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Investigating the Social and Cognitive Factors Influencing Risky Sexual Behavior in Emerging Adults

by

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Abstract

Condomless sexual activity has been shown to peak during emerging adulthood. Concurrently rates of sexually transmitted infections (STIs) and unwanted pregnancies are high amongst this age group. Past research has shown both social and cognitive factors to be predictive of sexual risk taking in this group, but few studies have looked at these factors together. The present investigation expands on this research by testing a regression model predicting sexual risk behavior among emerging adults using both social and cognitive factors. It was hypothesized that heightened impulsivity and perceived social normalcy of condomless sex would predict sexual behavior. Additionally it was hypothesized that social norms would moderate the relationship between impulsivity and condomless sexual intercourse. Participants were 301 sexually active young adults living in New York City. Participants completed survey measures pertaining to perceived social norms and a neuropsychological assessment designed to assess degree of inhibition control (impulsivity). Participants also underwent guided interviews to record sexual activity in the past 30 days. Analyses showed that social and cognitive factors predicted sexual behavior individually as predicted, but the expected moderation was not found. These data support previous findings that sexual behavior is influenced by cognitive factors and social norms but the way these factors interact is still not known.

Introduction

Casual sex among emerging adults has consistently been reported in the U.S., with condomless sex peaking during ages 18-29 (Fergus et al., 2007). Not surprisingly, sexually transmitted infections (STIs) such as Chlamydia and Gonorrhea are more prevalent amongst young adults than other age groups (CDC fact sheet, 2014) and approximately 54% of all unintended pregnancies occur among women in this age group (DePaul, 2009). The public health implications of these findings are clear: emerging adults encounter myriad sexual health risks, which can have long lasting consequences. It is therefore crucial to elucidate factors that contribute to such potentially risky behavior. A thorough understanding of how condomless sex fits into the social and cognitive development of emerging adults may facilitate the development of techniques to allow young adults to better protect themselves.

Emerging adulthood has been described as a discrete developmental stage occurring after adolescence but before the acceptance of adult responsibilities (Arnett, 2001; Arnett, 2004). Occurring between the ages of 18 and 29, young people are legally and physically considered adults but psychologically have not fully transitioned out of adolescence. Individuals in this developmental phase lack financial and/or emotional independence (Arnett, 2000) and strive to forge a cohesive identity. The successful navigation of this developmental phase may have significant health implications; adoption of an adult identity has been associated with multiple positive health outcomes in young people. In their research, Nelson & Barry (2005) discovered that young people who perceived themselves as being more adult than their same aged cohorts reported less depression and engaged in less substance use and condomless sex. The specific

mechanism underlying this behavioral discrepancy is unknown, but it is clear that nascent adults face unique health risks.

Emerging adulthood is a time of heightened engagement in potentially risky sexual behavior; young adults report engaging in sex more frequently and less consistent condom use than other age groups. Concurrent with these sexual practices, emerging adults have also been shown to vacillate between serial monogamous relationships over time further impacting sexual activity and contraceptive use (Frost et al., 2007; Pedersen & Blekesaune, 2006). These relationships may also overlap temporally, presenting additional risk for STI transmission (Adimora et al., 2007; Doherty et al., 2006; Doherty et al., 2007; Drumright et al., 2004; Riehm et al., 2006). This constellation of behaviors leaves emerging adults vulnerable to multiple health risks including contracting STIs and/or unwanted pregnancies (Brady et al., 2009; Bralock & Koniak-Griffin, 2007; Parks et al., 2009).

In addition, alcohol use has been shown to be particularly prevalent during emerging adulthood. Substance use (including alcohol use) often makes its debut during adolescence (Castellanos-Ryan, 2011; Kandel & Logan, 1984; Newcomb et al., 1986) and continues throughout emerging adulthood. Studies indicate that between 51-73% of 18-25 year olds report recent alcohol consumption and 27-46% report recent binge drinking (i.e. drinking five or more drinks in one sitting) (Windle, 2003). In addition, alcohol use can be detrimental due to its association with unintended or unwanted sexual activity and/or potential academic impairment (Oei & Morawska, 2004). Also engaging in binge drinking, a relatively common phenomenon in young adults, has been shown to exacerbate the negative consequences of alcohol use (Giancola, 2002).

Based on this literature, distinct health risk patterns can be observed within this group. The cognitive/neurological processes resulting in sexual risk taking (sober or under the influence of alcohol), however, are not apparent. As explained previously, a central theme of emerging adulthood is the crystallization of the individual's identity. Part of this identity refinement occurs through social interaction and identifying with one's peers (Morgan & Korobov, 2012). Therefore it seems plausible that social influences hold an especially powerful sway over emerging adults. Indeed, the literature lends support to this claim.

Social influences: Sexual behavior

Sexual risk behavior among young adults has been shown to be heavily influenced by perceptions of social norms (Huebner et al., 2011; Romer et al., 1994; Wilkinson et al., 1998). Boone and Lefkowitz (2004) demonstrated that young adults' perceived peer norms about condom use predicted their condom use during sex. That is, the higher perceived social acceptability of condom use, the more likely the subjects were to report using condoms. Interestingly, despite the fact that the majority of subjects understood the efficacy of condoms (i.e. they were effective at preventing STIs) many subjects reported inconsistent condom use.

The finding that condom efficacy knowledge did not affect condom use is important because it shows that ignorance does not necessarily explain suboptimal condom use. One would expect that if emerging adults understand the benefits of using condoms than they would maximize their condom use, but this is not the case. It seems that within a sexual context the choice whether or not to use condoms depends on other contingencies. One possible reason for inconsistent condom use could be the perceived social acceptance of this behavior. In support of this explanation researchers have found that even if individuals support safer sex behavior, peer

influence may facilitate engaging in risky sexual behavior (DiClemente, 1992; Furstenberg, 1985; Walter et al., 1992).

Social influences: Substance use

In addition to sexual behavior, the literature has shown substance use, including alcohol consumption, to be socially influenced. Perceived heightened substance use of peers' influences engagement in substance use behavior in young adults (Chassin et al., 2004). In addition to their influence on sexual behavior, Boone and Lefkowitz (2004) found that perceived social norms were also predictive of alcohol consumption in young adults. In addition emerging adults have been shown to endorse multiple social norms surrounding alcohol consumption and sexual activity (Abel & Plumridge, 2004). These results are in line with other research showing that sexual and substance use risk behaviors are often associated (Ritchwood et al., 2015). It would appear that the sexual and substance use behavior of young adults is heavily influenced by perceived social norms about these behaviors. While social norms play a role in predicting emerging adults' behavior, it is unclear what mechanism underlies this phenomenon.

Social influences: Theoretical explanations

One possible explanation for how social influence impacts behavior is Social Comparison Theory (Suls & Wheeler, 2012). Social Comparison Theory (SCT) refers to the process of searching for and utilizing information about others for self-assessment and judging the correctness of one's beliefs and actions (Collins, 1996). According to SCT, individuals compare themselves to others within their group to help define themselves (Festinger, 1954). Through this

comparison with their similar peers, individuals can infer what behaviors are socially sanctioned and thus adjust their own behavior accordingly (Suls & Wheeler, 2012).

In the context of emerging adulthood, individuals may use social comparisons as a referent point for their actions and thus engage in behaviors they otherwise may not have done on their own. For example, being a member of a social group in which casual sex and alcohol consumption is accepted and/or encouraged could influence otherwise sexually timid young adults to engage in more frequent drinking and casual sex. Thus it seems plausible that perceived group norms influence emerging adults' actions by offering a behavioral archetype they feel obliged to model.

Additionally, research on alcohol consumption has demonstrated that social context and peer expectations are a particularly strong influence of drinking behavior (Park et al., 2009; White et al., 2005). For example, Lau-Barraco and Collins (2011) demonstrated that alcohol use increased precipitately with the increase in "drinking buddies" in subjects' social circle. Perhaps more importantly, it was also shown that perceived drinking norms were positively associated with personal alcohol use and approval of drinking behaviors.

The literature reviewed above provides strong evidence that social factors play a substantive role in affecting young adults' behavior. The research, however, can be expanded upon in several ways. One limitation worth mentioning is the relatively narrow contextual scope of the work. Most researchers have employed a single methodological approach and do not examine behavior using more than one technique. For example, many researchers employ self-report measures of assessment or neuropsychological techniques, but most do not use both approaches concurrently. Incorporating self-report and neuropsychological assessment tools in a

single research study can help broaden our understanding of the myriad forces influencing sexual behavior and alcohol consumption. Employing a multi-disciplinary approach can demonstrate how these distinct factors influence individuals as well as each other to impact behavior.

Neurological research indicates that the brain continues to develop beyond childhood into early adulthood (Giedd et al., 1999; Casey & Jones, 2010). During this period, areas of the brain undergo morphological changes finalizing the transition from juvenescence to adulthood. These changes are especially pronounced in the Frontal Cortex (FC), a part of the brain associated with higher order cognitive functions such as impulse control (Barch et al. 1997; Braver & Cohen 2001; Horn et al., 2003). Not surprisingly, these changes to the FC correlate with changes in decision making often observed in young adults. As young adults mature they continue to display increased inhibition control (Caulum, 2007). Despite this consistent relationship between FC development and inhibition control, not all adults display good impulse control behavior.

Smith and Boettiger (2012), for example, found that young and older adults' performance on a reward based task was moderated by age. Specifically, emerging adult carriers of a gene allele linked to alterations in FC functioning showed less impulse control than other adolescents, but adult carriers of this same allele displayed a similar lack of impulse control. The authors posit that this is a result of a combination of genetic and normal age related changes in FC functioning. From this research it would appear that, aside from the social influences thus far described, cognitive traits such as impulse control, or impulsivity, also play a large role in emerging adults risk behavior.

Impulsivity is a multifaceted construct that has been defined as a lack of forethought before acting, insensitivity to the negative consequences of behavior and a lack of response

inhibition (Evenden, 1999; de Witt, 2009; Horn et al., 2003). Conceptually, impulsivity can be viewed as a means by which individuals suppress automatic or reward-driven responses that are not appropriate to the current demands (Aron, 2007). Widely researched, this critical skill has been studied with the use of a number of validated measures, varying from self-report questionnaires (Patton et al., 1995; Zuckerman et al., 1978) to neuropsychological tests (Morgan, 1998). Impulsivity seems to be associated with many health risk behaviors including alcohol use and condomless sex.

Research has consistently demonstrated an association between impulsivity and alcohol use in emerging adulthood (James & Taylor, 2007; MacKillop et al., 2007; Magid & Colder, 2007; Simons et al., 2004). In addition, risky sexual behavior has been linked to alcohol consumption (Shuper, et al., 2010; O'Hara & Cooper, 2015). Despite these links between sexual risk taking and emerging adulthood, the mechanism by which impulsivity and social factors interact to affect emerging adults' risk behaviors is not apparent. For example, social binge drinking is associated with increased impulsivity scoring on the Go/NoGo task (Henges & Marczinski, 2012). Given that social binge drinking occurs in a specific social context, social influence may help to drive this behavior. Alternatively, it is possible that impulsive people are more likely to socialize with other impulsive individuals and engage in the same binge drinking behavior. These explanations are not mutually exclusive; it is also possible that impulsive people who drink alcohol will socialize with one another and the prevailing social norms of alcohol consumption reinforce binge drinking.

Taken together, these results underscore the multiple influences impacting emerging adults. Emerging adults are influenced by the norms of their peers as well as their inherent cognitive functioning. The next step in better understanding emerging adults risk behavior is to

research how these multiple influences interact with each other and facilitate risk behavior. By employing multi-disciplinary assessment tools scientists will be able to illuminate the mechanisms by which emerging adults behave sexually. While much of the published research has not used such a multi-disciplinary approach a notable exception is the work done by Quinn and Fromme (2011).

In their research, Quinn and Fromme (2011) examined the relationship between peer influences and personality traits on alcohol consumption in college students. As noted above, alcohol consumption and sexual risk behaviors often occur together (O'Hara & Cooper, 2015) and are influenced by similar social (Boone & Lefkowitz, 2004; Wilkinson et al., 1998) and cognitive forces (Boettiger et. al. 2007; Pharo et al., 2011). Quinn and Fromme's results indicated that social norms were better predictors of drinking behavior than individual variations in impulsivity. The authors posited that these findings were indicative of "personality suppression." Suppression was defined as an individual process in which subjects modified their behavior to more accurately adhere to perceived drinking behavior norms. These findings could just as easily be explained using SCT; in this case young adults compare their behavior to the perceived behavioral zeitgeist and adjust it accordingly. As compelling as this research may be it can be expanded upon in several ways.

One way in which this research can be expanded upon is by using a more robust measure of impulsivity. Quinn and Fromme used the Sensation Seeking Scale (Zuckerman et al., 1993) as a self-report measure of impulsivity, which does not capture the full range of the trait. As with any self-report measure, this scale is hindered by potential linguistic misinterpretations and/or self-report biases. Fortunately, as implied above, impulsivity is a multifaceted construct that can be defined and measured in myriad ways. Neuropsychological instruments have been extensively

used in impulsivity research and are well validated (Moeller et al., 2001; Spinella, 2007).

Therefore, using a single self-report measure to quantify this nuanced trait makes detection of a relationship more difficult. It is possible that utilizing neuropsychological measures would better elucidate this association.

Another way Quinn and Fromme's (2011) research could be expanded upon would be the inclusion of non-college students. While exclusive sampling from a student population was relevant to the investigators' research topic, it limits the generalizability of their findings. All young adults undergo identity shifts as they mature (Marcia, 1993) but not all young adults attend university. In addition research suggests that the university setting positively influences health risk behaviors (White et al., 2006). One possible explanation for this phenomenon is the increased social pressure exerted on college students. Particularly for those living on campus, increased identification with and exposure to social groups may result in disproportionately more pressure to conform to perceived social norms. Indeed studies suggest that students who endorse the norm that drinking among their peers is common consume more alcohol as well (Baer et al., 1991; Neighbors et al., 2006; Read et al., 2005; Sher & Rutledge, 2007; Stappenbeck et al., 2010). Additionally, using exclusively college students may limit the variability of impulsivity in the sample. It is possible that a sample comprised entirely of college students would be less impulsive than the general population seeing that impulsivity is negatively associated with education (Wiehe, 1987; Glahn et al., 2006). In order to get a more nuanced understating of how impulsivity fits into the behavioral model of risky sexual behavior, non-college students should be examined as well as college students.

To this end, the current study has been engineered to help bring into focus issues outside the scope of previous research. The current research is designed to explore how social and

cognitive factors interact to influence sexual risk taking amongst young adults. Based on the literature, I propose a behavioral model in which both impulsivity and perceived group norms about sex influence sexual risk taking. As demonstrated in Figure 1, I expect to see a positive association between sexual risk taking, impulsivity, and perceived sex norms. First, I expect to find that participants who show poor impulse control (relative to the overall sample) will report more condomless anal/vaginal intercourse, anal/vaginal intercourse after drinking alcohol and condomless anal/vaginal intercourse after drinking alcohol. In the interest of succinctness, these behaviors will be referred to as “risky sexual behaviors”. Impulsivity has been consistently shown to be a powerful predictor of sexual risk taking (Deckman & DeWall, 2011) and I do not anticipate the current study to contradict the aforementioned past research.

Next, I hypothesize that social norms will also be predictive of risky sexual behaviors. Specifically, I anticipate that the more individuals perceive their peers to engage in risky sexual behavior the more likely they are to report risky sexual behavior. For example, I predict that the more individuals believe their peers engage in condomless anal/vaginal intercourse after drinking alcohol the more these subjects will report engaging in condomless anal/vaginal intercourse after drinking alcohol themselves. As cited above, social influence has been shown to be a powerful influence on young people’s sexual risk taking. Additionally, social networks are particularly relevant to emerging adults therefore it seems logical that these young people engage in behaviors they perceive are congruent with their peers’.

The final hypothesis builds upon the second hypothesis; emerging adults with better inhibition control are expected to report similar levels of sexual risk behaviors as their more impulsive cohorts if they also believe that their peers engage in sexual risk behaviors. That is, I expect to find that group sex norms will moderate the relationship between impulsivity and

sexual risk taking. According to Quinne and Fromme's suppression theory (2011), emerging adults adjust their behavior to better align with the perceived social mores of their peers. It is therefore plausible that young adults who may not be predisposed to engage in risky sexual behaviors would nonetheless participate in condomless sex to emulate their peer group.

Methods

Data for this analysis were taken from the Drinking and Sexual Health (DASH) study, a longitudinal study funded by the National Institutes of Health (NIH) designed to investigate the cognitive and affective correlates of risky sexual behavior and alcohol consumption among emerging adults living in the New York City (NYC) area. Between Spring 2011 and Spring 2013, participants were recruited to this study via active recruitment (i.e. bars, parks, and cafes) or referred by other participants via modified respondent driven sampling (RDS) techniques as described by Schonlau & Liebau (2012). Participants were deemed eligible to participate if they were between the ages of 18 and 29, reported alcohol use (≥ 3 standard drinks) and sexual activity (≥ 1 vaginal or anal sex act) within the last 30 days.

Participants

A total of 301 participants were included in the analyses. All participants were between 18 and 29 years of age. The mean age of the sample was 23.58 ($SD=2.87$). Roughly half of the sample identified as White (49.2%) with the remainder identifying as Latino (18.6%), Black (12%), Asian/Pacific Islander (7%), Multiracial (12.6%), or Other (.7%). The sample was predominantly male (64.8%), heterosexual (57%) and currently in a romantic relationship (55%). Participants were relatively well educated, with 44% having completed at least a 4-year degree. For a complete list of demographic information, see Table 1.

Materials and Procedure

Participants completed an online survey, which included questions about demographic information as well as social norms regarding alcohol use and sexual behavior. The at-home survey took approximately 1 hour to complete. After completing the online survey (which could also be completed during their first visit), participants came to the research center for a two-hour visit that included collection of sexual and alcohol consumptive behaviors captured using the timeline-followback (TLFB) measure. Following this, participants completed a battery of neurocognitive tasks including the Go-No/Go task, which was used to measure impulsivity. After their initial visit, participants were asked to return for a follow-up assessment once every 12 months for 24 months. All data for this analysis were taken from participants' baseline assessments.

Measures

Social Norms.

A modified form of the Sexual Norms and Expectancies Scale (Ward, 2002) was used to investigate emerging adults' beliefs in the prevalence of different sexual behaviors amongst their peers. These items were modified to include peer norms about alcohol and condomless sex. Participants were asked to estimate the percentage of similar peers (i.e. individuals who are the same age, gender and sexual orientation as the subject) who they believe engage in a series of specific sexual and drinking behaviors. For example, a sample item would include "By your age, how many [participant sexual orientation] [participant gender] usually have sex without using condoms" Participants were asked to indicate what percentage of their peers engaged in these behaviors using a 11 point Likert-type scale ranging from 0% (none of my peers) to 100% (all of

my peers). This variable was treated as a continuous variable in all analyses. For this analysis, three items were chosen to represent participants' estimates of social norms regarding: a) condomless anal/vaginal sex (labeled "Condomless Sex Norm" in analyses") b) anal/vaginal sex after consuming alcohol (labeled "Alcohol Sex Norm" in analyses) and c) condomless anal/vaginal sex after consuming alcohol (labeled "Condomless Sex under the Influence of Alcohol Norm" in analyses).

Impulsivity.

Inhibition control was measured by using a Go/NoGo task administered via a computer as described by Golub, Starks, Kowalczyk, Thompson, and Parsons (2012). Participants were shown a series of 5 letter strings and told to press the space bar when a predetermined letter was shown in third letter position. After the task was learned, participants were then required to selectively inhibit this response. Participants were first given a practice trial where 10 sets of 5 letter strings were presented to them. The letter strings consisted of 5 letter combinations of the letters 'A' and 'C' (e.g. 'AAAAA', 'AACAA'). Participants were instructed to focus on the letter in the center and press the space bar when the letter C was in the center (go stimulus). For the practice round, a green 'O' appears when participants respond correctly, and a red 'X' appears when they respond incorrectly. For the actual trial, the five letter string combinations consist of the letters 'B' and 'D'. The letter 'B' in the center of the letter string is the go stimulus. In the actual trial the participants have no indication whether or not they respond correctly. A fixation point was presented in the center of the screen between trials. The task consisted of 3 blocks with each block consisting of 200 trials. Each letter string was presented in white letters on a black background with a 104 ms break between trials. Participants' number of false alarm responses (i.e. pressing the space bar in the presence of the letter D, the NoGo stimulus) was

used in this analysis as a measure of impulsivity. Due to unequal variances, all go no go data were log transformed before being entered into statistical models.

Sexual Behavior.

The timeline followback (TLFB), a semi-structured interview technique, was used to collect recent sexual behavior and alcohol consumption data from participants (Sobell, & Sobell, 1992). Modeled after the method outlined by Carey, Carey, Maisto, Gordon, and Weinhardt (2001), research staff interviewed participants individually about their past 30-day sexual encounters. Interviewers used a calendar to help participants identify days on which they engaged in sexual behavior in the past 30 days. For each sexual encounter, participants provided details of the type of partner (main, casual; male or female) and sexual activity (anal or vaginal intercourse; condom or no condom). Participants also indicated the days on which they consumed alcohol as well as which sexual encounters occurred after ingesting alcohol. Aggregate scores of sexual behaviors (i.e. frequency counts of anal/vaginal sex with or without condom use, number of alcohol use days, and the number of sexual encounters under the influence of alcohol) were used in the analyses.

Data Analysis.

The outcome variables in the current analyses consisted of count variables (e.g. number of condomless sex acts), therefore a Poisson regression model was utilized. Poisson regression is a member of a group of analyses known as the general linear model (Dobson, 2002; Fahrmeir & Tutz, 2001; Fox, 2008; McCullagh & Nelder, 1989; Nelder & Wedderburn, 1972). This regression model is based on the Poisson distribution, which is discrete and takes on a probability of only nonnegative integers (Coxe et al., 2009) which makes this regression an

excellent choice for modeling count outcomes. All models were adjusted for gender and sexual orientation. All data were analyzed using SPSS version 22.0.

Results

Model predictor: Number of condomless anal/vaginal sex acts

The first model examined how demographic factors influenced rates of condomless sex. Results from this model are depicted in Table 2. Both gender and sexual orientation were significant predictors, such that men had greater odds of reporting condomless sex ($B = .247, p < .001$) and non-heterosexual participants had lower odds of reporting condomless sex ($B = -.238, p < .001$). Next, the impact of each of the social norms was assessed. Greater belief in Alcohol Sex Norms was predictive of engaging in less condomless sexual behavior ($B = -.008, p < .001$). Conversely greater belief in the Condomless Sex under the influence of Alcohol Norm was predictive of more condomless sex ($B = .011, p < .001$). Finally, the association between impulsivity and condomless sex was examined. Heightened impulsivity was associated with higher frequencies of condomless sex acts ($B = .463, p < .001$). The interaction between the social norm variables and the Go/NoGo score was not significant (data not shown).

Model predictor: Number of anal/vaginal sex acts under the influence of alcohol

The second model examined how gender, sexual orientation, sexual norms and Go-NoGo false alarms predicted the number of anal/vaginal intercourse while under the influence of alcohol. Results from this model are depicted in Table 3. Unlike the previous model, gender was not a significant predictor of sexual behavior ($B = -.089, p = .199$) but sexual orientation was. Non-heterosexual identified participants had decreased odds of reporting sex while under the influence of alcohol ($B = -.149, p = .031$). In this model, Condomless Sex Norms were better

predictors of sex after drinking than unprotected sex. Specifically, greater belief in Condomless Sex Norm and Alcohol Sex Norm were associated with decreased odds of reporting sex while under the influence of alcohol ($B=-.006$, $p=.002$ and $B=-.008$, $p<.001$). Conversely greater belief in the Condomless Sex under the Influence of Alcohol Norm was associated with increased frequency of sex while under the influence of alcohol ($B=.008$, $p<.001$). Finally, false alarms on the Go-NoGo were not associated with sex while under the influence of alcohol. Once again, the interaction between the social norm variables and the Go/NoGo score was not significant (data not shown).

Model predictor: Number of condomless anal/vaginal sex acts under the influence of alcohol

The final model was used to predict participants' condomless sexual behavior after consuming alcohol. Results from this model are depicted in Table 4. The first step of the model showed gender to be significantly associated with condomless sexual behavior whilst under the influence of alcohol; men were more likely to report condomless sex after drinking than women ($B=.208$, $p=.039$). Additionally non-heterosexual participants reported lower rates of condomless sex after drinking ($B=-.283$, $p=.004$) than heterosexual participants. Next sexual norms were used to predict unprotected sexual behavior after alcohol consumption. The only significant predictor was belief in the Condomless Sex while under the Influence of Alcohol Norm, which increased odds of participants reporting condomless sexual behavior after consuming alcohol ($B=.011$, $p<.001$). Finally, increases in false alarms on the Go-NoGo were associated with increased odds of reporting condomless sex after drinking ($B=.450$, $p=.001$). The interaction between the social norm variables and the Go/NoGo score was not significant (data not shown).

Discussion

The objective of the current investigation was to explore risky sexual behavior in emerging adults. Expanding upon past research, this study aimed to determine how both social influences and cognitive factors influence sexual behavior. In addition, this study intended to determine if social norms moderated the relationship between impulsivity and risky sexual behavior. Regression modeling yielded several significant findings. Gender was shown to be a significant predictor of condomless anal/vaginal sex while sober or intoxicated, with men reporting more condomless sex in both states. Additionally, non-heterosexually identified participants reported lower frequencies of condomless sex and sex while under the influence of alcohol. In all but one of the models, Impulsivity was a significant predictor of sexual risk, with higher Go/No-Go scores being associated with increased frequency of sexual risk behavior (both or under the influence of alcohol). In line with the initial hypotheses, peer sexual norms were associated with sexual behavior, but this relationship was inconsistent across norms and outcomes.

In contrast to previous research, the association between social norms and emerging adults' sex and alcohol use behavior was not consistent. Believing that more of their peers engaged in condomless sex after drinking was associated with increased frequency of condomless sex, but believing more of their peers engaged in sex after drinking (regardless of condom use) was associated with *less* condomless sex overall. Frequency of sex after drinking was less likely to occur for individuals who believed more of their peers engaged in condomless sex and engaged in sex after drinking. At the same time, however, belief that more of their peers engaged in condomless sex after drinking predicted more anal/vaginal sex overall. Condomless

sex while under the influence of alcohol was associated with the belief that more of their peers engaged in condomless sex after drinking.

It is unclear why the current results diverge from past literature. One explanation for these findings could be that making risk behavior salient affected the self-reporting of participants. Participants may have felt uncomfortable reflecting on the similarity between their peers' and their own behavior and thus downplayed their own sexual behavior. This phenomenon is known as downward comparison and will be elaborated on below.

The third hypothesis of this research, that Social Norms would predict risky sexual behavior regardless of degree of impulsivity, was not supported by the research. All interaction terms between social norm endorsement and impulsivity scores were non-significant. These results indicate that the relationship between impulsivity and sex risk behavior is not attenuated by how much emerging adults endorse social sex risk norms. Based on these analyses I failed to reject the null hypothesis that social norms do not significantly moderate the relationship between impulsivity and sex risk behavior.

Taken together, the results of this analysis reinforce the findings of past research showing relationships between impulsivity and social influence on sexual risk taking. The current results do not lend support to possible personality suppression as described in Quinn and Fromme (2011); less impulsive individuals did not engage in analogous frequencies of condomless sex compared to their more impulsive peers as a result of prevailing social norms around condomless sex. Despite this lack of support, social norms may moderate the relationship between cognitive factors and sexual risk taking. Due to the limitations of the present research, however, this relationship may not have been detected.

A possible explanation for these results could be that these participants are engaging in downward comparison. Downward comparison is theorized to be a sort of ego defense; when individuals feel unease about their own risk taking they compare their behavior with that of a person or group they consider to be riskier than themselves (Klein & Weinsten, 1997). The subject can say that, compared to the referent other, they are better off (i.e. safer), and thus feel at ease with their own behavior. Psychological research has found support for this theory in multiple behaviors including health risk (Gibbons & Gerrard, 1995; Weinsten & Klein, 1995). In this study it is possible that asking participants to rate the amount of sexual risk (i.e. condomless sex) their peers engage in may have invoked thoughts of their own sexual behavior. This invocation may have caused unease due to heightened salience of otherwise glossed over risk behavior and lead subjects to overestimate their peers' sexual risk. In this way, participants would be able to reduce anxiety about their own behavior. This relationship may have been directly proportional to the frequency of risky sex reported by subjects.

As stated above, men were at increased odds of engaging in condomless sex compared to women. Men were shown to be at ~28% greater odds of engaging in condomless sex and condomless sex after drinking than women. This finding may simply be an artifact of the disproportionate number of men in the study. Perhaps more interestingly, men were also shown to be less likely to engage in sex after drinking when compared to women. These results were marginally significant, but they hint at future areas of research, namely investigations into the differences in motivations for drinking amongst young adult men and women. For example women may engage in alcohol consumption specifically to facilitate sexual intercourse (e.g. to decrease anxiety around sex), or in social settings where sexual intercourse is likely to occur, or possibly both. The literature lends support to this claim; research has shown unique variances in

alcohol use and alcohol expectancies between genders (Jones et al., 2001) but these findings are not always replicated. Utilization of a multi-faceted approach to behavior as in the current study may shed light on this phenomenon. Again, the results from the current study were not significant and cannot offer us answers, but it would be useful for future researchers to investigate this topic.

An important limitation to generalizability of this research is the sample population. The present study consisted emerging adult drinkers who engaged in relatively frequent risky health behaviors; on average participants drank alcohol on 12 days ($SD=6$) of the past month and had sex four times while under the influence of alcohol in the past month ($SD=8$). Research suggests this is not unusual for this population (Windle, 2003; Fergus et al., 2007), nonetheless not all emerging adults engage in these behaviors. Due to this sampling bias, the relationship between social influences and personality suppression could be occluded. Specifically since impulsivity has long been associated with substance use and condomless sexual behavior, it may be difficult to determine how much social norms attenuate the relationship between impulsivity and condomless sex. That is, the study sample may be more impulsive than the overall emerging adult population. Future research in this area would benefit from sampling a more diverse population.

Another potential explanation for the results of this study are that sexual behaviors are not necessarily socially constructed in the way drinking can be. In general, sexual behavior occurs in private settings between limited numbers of people. Drinking, on the other hand, is often a highly social activity, with friends and acquaintances gathering together to enjoy one another's company. Given the latter example, social norms may be more influential due to the number of people involved as well as the more accurate estimation of number of drinks

consumed by peers. With regard to sexual norms, these are more speculative; due to a lack of witness accounts and perhaps a lack of sexual communication amongst peers, it is not apparent how much sexual activity their peers engage in nor the accuracy of these estimates.

Emerging adulthood can be a challenging phase of life. While physically mature, nascent young adults must continue to develop their social and personal identity. Part of this growth often entails sexual exploration leading to increased sexual behavior. While seemingly innocuous and pleasurable the consequences of this sexual navigation, including potential infection with STIs and unwanted pregnancy, can have long-term consequences. The current analysis adds to the literature on the influence of social and cognitive factors on sexual risk, but failed to provide a clear schematic of how these factors interplay. It is important therefore for researchers to continue investigating the decision-making process emerging adults use when engaging in risky sexual behaviors. A better understanding of this process will hopefully provide useful information on how young adults can best protect themselves from harm and enjoy their new-found autonomy.

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Figure 1.

Schematic of expected influence of high social norms and impulsivity on emerging adults' risky sexual behavior.

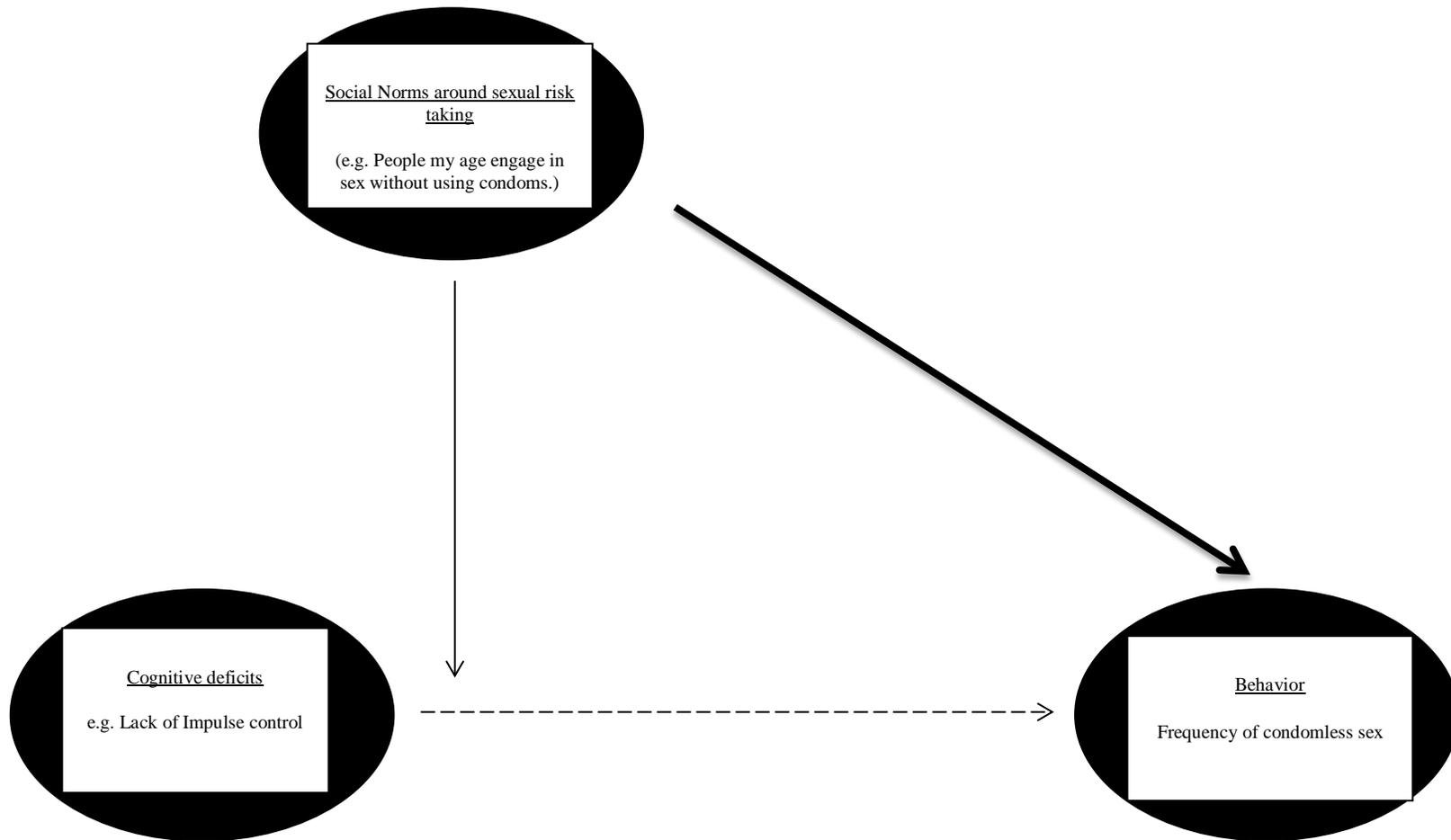


Table 1

Demographic data on Study Sample

	N	Mean	Median	Range	S.D.
Age (years)	301	23.58	24	18—29	2.869
Race	N	%			
Black	36	12			
Latino	56	19			
White	148	49			
Asian/PI	21	7			
Multiracial or Other	40	14			
Gender	N	%			
Male	195	65			
Female	106	35			
Sexual Identity	N	%			
Gay	84	28			
Bisexual	37	12			
Heterosexual	171	57			
Other	9	3			
Relationship Status	N	%			
Married	8	3			
Partner/lover	48	16			
Boyfriend/girlfriend	108	36			
Single	137	45			

Education	N	%
High School degree or less	46	15
Some College/Associates Degree	70	23
Currently in College	53	18
4-Year Degree or more	132	44

Annual Income	N	%
Less than \$10,000	127	42
\$10,000 - \$29,999	91	30
\$30,000 - \$74,999	74	25
More than \$74,999	4	1
Refused to answer	5	2

Table 2

Predictors of condomless anal/vaginal intercourse.

	B	S.E.	χ^2	P	ExpB (95% C.I.)
Independent variables					
Gender					
Men	.247	.060	16.73	.00	1.28 (1.14-1.4)
Women	1	-	-	-	-
Sexual Orientation					
Non- Heterosexual	-.238	.057	17.46	.00	.79 (.71-.88)
Heterosexual	1	-	-	-	-
Condomless Sex Norm	.000	.002	.07	.79	1.00 (.10-1.00)
Alcohol Sex Norm	-.008	.002	23.48	.00	.99 (.99-.10)
Condomless Sex under the Influence of Alcohol					
Norm	.011	.002	51.23	.00	1.01 (1.01-1.01)
Go/NoGo Score	.463	.082	31.65	.00	1.59 (1.35-1.87)

Table 3

Predictors of anal/vaginal intercourse under the influence of alcohol.

	B	S.E.	χ^2	P	ExpB (95% C.I.)
Independent variables					
Gender					
Men	-.089	.069	1.65	.20	.92 (.80-1.05)
Women	1	-	-	-	-
Sexual Orientation					
Non- Heterosexual	-.149	.069	4.65	.031	.86 (.75-.99)
Heterosexual	1	-	-	-	-
Condomless Sex Norm	-.006	.002	9.99	.002	.99 (.99-.10)
Alcohol Sex Norm	-.008	.002	17.58	.001	.99 (.99-.10)
Condomless Sex under the Influence of Alcohol Norm					
	.008	.002	17.34	.001	1.01 (1.0-1.01)
Go/NoGo Score	.125	.098	1.63	.201	1.13 (.94-1.37)

Table 4

Predictors of condomless anal/vaginal intercourse under the influence of alcohol.

	B	S.E.	χ^2	P	ExpB (95% C.I.)
Independent variables					
Gender					
Men	.208	.100	4.28	.04	1.23 (1.01-1.50)
Women	1	-	-	-	-
Sexual Orientation					
Non- Heterosexual	-.283	.097	8.50	.00	.75 (.62-.91)
Heterosexual	1	-	-	-	-
Condomless Sex Norm	-.002	.003	.60	.44	.10 (.99-1.00)
Alcohol Sex Norm	-.005	.003	3.13	.08	.995 (.99-1.00)
Condomless Sex under the Influence of Alcohol Norm					
Go/NoGo Score	.450	.141	10.22	.00	1.57 (1.19-2.07)