepancy	0.15	1	0.15	0.00	.958	.000
Gender * Proximity * Discrepancy	39.81		39.81	0.76	.386	.004
Error	10000.70	190	52.64			
Total	12748.01	201				

Note: N = 201

*p < .05. **p < .01.

Table 14.
Frequency of Endorsement of Sexual Health Information Seeking by Experimental Condition and Gender

	Proximal, wide discrepancy [a]		Proximal, narrow discrepancy [b]		Distal, wide discrepancy [c]		Distal, narrow discrepancy [d]	
	Male *n (%)*	Female *n (%)*	Male *n (%)*	Female *n (%)*	Male *n (%)*	Female *n (%)*	Male *n (%)*	Female *n (%)*
Sought Info.								
Yes	4 (17.4)	7 (25.9)	10 (33.3)	11 (34.4)	9 (33.3)	9 (37.5)	6 (24.0)	9 (37.5)
No	19 (82.6)	20 (74.1)	20 (66.7)	21 (65.6)	17 (63.0)	15 (62.5)	16 (76.0)	15 (62.5)

Note. Total Ns = 212. [a] N = 50; [b] N = 62; [c] N =51; [d] N = 49; Percentages may not add up to 100% due to missing data (i.e., participants declining to respond to certain measures).

Table 15.

Adjusted Odds Ratio (aORs) of the Association between Gender, Referent Proximity, Width of Discrepancy, and Sexual Health Information Seeking in the Context of a Personalized Normative Feedback Intervention

	aOR	95% Confidence Interval	
		Lower	Upper
Step 1			
Drinking Motives	0.95**	0.95	0.99
Step 2			
Gender	1.30	0.70	2.45
Referent Proximity	0.77	0.41	1.45
Width of Discrepancy	0.83	0.44	1.55
Gender * Proximity	0.91	0.63	1.31
Gender * Discrepancy	0.95	0.65	1.37
Proximity * Discrepancy	0.56	0.24	1.21
Gender * Proximity * Discrepancy	0.75	0.45	1.91

Note: N = 212; *p < .05. **p < .01.

Figure 1
Experimental Session Procedures Flow Diagram
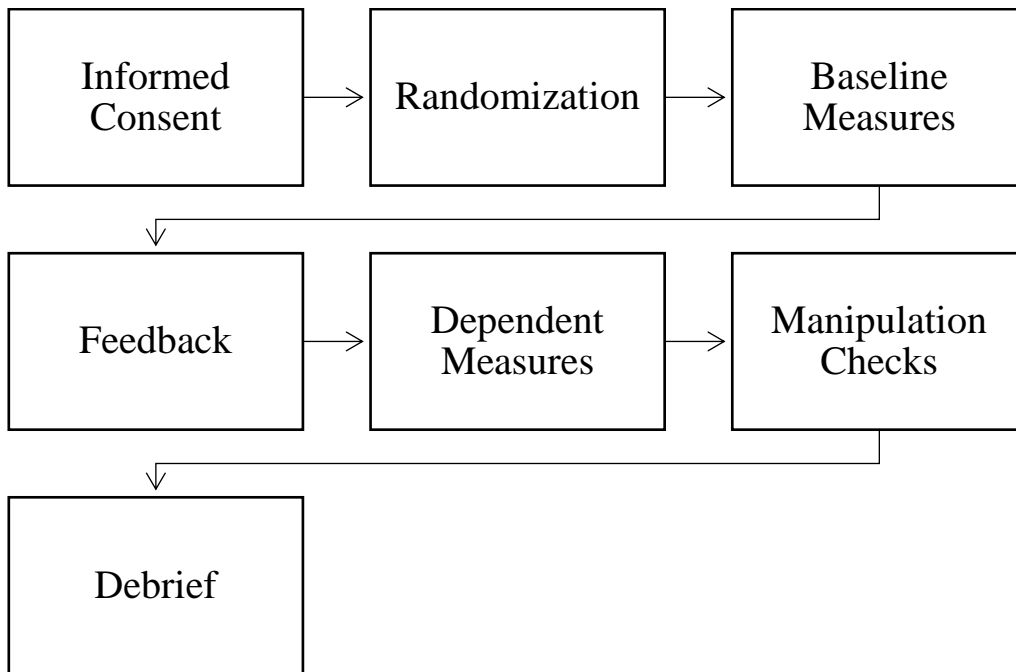
Figure 2

Influence of Referent Proximity and Width of Discrepancy on Willingness to Change Condom Use
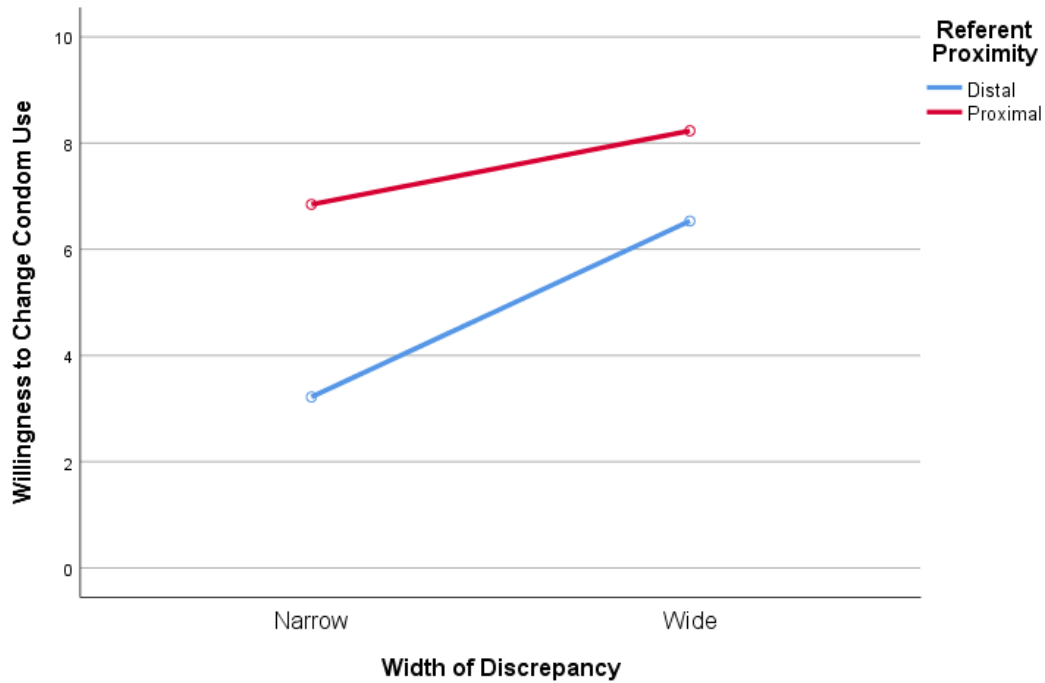
Note. Predicted values of the referent proximity x width of discrepancy interaction in the model predicting willingness to change condom use.

Appendix: Materials & Measures

A. Screening Questionnaire

B. Sample Demographics

C. Sexual Behavior Questionnaire

D. Individual-Difference Measures

E. Perceived Descriptive Norms

F. Normative Feedback Example

G. Dependent Measures

H. Manipulation Checks

I. Debriefing Statement

Appendix A

Screening Questionnaire

1. What is your age?   _____

2. What is your date of birth?   _____

3. What is your gender or sex (Check all that apply)?

Male

Female

Other

4. Do you currently identify as (Choose one):

Heterosexual/straight

Homosexual/gay/queer

Bisexual

Not sure/questioning

Other

5. IN THE PAST YEAR: How many different partners have you had sex with?

_____

Appendix B

Sample Demographics

1. What is your age?   _____

2. What is your date of birth?   _____

3. What is your gender or sex (Check all that apply)?

Male

Female

Other

4. Do you currently identify as (Choose one):

Heterosexual/straight

Homosexual/gay/queer

Bisexual

Not sure/questioning

Additional category. Please specify.

5. What best describes your academic standing?

Freshman

Sophomore

Junior

Senior

6. How do you identify your race or ethnicity?

American Indian/Alaska Native

Asian/Pacific Islander

Black or African American

Caucasian/White

Mixed Race

Additional Category. Please specify.

7. Do you identify as Hispanic or Latinx?

Yes

No

8. Are you an international student?

Yes

No

9. Select the option that best describes your current living situation.

On campus/residence hall/south campus

Off-campus/apartment/fraternity or sorority house

Additional category. Please specify.

10. Select the option that best describes your current relationship status.

Single/not-dating

Monogamous (exclusive) relationship

Non-monogamous (not exclusive) relationship

Additional category. Please specify.

11a. Before you were 18, did you ever receive formal instruction at school about sexual health (e.g., STI prevention, methods of birth control)?

Yes

No

11b. Did your formal instruction provide information about proper condom use techniques (i.e., how to put on and take off a male condom)?

Yes

No

11c. Select the grade level/s during which you received formal instruction at school about sexual health (e.g., STI prevention, methods of birth control).

Elementary school (grades 1-5)

Middle school (grades 6-8)

High school (grades 9-12)

12. In which state did you attend elementary school (grades 1-5)?

Options for all states or other (e.g., international)

13. In which state did you attend middle school (grades 6-8)?

Options for all states or other (e.g., international)

14. In which state did you attend high school (grades 9-12)?

Options for all states or other (e.g., international)

Appendix C

Sexual Behavior Questionnaire

The next set of questions asks about your sexual behavior. It is extremely important that you be truthful. Remember, your name does not appear anywhere on this survey. Please answer these questions honestly to the best of your knowledge.

1.   IN YOUR ENTIRE LIFE: How many different partners have you had insertive/receptive sex with?

2.   IN THE PAST YEAR: How many different partners have you had insertive/receptive sex with?

Now, think back carefully over the past 3 months. Think of places you've been, people you've met, and things you've done. Please answer these questions about the past 3 months.

3.   How many different partners have you had sex with in the past 3 months?

4.   How many times did you engage in insertive/receptive oral sex in the past 3 months?

1	2	3	4	5	6	7
Did not engage in this activity in the past 3-months	1-2 times	3-4 times	5-6 times	7-8 times	9-10 times	11 or more times

5.   How many times did you engage in insertive/receptive anal sex in the past 3 months?

1	2	3	4	5	6	7
Did not engage in this activity in the past 3-months	1-2 times	3-4 times	5-6 times	7-8 times	9-10 times	11 or more times

6.   How many times did you engage in insertive/receptive vaginal sex in the past 3 months?

1	2	3	4	5	6	7
Did not engage in this activity in the past 3-months	1-2 times	3-4 times	5-6 times	7-8 times	9-10 times	11 or more times

7.   How many times did you or your partner use a male latex condom during insertive/receptive vaginal sex in the past 3 months?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

8.   How often did you talk to your sexual partner about using condoms before or during intercourse in the past 3 months?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

9.   How often did you consume alcohol in conjunction with a sexual encounter in the past 3 months?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

10.   How often did you consume cannabis or other drugs in conjunction with a sexual encounter in the past 3 months?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

Now, think back carefully over the past month (30 days). Think of places you've been, people you've met, and things you've done. Please answer these questions about the past month.

11.   How many different partners have you had sex with in the past 30 days?

12.   How many times did you engage in insertive/receptive oral sex in the past 30 days?

1	2	3	4	5	6	7
Did not engage in this activity in the past 30 days	1-2 times	3-4 times	5-6 times	7-8 times	9-10 times	11 or more times

13.   How many times did you engage in insertive/receptive anal sex in the past 30 days?

1	2	3	4	5	6	7
Did not engage in this activity in the past 30 days	1-2 times	3-4 times	5-6 times	7-8 times	9-10 times	11 or more times

14.   How many times did you engage in insertive/receptive vaginal sex in the past 30 days?

1	2	3	4	5	6	7
Did not engage in this activity in the past 30 days	1-2 times	3-4 times	5-6 times	7-8 times	9-10 times	11 or more times

15.   How many times did you or your partner use a male latex condom during insertive/receptive vaginal sex in the past 30 days?

1	2	3	4	5
Never	Rarely	Sometimes	Often	Always

16. IN YOUR ENTIRE LIFETIME: How likely are you to let your partner decide whether or not to use a condom?

1	2	3	4	5	6	7
Not at all likely			Neutral			Very likely

Appendix D

Condom Use Self-Efficacy Scale – Modified (MCUSES)

1	2	3	4	5
Strongly agree	Slightly agree	Undecided	Slightly disagree	Strongly disagree

1.   I feel confident in my ability to put a condom on myself or my partner

2.   I feel confident I could purchase condoms without feeling embarrassed

3.   I feel confident in my ability to discuss condom usage with any partner I might have

4.   I feel confident in my ability to suggest using condoms with a new partner

5.   I feel confident I could suggest using a condom without my partner feeling "diseased"

6.   I feel confident in my own or my partner's ability to maintain an erection while using a

condom

7.   I would feel embarrassed to put a condom on myself or my partner

8.   I feel confident in my ability to use a condom correctly

9.   I feel confident I could gracefully remove and dispose of a condom after sexual

intercourse

10.   I feel confident in my ability to incorporate putting a condom on myself or my partner

into foreplay

11.   I feel confident in my ability to put a condom on myself or my partner quickly

12.   I feel confident that I would remember to use a condom even after I have been drinking

13.   I feel confident I would remember to use a condom if I were high

14.   I feel confident I could stop to put on a condom myself or my partner even in the heat of

passion

Appendix D

Alcohol Use Disorders Identification Test-Consumption (AUDIT-C)

1. How often do you have a drink containing alcohol?	Never
	Monthly or less
	2-4 times a month
	2-3 times a week
	4 or more times a week
2. How many standard drinks containing alcohol do you have on a typical day? A standard drink is a 12 oz glass of beer, a 5 oz glass of wine, or a 1.5 oz shot.	1 or 2
	3 or 4
	5 or 6
	7 to 9
	10 or more
3. How often do you have six or more drinks on one occasion?	Never
	Less than monthly
	Monthly
	Weekly
	Daily or almost daily

Appendix D

Sexual Sensation Seeking Scale (SSSS)

1	2	3	4
Not at all like me	Slightly like me	Mainly like me	A lot like me

1. I like wild "uninhibited" sexual encounters

2. The physical sensations are the most important thing about having sex

3. I enjoy the sensation of intercourse without a condom

4. My sexual partners probably think I am a "risk taker"

5. When it comes to sex, physical attraction is more important to me then how well I know the person

6. I enjoy the company of "sensual" people

7. I enjoy watching "X-rated" videos

8. I have said things that were not exactly true to get a person to have sex with me

9. I am interested in trying out new sexual experiences

10. I feel like exploring my sexuality

11. I like to have new and exciting sexual experiences and sensations

Appendix D

Sexual Motives Questionnaire (SMQ)

1	2	3	4	5
Almost never/never have sex for this reason		Sometimes have sex for this reason		Almost always/always have sex for this reason

1. I have sex to help me deal with disappointments in my life.

2. I have sex to feel emotionally close to my partner.

3. I have sex because I don't want my partner to be angry with me.

4. I have sex because it feels good.

5. Sometimes I have sex just because all my friends are having sex.

6. I have sex to reassure myself that I am attractive.

Appendix D

Inventory of Dimensions of Emerging Adulthood (IDEA-8)

First, please think about this time in your life. By "time in your life," we are referring to the present time, plus the last few years that have gone by, and the next few years to come, as you see them. In short, you should think about a roughly five-year period, with the present time right in the middle.

Is this period of your life a time of…?

1	2	3	4
Strongly disagree	Somewhat disagree	Somewhat agree	Strongly agree

1. time of many possibilities

2. time of exploration

3. time of feeling stressed out

4. time of high pressure

5. time of defining yourself

6. time of deciding your own beliefs and values

7. time of feeling adult in some ways but not in others

8. time of gradually becoming an adult

Appendix E

Perceived Descriptive Norms

Have you ever wondered about the sexual behavior of your fellow Syracuse University (SU) students?

We conducted a survey last year of a large sample of SU students to ask them about their sexual behavior. Before we share the results of this survey with you, we'd like to see what you currently assume about the sexual behavior of your fellow SU students.

Please answer these questions the best you can for the **typical student at your university**, and if you're not sure, just guess.

1. What percentage of SU students would you say were completely <u>abstinent</u> from all sexual activity over the past three months?

2. What percentage of SU students would you say had <u>one sexual partner</u> with whom they had sexual intercourse over the past three months?

3. What percentage of SU students would you say had <u>two or more sexual partners</u> with whom they had sexual intercourse over the past three months?

4. Of the SU students who had vaginal intercourse over the past three months, what percentage would you say used a condom <u>all or most of the time</u>?

5. Of the SU students who had vaginal intercourse over the past three months, what percentage would you say <u>never</u> used a condom?

6. Of the SU students who had vaginal intercourse over the past three months, what percentage would you say <u>talked to their sexual partner about using a condom before or during intercourse</u>?

7. What percentage of SU students would you say consumed <u>alcohol</u> in conjunction with <u>all or most</u> of their sexual encounters over the past three months?

8. What percentage of SU students would you say consumed <u>cannabis or other drugs</u> in conjunction with <u>all or most</u> of their sexual encounters over the past three months?

Now, please answer these questions the best you can for the **typical male student at your university**, and if you're not sure, just guess.

9. What percentage of male SU students would you say were completely <u>abstinent</u> from all sexual activity over the past three months?

10. What percentage of male SU students would you say had <u>one sexual partner</u> with whom they had sexual intercourse over the past three months?

11. What percentage of male SU students would you say had <u>two or more sexual partners</u> with whom they had sexual intercourse over the past three months?

12. Of the male SU students who had vaginal intercourse over the past three months, what percentage would you say used a condom <u>all or most of the time</u>?

13. Of the male SU students who had vaginal intercourse over the past three months, what percentage would you say <u>never</u> used a condom?

14. Of the male SU students who had vaginal intercourse over the past three months, what percentage would you say <u>talked to their sexual partner about using a condom before or during intercourse</u>?

15. What percentage of male SU students would you say consumed <u>alcohol</u> in conjunction with <u>all or most</u> of their sexual encounters over the past three months?

16. What percentage of male SU students would you say consumed <u>cannabis or other drugs</u> in conjunction with <u>all or most</u> of their sexual encounters over the past three months?

Now, please answer these questions the best you can for the **typical female student at your university**, and if you're not sure, just guess.

17. What percentage of female SU students would you say were completely <u>abstinent</u> from all sexual activity over the past three months?

18. What percentage of female SU students would you say had <u>one sexual partner</u> with whom they had sexual intercourse over the past three months?

19. What percentage of female SU students would you say had <u>two or more sexual partners</u> with whom they had sexual intercourse over the past three months?

20. Of the female SU students who had vaginal intercourse over the past three months, what percentage would you say used a condom <u>all or most of the time</u>?

21. Of the female SU students who had vaginal intercourse over the past three months, what percentage would you say <u>never</u> used a condom?

22. Of the female SU students who had vaginal intercourse over the past three months, what percentage would you say <u>talked to their sexual partner about using a condom before or during intercourse</u>?

23. What percentage of female SU students would you say consumed <u>alcohol</u> in conjunction with <u>all or most</u> of their sexual encounters over the past three months?

24. What percentage of female SU students would you say consumed <u>cannabis or other drugs</u> in conjunction with <u>all or most</u> of their sexual encounters over the past three months?

Appendix F

Normative Feedback Examples

Please turn the volume on and click the audio symbol next to the feedback. Please read the feedback while you are listening.

You stated that **46% of typical students at your university** use a condom all or most of the time during sexual intercourse in the past three months. In fact, **66% of typical students at your university** use a condom all or most of the time during sexual intercourse in the past three months. You underestimated your peers' condom use by **20%**.

Did you use the audio to listen to the feedback?	**Yes**
	No
Did you read the feedback?	**Yes**
	No

Please re-read the same feedback while listening to the audio.

You stated that **69% of typical female students at your university** have had sex with multiple partners in the past three months. In fact, **64% of typical female university students** have had sex with multiple partners in the past three months. You overestimated the typical female students' number of partners by **5%.**

Did you use the audio to listen to the feedback?	**Yes**
	No
Did you read the feedback?	**Yes**
	No

Appendix G

Willingness to Change Condom Use

How willing are you to increase your condom use in the next three months?

0	1	2	3	4	5	6	7	8	9	10
not at all willing					neutral					Extremely willing

Appendix G

Readiness to Change Condom Use

On the ruler below, please select the number that best describes how you are feeling right now.

0	1	2	3	4	5	6	7	8	9	10
Never think about safe sex			Sometimes I think about using condoms more		I have decided to use condoms more often		I am already trying to use condoms more during sex			My condom use has changed to use always

Appendix G

Decisional Balancing

Here are some good things about sex with condoms and sex without condoms. How true is each one for you in your decisions about unprotected sex?

1	2	3	4	5
Not important		Somewhat important		Extremely important

1. I would be safer from disease

2. I would feel more responsible

3. It protects my partner as well as myself

4. It would be safer from pregnancy

5. It is easily available

6. It makes sex feel unnatural

7. It would be too much trouble

8. My partner would be angry

9. I would have to rely on my partner's cooperation

10. My partner would think that I do not trust him/her

Appendix G

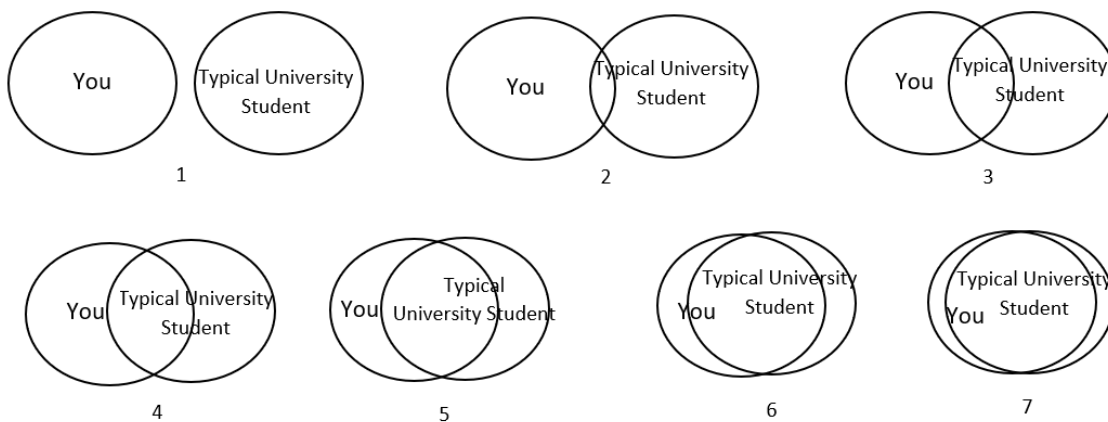*Willingness to Reduce Number of Sexual Partners*

How willing are you to reduce your number of sexual partners over the next three months?

0	1	2	3	4	5	6	7	8	9	10

not at all   neutral   Extremely
willing   willing

Appendix H

Inclusion of Other in the Self (IOS)

Consider the group that was referenced in the feedback you received **(typical student at your university)**. Please select the number aligned with the Venn diagram which best describes your relationship with the **typical student at your university**.

Appendix H

Identification of Discrepancy

Based on the feedback you received, describe the width of discrepancy between your perception of your peers' condom use in the past 3-months and your peers' actual reported condom use in the past 3-months.

0	1	2	3	4	5	6	7	8	9	10

No	Medium	Large
discrepancy	discrepancy	discrepancy

Based on the feedback you received, describe the width of discrepancy between your perception of your peers' average number of sexual partners in the past 3-months and your peers' actual reported average number of sexual partners in the past 3-months.

0	1	2	3	4	5	6	7	8	9	10

No	Medium	Large
discrepancy	discrepancy	discrepancy

How realistic was the width of discrepancy between your perception of your peers' condom use in the past 3-months and your peers' actual reported condom use in the past 3-months?

1	2	3	4

| Not realistic | | | Very realistic |

How realistic was the width of discrepancy between your perception of your peers' number of sexual partners in the past 3-months and your peers' actual reported number of sexual partners in the past 3-months?

1	2	3	4

| Not realistic | | | Very realistic |

What would have been a more realistic discrepancy between your own perceptions and the normative data? (participants insert an answer)

Appendix H
Typical Student Profile

Think about the typical college student at your university. Please fill in the following

demographic information for your perception of the typical college student at your university.

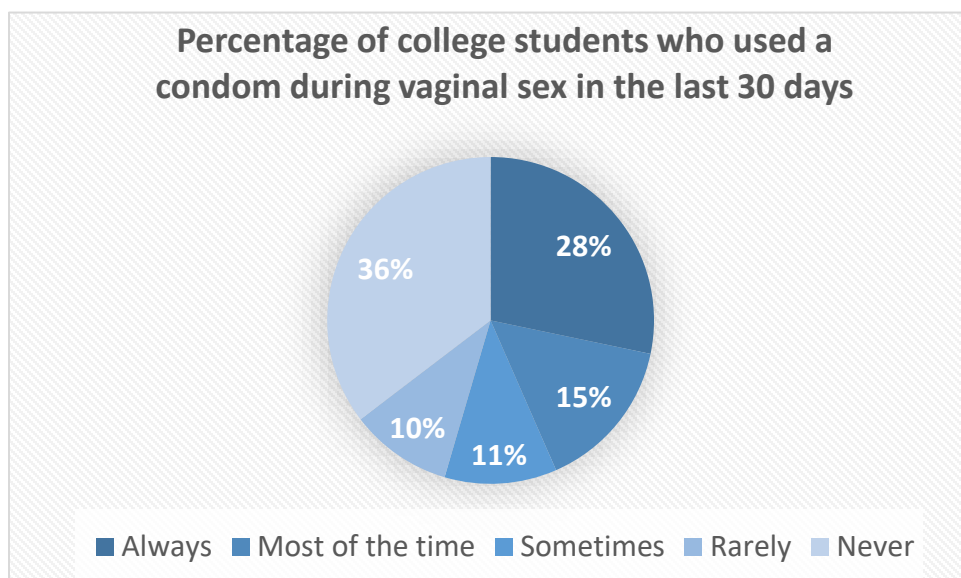|	
1. What is their age?	_____
2. What is their gender or sex (Check all that apply)?	Male
	Female
	Transgender Male or Transman
	Transgender Female or Transwoman
	Genderqueer
	Additional category. Please specify.
	Decline to state
3. What best describes their academic standing?	Freshman
	Sophomore
	Junior
	Senior
	Decline to state
4. How do they identify your race or ethnicity?	American Indian/Alaska Native
	Asian/Pacific Islander
	Black or African American
	Caucasian/White
	Mixed Race
	Additional Category. Please specify.
	Decline to state
5. Do they identify as Hispanic or Latinx?	Yes
	No
6. Select the option that best describes their current living situation.	On campus/residence hall/south campus
	Off-campus/apartment/fraternity or sorority house
	Additional category. Please specify.
	Decline to state

7. Are they a member of a fraternity or sorority on campus?	Yes
	No
8. Are they a member of a professional fraternity on campus?	Yes
	No
9. Are they a student athlete affiliated with Syracuse University?	Yes
	No
10. Select the option that best describes their current relationship status.	Single/not-dating
	Monogamous (exclusive) relationship
	Non-monogamous (not exclusive) relationship
	Additional category. Please specify.
	Decline to state

Appendix I

Debriefing Statement

The purpose of this study was to better understand how informational feedback influences motivation to change health-related behavior. You received sham feedback about your peers' sexual behavior and reported on your own motivation to modify your sexual behavior, as well as your perceptions of the feedback. The feedback you received **did not contain accurate data** on normative levels of condom use and number of sexual partners among college students.

Please find below national data gathered by the American College Health Association (ACHA) regarding college students' average levels of condom use and number of sexual partners.

Percentage of college students who used a condom during vaginal sex in the last 30 days

Always — 28%
Most of the time — 15%
Sometimes — 11%
Rarely — 10%
Never — 36%

Average number of sexual partners within the past 12 months among college students

0 — 38%
1-3 — 51%
4 or more — 11%
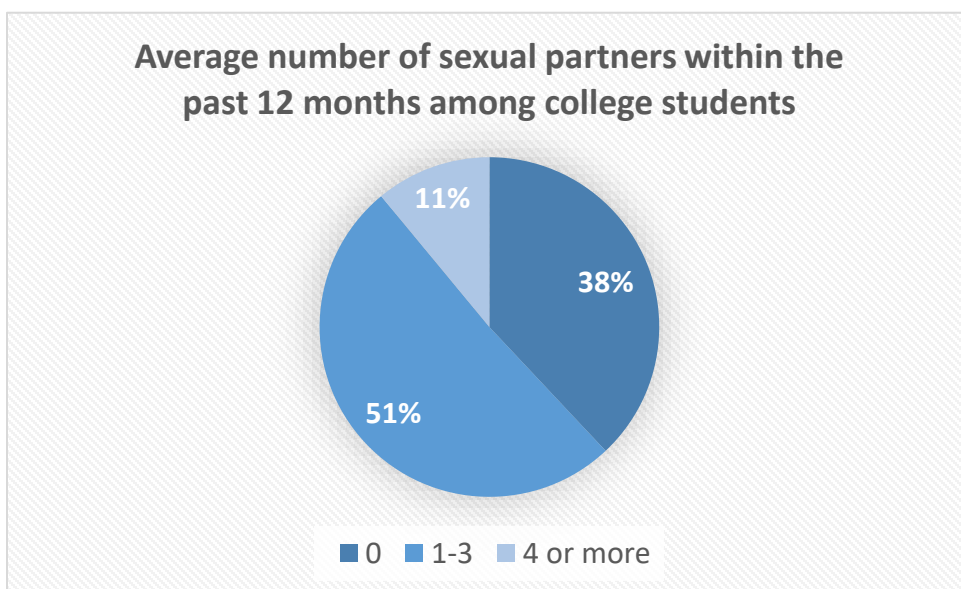
Your participant will help inform future normative feedback interventions for condom promotion among college students.

For more information regarding how to have safe safely, pleasurably, and with consent, please contact Planned Parenthood (https://www.plannedparenthood.org/learn).

If you have any further questions about your participation in this study, please contact Madison Firkey (mkfirkey@syr.edu).

After learning the intent and purpose of this study, what would you like for use to do with your data? As a reminder, your name and any other identifying information is not attached to your data. You will not be penalized in any way if you decide to withdraw your data from the study (i.e., you will still receive compensation).	Keep my data Withdraw my data
Please acknowledge that you have read the debriefing statement by clicking "yes."	Yes

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adults: An experimental study. *Archives of Sexual Behavior*, *44*(3), 571–581.

https://doi.org/10.1007/s10508-014-0362-7

CURRICULUM VITAE

Madison Firkey

EDUCATION
Syracuse University, Syracuse, New York
Clinical Psychology Doctoral Program, August 2018 – present
Advisor: Sarah E. Woolf-King Ph.D., M.P.H.

Syracuse University, Syracuse, New York
Bachelor of Arts in Psychology and Neuroscience, May 2018

HONORS AND AWARDS
2014-2018 – Dean's List, Syracuse University
2017 – Syracuse University Allport Research Grant
2018 – Graduated Suma Cum Laude, Syracuse University

CLINICAL EXPERIENCE

Syracuse University, Psychological Services Center, Syracuse, New York
Student Clinician, August 2020 - Present
Provide individual therapies in a university-based outpatient training facility to adults with
diverse psychiatric conditions and conduct clinical/neuropsychological assessments (e.g., ADHD
assessment) with adults and adolescents.

RESEARCH EXPERIENCE

Syracuse University, Psychology and Health Laboratory, Syracuse, NY
Graduate Research Assistant, August 2018 – August 2020
Supervisor: Dr. Sarah E. Woolf-King, Ph.D., M.P.H.
Conduct research on a pilot comparative effectiveness randomized clinical trial of Acceptance
and Commitment Therapy for HIV-infected hazardous drinkers entitled *Brief Acceptance and
Commitment Therapy for HIV-Infected At-Risk Drinkers (NIAAA 1R34AA026246-01A1)*

Syracuse University, Alcohol Research Lab, Syracuse, NY
Graduate Research Assistant, August 2016 – May 2018
Supervisor: Dr. Stephen A. Maisto, Ph.D.
Conduct research on an experimental study examining the influence of alcohol use on sexual
decision-making among men who have sex with men entitled *Alcohol and Implicit Process in
Sexual Risk Behavior in Men who have Sex with Men (NIAAA R01AA022301)*

PEER-REVIEWED MANUSCRIPTS

Firkey, M., Buckheit, K., Mitzel, L., Maisto, S.A., Palfai, T., & Vanable, P. (2020). Sexual Risk and Social Desirability among Black and White Men Who Have Sex with Men. *Journal of Black Sexuality and Relationships, 6*(3), 29-47. doi.org/10.1353/bsr.2020.0006

Woolf-King, S.E., Sheinfil, A.Z., Ramos, J., Foley, J., Moskal, D., **Firkey, M.**, Kellen, D., & Maisto, S.A. (2020). A Conceptual Model of Alcohol Use and Adherence to Antiretroviral Therapy: Systematic Review and Theoretical Implications for Mechanisms of Action. *Health Psychology Review*. doi.org/10.1080/17437199.2020.1806722

Firkey, M., Sheinfil, A., & Woolf-King, S.E. (2020). Substance Use, Sexual Behavior, and General Well-being of U.S. College Students During the COVID-19 Pandemic: A Brief Report. Manuscript submitted for publication.

Firkey, M., Sheinfil, A., Ramos, J., & Woolf-King, S.E. (2020). Cannabis and Alcohol Use Co-Use and Condomless Anal Sex Among Men Who Have Sex with Men Living with HIV: An Event-Level Analysis. Manuscript submitted for publication.

Simmons., E.M., **Firkey, M.**, Sheinfil, A.Z., Ramos, J.M., & Woolf-King, S.E. (2020). The Association Between Financial Resources Strain and Perceived Adherence to Antiretroviral Therapy (ART) Among HIV-Positive Men who Have Sex with Men: A Brief Report. Manuscript submitted for publication.

Foley, J.D., **Firkey, M.**, Sheinfil, A., Ramos, J., Woolf-King, S.E., & Vanable, P.A. (2020). Framed Messages to Reduce Sexual Risk Compensation Associated with Pre-Exposure Prophylaxis. Manuscript submitted for publication.

Scheer, J., Edwards, K., Sheinfil, A., Dalton, M., **Firkey, M.**, & Watson, R. (2020). Interpersonal Victimization, Substance Use, and Mental Health among Sexual and Gender Minority Youth: The Role of Cognitive Mechanisms. Manuscript submitted for publication.

PRESENTATIONS

Firkey, M. & Goodhines, P. A. (2020, October 2). *Health psychology data collection during the COVID-19 pandemic: Barriers, solutions, and implications* [Invited oral presentation]. Clinical Psychology Monthly Program Seminar at Syracuse University, Syracuse NY, United States.

Firkey, M., Sheinfil, A., Ramos, J., & Woolf-King, S.E. (2020, June). *Unprotected Anal Intercourse and Combined Alcohol and Cannabis Use Among Men Who Have Sex with Men Living with HIV: An Event-Level Analysis*. Poster presented at the annual meeting of the Research Society on Alcoholism, New Orleans, LA.

Ramos, J., Sheinfil., A., **Firkey, M.**, Simmons, E., & Woolf-King, S.E. (2020, June). *Coping Motives as a Moderator of the Association Between Minority Stress and Alcohol Use Among College Students of Marginalized Sexualities and Genders.* Poster presented at the annual meeting of the Research Society on Alcoholism, New Orleans, LA.

Firkey, M., Foley, J., Bricker, J., Hahn, J., Reddy, E., Wikiera, J., … & Woolf-King, S.E. (2019, June). *Adaptation and Acceptability of a Brief Acceptance and commitment Therapy for Alcohol Use Among People Living with HIV.* Poster presented at the annual meeting of the Research Society on Alcoholism, Minneapolis, MI.

Foley, J., Sheinfil, A., Ramos, J., **Firkey, M.**, & Woolf-King, S.E. (2019, March). *Changes in Depressive Symptoms and Antiretroviral Adherence among Men Who Have Sex with Men Living with HIV.* Poster presented at the annual meeting and scientific sessions of the Society of Behavioral Medicine, Washington, DC.

Firkey, M., Mitzel, L.D., & Maisto, S.A. (2017, October). *Risky sexual behaviors and social desirability bias among racially diverse men who have sex with men.* Poster presented at the annual meeting of the New England Psychological Association, Newton, MA.

TEACHING EXPERIENCE

Guest Lecturer, Health Psychology, Condom Promotion Interventions, Summer 2020

PROFESSIONAL MEMBERSHIP

2019 – Psychology Research Initiative in Diversity Enhancement Mentor
2019-2020 – Women in Science and Engineering Associate
2020 – Member of the Psychology Action Committee
2020 – Member of the Committee for Diversity and Inclusion
2020-2021 – Appointed member of the Chancellor's Citation for Excellence Selection Committee

SERVICE

2020 – Syracuse City School District Tutor