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**PREVENTING SEXUAL VICTIMIZATION ON COLLEGE CAMPUSES:
IMPLICATIONS FOR THE TRANSLATIONAL SPECTRUM**

A Dissertation in
Human Development and Family Studies

by

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Abstract

Sexual violence is a major problem on college campuses, with negative effects on victims' health and educational achievement. In general, sexual violence includes attempted or completed nonconsensual touching or penetration (oral, vaginal, or anal) that occurs through verbal coercion, incapacitation, or physical force. Addressing sexual violence requires a focus on the entire translational spectrum from discovery science on the development of risk and protective factors to large scale dissemination of effective preventative interventions and policy changes. In the current dissertation, I present research from two different stages of the translational spectrum to inform sexual violence prevention.

In the first paper, I focus on the Type 0 stage of translational research, that is, discovery science about the etiology of sexual violence. I use structural equation modeling to explore longitudinal associations between beliefs about alcohol's role in sexual experiences, drinking in large group contexts such as bars and parties, and sexual violence during college among female college students. Findings indicated that women who had been the victims of sexual violence before college were more likely to be victims of sexual violence during college. Women with more positive sex-related alcohol expectancies tended to drink alcohol in large group contexts more frequently than women with less positive expectancies. However, contrary to previous cross-sectional research, women with more positive sex-related alcohol expectancies at the beginning of college were no more likely to be victims of sexual violence during college than women with less positive sex-related alcohol expectancies.

In the second paper, I focus on Type 1 translation, or intervention development. A current challenge facing the field of prevention science is scaling up, or disseminating preventative interventions on a large scale. In this paper, I discuss the application of the desirability, feasibility, viability framework to the development of preventative interventions with the potential for large scale impact. Then, in a

case study, I present a method for evaluating the desirability, feasibility, and viability of preventative interventions.

Implications from the current dissertation indicate a need for longitudinal research on sexual victimization risk factors, because risk factors that precede the social problem may be targeted with preventative interventions. I propose that preventionists may use the desirability, feasibility, viability framework to increase the potential of their interventions for large scale impact. In addition, I suggest that future sexual violence prevention efforts should focus on preventing revictimization, vary intervention settings, and disseminate effective preventative interventions prior to the college transition. Preventionists should consider the multiple stages of translational research in their work to rapidly turn scientific findings into public health impact.

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Introduction

Addressing sexual victimization requires comprehensive understanding of the development of risk and protective factors and a focus on the entire translational spectrum from discovery science to large scale dissemination of effective preventative interventions. Preventative interventions may include, but are not limited to, intensive sequenced programs, time-limited educational events, and social marketing campaigns. Preventionists should consider the multiple stages of translational research in their work to rapidly turn scientific findings into public health impact (Fishbein, Ridenour, Stahl, & Sussman, 2016). This dissertation contains two papers that address different stages of scientific translation in the area of sexual victimization prevention. The first paper focuses on the Type 0 (T0) stage of translational research, or discovery science about the etiology of sexual victimization–risk factors and how they develop. The second paper focuses on Type 1 (T1) translation, or intervention development (Fishbein et al., 2016).

I define sexual victimization as attempted or completed nonconsensual touching, or attempted or completed nonconsensual oral, vaginal, or anal penetration that occurs through verbal coercion, incapacitation, or physical force, including rape (Koss, Gidycz, & Wisniewski, 1987). I define rape as a type of sexual victimization, in the form of incapacitated or physically forcible sexual intercourse (see Table 1-1; Bagwell-Gray, Messing, & Baldwin-White, 2015; Messman-Moore, Coates, Gaffey, & Johnson, 2008). Women who have been raped tend to experience more negative consequences, such as greater Post-Traumatic Stress Disorder symptomology, than women who have experienced other types of sexual victimization (Bennice, Resick, Mechanic, & Astin, 2003; Jordan, Combs, & Smith, 2014; Stephens & Wilke, 2016). Thus, the current dissertation, I focus specifically on rape in the first paper. However, because more research focuses on broadly defined sexual victimization than on rape, I draw on empirical and theoretical literature about sexual victimization. In the second paper, I examine solutions for sexual violence more broadly.

In these papers, I focus my discussion on female victims and male perpetrators during young adulthood (aged 18-28). Although research on male victims is growing (Davies, 2002), there is strong evidence that the majority of victims are women and that the majority of perpetrators are men (Bureau of Justice Statistics, 1995; Tjaden & Thoennes, 1998). Young adults are at heightened sexual victimization risk, compared to individuals in other ages groups (Sinozich & Langton, 2014). Most of the research in this area uses college student samples (Testa & Livingston, 2009).

Sexual victimization is a major social problem on college campuses (Krebs, Lindquist, Warner, Fisher, & Martin, 2009). Sexual victimization affects women's health and educational achievement, including, but not limited to, increases in Post-Traumatic Stress Disorder symptomology, substance use, sexual risk-taking, eating disorder behaviors, and poor grades (Bennice et al., 2003; Gidycz, Orchowski, King, & Rich, 2008; Jordan et al., 2014; Ullman, 2007; Stephens & Wilke, 2015). One in five college women is sexually victimized during her undergraduate years, and 3.4% and 8.5% of women experience forcible rape and incapacitated rape, respectively (Krebs et al., 2009). Sexual victimization is a financial burden on society due to associated costs in areas such as healthcare, criminal justice, and lost productivity (Miller, Cohen, & Wiersema, 1996; Post, Mezey, Maxwell, & Wilbert, 2002). Because of high sexual victimization prevalence and public health costs, public interest in sexual victimization prevention is growing. There is tremendous potential for researchers and preventionists to impact sexual victimization incidence (Vladutiu, Martin, & Macy, 2011).

Sexual Victimization Prevention

Sexual violence preventative interventions have three broad strategies. First, primary prevention aims to reduce sexual aggression and to create a culture that does not support aggression (Menning & Holtzman, 2015). Second, risk reduction aims to reduce sexual victimization (Menning & Holtzman, 2015). Third, bystander interventions aim to increase the number and effectiveness of bystanders, or witnesses to situations where there is risk of sexual violence (McMahon & Banyard, 2012;

Schewe, 2007). In general, effective preventative interventions are comprehensive, meaning they address all domains of a social problem (Nation et al., 2003). That is, sexual victimization prevention efforts must include primary, secondary, and bystander intervention (Menning & Holtzman, 2015). In the first paper of the current dissertation, I focus on identifying risk factors for risk reduction preventative interventions.

For risk reduction intervention to be effective, it is important that preventionists identify the major risk and protective factors associated with sexual victimization (Rutter, 2009; Weisz, Sandler, Durlak, & Anton, 2005). Identification of risk and protective factors enables researchers to create logic models on which to base preventative interventions, which is essential for intervention effectiveness (Nation et al., 2003). Risk factors increase the likelihood of an individual being victimized. Protective factors buffer individuals even in the presence of risk (Kramer et al., 1997). Risk factors for sexual victimization include behavioral factors such as having sex with a stranger (Combs-Lane & Smith, 2002), attitudinal factors such as rape myth beliefs (Yeater, Treat, Viken, & McFall, 2010), and contextual factors such as sorority participation (Minow & Einolf, 2009). A protective factor for sexual victimization is sexual assertiveness (Testa & Livingston, 2009; Livingston, Testa, & VanZile-Tamsen, 2007).

Sex-related alcohol expectancies may be one risk factor for sexual victimization (Abbey, McAuslan, Ross, & Zawacki, 1999). Sex-related alcohol expectancies are positive or negative beliefs about alcohol's role in sexual experiences (Benson, Gohm, & Gross, 2007; Messman-Moore et al., 2008; Palmer, McMahon, Rounsaville, & Ball, 2010; Walsh et al., 2013). Cross-sectional studies demonstrate that women who have been sexually victimized tend to have both more positive sex-related alcohol expectancies, such as beliefs that one is more aroused while intoxicated, and more negative sex-related alcohol expectancies, such as the beliefs that one is sexually vulnerable while intoxicated, than women who have not been sexually victimized (Benson et al., 2007; Palmer et al., 2010), and that women with more sex-related alcohol expectancies are at risk for substance-related sexual victimization (Walsh et al.,

2013). In addition, at least one longitudinal study has demonstrated that positive sex-related alcohol expectancies are marginally associated with rape eight months later (Messman-Moore et al., 2008). In the first paper, I explore the association of positive and negative sex-related alcohol expectancies with rape during three years of college.

One of the biggest risk factors for sexual victimization is alcohol use. Women who use alcohol are more likely to be sexually victimized than women who do not use alcohol (Adams-Curtis & Forbes, 2004; Combs-Lane & Smith, 2002; Norris et al., 2006; Messman-Moore et al., 2008; Testa & Livingston, 2009). Incapacitated sexual victimization is more likely to involve alcohol than date rape drugs or other substances (Krebs et al., 2009). In prospective studies, frequent heavy episodic alcohol use, but not frequent casual alcohol use, increases the risk for sexual victimization (Mouilso, Fischer, & Calhoun, 2012; Testa & Livingston, 2009). Reducing alcohol use, particularly heavy alcohol use, may be an effective way to reduce sexual victimization (Testa & Livingston, 2009).

Young adults' alcohol use often occurs in large group contexts such as parties or bars (Knibbe, 1998; Testa & Livingston, 2009). Women with positive sex-related alcohol expectancies may use alcohol in large group contexts such as bars and parties because they provide an opportunity to make new social connections that may lead to consensual sexual and romantic experiences. However, these contexts may also confer risk. According to the rape culture hypothesis, these social contexts tend to be rape-supportive (Armstrong, Hamilton, & Sweeney, 2006), meaning they support the acceptance of rape myths, unrestricted sexuality, and victim blaming (Armstrong et al., 2006; Sutton & Simons, 2004). Due to the lack of social inhibition against sexual aggression, these contexts may increase the likelihood of men being sexually aggressive (Finkel & Eckhardt, 2013). According to Routine Activities Theory (Cohen & Felson, 1979), spending more time in contexts with sexually aggressive men increases the likelihood that women will be victimized. Thus, alcohol use in large group contexts may be a mechanism for the

association between sex-related alcohol expectancies and rape. In the first paper, I test whether alcohol use in large group contexts mediates this association.

The Translational Spectrum and Sexual Victimization Prevention

To impact a social problem at a population level, preventionists must focus on a full spectrum of scientific translation, from discovery science about the etiology of behavioral risk factors to large scale dissemination of effective preventative interventions (Fishbein et al., 2016; Kreuter & Bernhardt, 2009; Sandler et al., 2005). The translational process is not linear; preventionists can address multiple stages of translation simultaneously (Fishbein et al., 2016). In fact, doing so is important for decreasing the time from scientific findings to public health impact (Spoth et al., 2013). Although no individual scientific team can be responsible for the entire translational spectrum, at minimum, preventionists need to consider the implication of their work for multiple stages of the translational spectrum. It is beneficial for preventionists to work on multiple stages of translation at the same time, either in the context of one study or with multiple, simultaneous studies (Fishbein et al., 2016).

Sexual victimization prevention is particularly well-suited to be an exemplar of how working across the translational spectrum can increase the public health impact. First, in terms of T0 and T1 translation, sexual victimization prevention has generally lagged behind other areas of prevention such as aggressive and disruptive behavior, maladaptive parenting, child abuse, obesity, depressive symptoms, and illicit drug use (Faggiano et al., 2008; Horowitz & Garber, 2006; Lundahl, Nimer, & Parsons, 2006; Nowak & Heinrichs, 2008; Stice, Shaw, & Matri, 2006; Vladutiu et al., 2011; Wilson & Lipsey, 2007). Hence, there is a valuable opportunity to build on the successes and shortcomings of these other domains. Second, although sexual victimization preventative interventions for college students have had very small effects on behavioral intentions and sexual victimization incidence (Anderson & Whiston, 2005; Daigle, Fisher, & Stewart, 2009; Garrity, 2011; Vladutiu et al., 2011), recent theory-based preventative interventions show promise of effectiveness (Coker et al., 2015; Menning &

Holtzman, 2015; Salazar, Vivolo-Kantor, Hardin, & Berkowitz, 2014). As these studies are replicated and interventions are improved, preventionists can also consider how they might be disseminated on a wider scale. Third, preventionists can benefit from current national attention to sexual victimization by partnering with communities that are strongly focused on preventing sexual victimization (Fisher, Hartman, Cullen, & Turner, 2002; Gilbert, 2014; Golding, 1999; Lierman, 2014; Pérez-Peña & Lovett, 2014).

Because of the importance of working at multiple stages of translation, in the second paper, I go beyond discovery science to study intervention development for sexual victimization prevention. According to the desirability, feasibility, viability framework, a truly innovative solution is high on three elements: 1) desirability, or the appeal of the solution to the people using it; 2) feasibility, or the theoretical potential for the solution to actually solve the problem; and 3) viability, or the ability of the solution to be financially sustainable and spread to different marketplaces (Jones & Samalionis, 2008). In the second paper, I present a method for examining preventative interventions using the desirability, feasibility, viability framework. Because interdisciplinary teams – teams of professionals and non-professionals with complementary skills and expertise (Nancarrow et al., 2013) – might be the key to creating innovative solutions to complex social problems that span the translational spectrum (Fishbein et al., 2016; Lakhani, Benzies, & Hayden, 2012), I examine ideas for sexual violence preventative interventions among team members with diverse roles.

The Current Papers

The current dissertation addresses multiple stages of the translational spectrum to prevent sexual victimization. The results of my dissertation will contribute to the field in several ways. First, the results will make an important contribution to theory by exploring alcohol use in large groups as a potential risk factor (e.g., Cass, 2007; Combs-Lane & Smith, 2002; Mouilso et al., 2012; Mustaine & Tewksbury, 2002; Schwartz, DeKeseredy, Tait, & Alvi, 2001), and by replicating studies that suggest sex-

related alcohol expectancies are a risk factor (Benson et al., 2007; Messman-Moore et al., 2008; Palmer et al., 2010). These theoretical contributions will guide prevention by identifying potential targets for preventive interventions. Second, I will contribute to the field by using longitudinal methodology. Longitudinal studies on sexual victimization risk typically span measurement occasions across one year (e.g., Bryan et al., 2016; Mouilso et al., 2012), but few have measured victimization across multiple years. Longitudinal methodology is necessary for exploring the temporal ordering of sexual victimization risk factors. Third, despite calls for interdisciplinary teamwork in prevention science (Fishbein et al., 2016; Lakhani et al., 2012), there has been little research on how these teams develop innovative preventative interventions. The second paper will serve as a base for future interdisciplinary research on intervention development using the desirability, feasibility, viability framework. Fourth, this work is an interdisciplinary project in and of itself. The study applies an engineering design framework (Jones & Samalionis, 2008) to intervention development. Lastly, experts in the field advocate for preventionists to work across the translational spectrum (Fishbein et al., 2016). In the current dissertation, I present research that addresses multiple stages of translation and offers new insights into how important discoveries can be more quickly disseminated.

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Table 1-1

Definitions of sexual victimization and rape

	Sexual	Rape
<u>Nonconsensual experiences:</u>	victimization	
Attempted sexual touching	X	
Completed sexual touching	X	
Attempted oral penetration	X	
Completed oral penetration	X	
Attempted vaginal penetration	X	X
Completed vaginal penetration	X	X
Attempted anal penetration	X	X
Completed anal penetration	X	X
<u>Occurs through:</u>		
Verbal coercion	X	
Incapacitation	X	X
Physical force	X	X

Paper 1

Does alcohol use in large group contexts mediate the association between sex-related alcohol expectancies and rape?

This paper will be a multiple-authored work. Emily Waterman will be the first author, who will perform statistical analysis and draft the manuscript. Dr. Eva S. Lefkowitz will be a co-author. She developed the larger study and will help revise the final manuscript. Dr. Jennifer L. Maggs will also be a co-author. She developed the larger study and will review the manuscript before submission. The target journal for publication of this manuscript is *Journal of Interpersonal Violence*.

Abstract

Women who hold positive beliefs about alcohol's role in sexual experiences may be more likely to drink alcohol in large group contexts such as bars and parties than women who do not hold these beliefs. These contexts may confer risk because alcohol use in large group contexts may increase risk for rape (Knibbe, 1998; Testa & Livingston, 2009). In the current paper, we examined the association between sex-related alcohol expectancies and rape during three years at college, and whether drinking in large group contexts mediates this association. College women ($n = 299$; 41.5% White/European American, 27.4% Asian/Asian American/Hawaiian/Pacific Islander, 26.8% Hispanic/Latino American, and 25.8% Black/African American) completed surveys for seven consecutive college semesters starting in their first semester. Women with more positive sex-related alcohol expectancies tended to drink alcohol in large group contexts more frequently than women with less positive expectancies. However, contrary to previous cross-sectional research, women with more positive sex-related alcohol expectancies at the start of college and women who drank alcohol more frequently in large groups at the start of college were no more likely to experience rape during college. Thus, we did not find that alcohol use in large groups was a mediator. Women who had been sexually victimized before college were more likely to be raped during college. Frequency of alcohol use was not associated with rape during college. We discuss implications for sexual victimization prevention in college settings.

Keywords: sexual victimization, rape, alcohol expectancies, alcohol use, college

Does alcohol use in large group contexts mediate the association between sex-related alcohol expectancies and rape?

Researchers and policy makers have identified rape as a major public social problem that impact health (Abbey, 2002; Koss, Gidycz, & Wisniewski, 1987; Post, Mezey, Maxwell, & Wilbert, 2002). Rape has deleterious effects on women's health and educational achievement (Gidycz, Orchowski, King, & Rich, 2008; Jordan, Combs, & Smith, 2014; Ullman, 2007), and is costly to public health (Miller, Cohen, & Wiersema, 1996; Post et al., 2002). We define rape as incapacitated or physically forcible sexual intercourse (Bagwell-Gray, Messing, Baldwin-White, 2015; Messman-Moore, Coates, Gaffey, & Johnson, 2008; Testa & Livingston, 2009). The rates of rape are much higher among college women than in the general population; 3.4% are raped via physical force and 8.5% are raped via incapacitation from alcohol or other substance (Krebs, Lindquist, Warner, Fisher, & Martin, 2009). Thus, it is important to identify risk factors for rape and to understand the mechanisms of those risk factors.

Women with positive beliefs about alcohol's role in sexual experiences may be more likely to consume alcohol in large group drinking contexts such as bars and parties than women who do not hold these beliefs (Corbin, Bernat, Calhoun, McNair, & Seals, 2001; Knibbe, 1998). Beliefs about alcohol's role in sexual experiences are known as sex-related alcohol expectancies. Women who hold these beliefs may spend time in large group contexts because these contexts provide an opportunity to make new social connections that may lead to friendships, romantic relationships, or consensual sexual experiences. However, these contexts are also risky because alcohol use in large group contexts may increase risk for rape through interactions with potential perpetrators (Knibbe, 1998; Testa & Livingston, 2009). In the current paper, we test how alcohol use in large group contexts mediates the association between sex-related alcohol expectancies and rape.

Measuring Rape and Sexual Victimization

In the current paper we focus specifically on rape. However, most research focuses on a broader

definition of sexual victimization (Koss et al., 1987), which includes attempted or completed nonconsensual touching or penetration (oral, vaginal, or anal) that occurs through verbal coercion, incapacitation, or physical force. Rape is a specific type of sexual victimization (Benson, Gohm, Gross, 2007; Walsh et al., 2013). Whether researchers measure rape or sexual victimization more broadly may impact results, and thus, it is important to study both rape and sexual victimization (Bryan et al., 2016). Compared to women who have experienced other types of sexual victimization, women who have been raped tend to experience more negative consequences, such as poorer grades (Jordan et al., 2014), greater likelihood of eating disorder behaviors (Stephens & Wilke, 2016), and more Post-Traumatic Stress Disorder symptomology (Bennice, Resick, Mechanic, & Astin, 2003). Thus, in the current paper we focus specifically on rape. We exclude other forms of sexual victimization such as nonconsensual touching and sexual coercion. However, because the literature on sexual victimization is larger than the literature on rape, our review includes the literature on sexual victimization more broadly.

Sex-Related Alcohol Expectancies and Sexual Victimization Risk

Sex-related alcohol expectancies are an established risk factor for sexual victimization (Abbey, McAuslan, Ross, & Zawacki, 1999). Conceptualizations of sex-related alcohol expectancies vary. Beliefs may be positive, such as beliefs that alcohol use enhances sexual experiences (Messman-Moore et al., 2008; Palmer, McMahon, Rounsaville, & Ball, 2010), and that individuals are more likely to have a sexual experience when intoxicated (Benson et al., 2007; Walsh et al., 2013). Beliefs may also be negative, such as beliefs that individuals are at risk for sexual victimization when intoxicated (Benson et al., 2007). Because associations between sex-related alcohol expectancies and behavior differ by type of expectancy (Patrick & Maggs, 2009), it is important to examine different types of sex-related alcohol expectancies (Abbey et al., 1999). Thus, we examine three types of alcohol expectancies: 1) sexual affect, or the belief that one is more sensual and affectionate while intoxicated, 2) sexual drive, or the belief that one is more aroused and more likely to initiate sex while intoxicated, and 3) vulnerability to

sexual coercion, or the belief that one is at risk of sexual victimization while intoxicated (Abbey et al., 1999).

Cross-sectional studies demonstrate that women who have been sexually victimized tend to have more positive and negative sex-related alcohol expectancies than women who have not been sexually victimized (Benson et al., 2007; Palmer et al., 2010), and that women with more positive sex-related alcohol expectancies are at risk for substance-related sexual victimization (Walsh et al., 2013). At least one longitudinal study has demonstrated a weak association between positive sex-related alcohol expectancies and rape eight months later. This association was significant at the $p < .10$ level, but not significant at the $p < .05$ level (Messman-Moore et al., 2008). Because the association was weak, more longitudinal studies on sex-related alcohol expectancies and sexual victimization risk are needed to replicate this finding. Our paper differs from Messman-Moore and colleagues' (2008) previous longitudinal study in two important ways. First, we assessed three different kinds of sex-related alcohol expectancies, whereas the previous study only assessed general positive sex-related alcohol expectancies (Brown, Christiansen, & Goldman, 1987). Second, in the current paper, participants reported on rape during three years of college, whereas participants in the previous study reported on rape during an eight-month period.

Thus, in the current paper, we use a longitudinal design to examine the association between sex-related alcohol expectancies, and rape during college. Congruent with previous research (Benson et al., 2007; Messman-Moore et al., 2008; Palmer et al., 2010), we predict that women with more sex-related alcohol expectancies about sexual affect and drive will be more likely to be raped during college than women with less sex-related alcohol expectancies about sexual affect and drive. Cross-sectional research has also found that women with more sex-related alcohol expectancies about vulnerability are more likely to be raped than other women (Benson et al., 2007). It is likely that women who have been raped in the past believe that they are vulnerable because of past experiences. However, results may

differ with a prospective design. In the current paper, we expect that women with more sex-related alcohol expectancies about vulnerability will be less likely to be raped during college than women with less sex-related alcohol expectancies about vulnerability.

Routine Activities Theory and the Role of Alcohol Use in Large Groups Contexts

Alcohol use in large group contexts may be a mechanism that explains the association between sex-related alcohol expectancies and sexual victimization. According to Routine Activities Theory, the crime incidence in a particular location is dependent on three factors: 1) presence of suitable victims, 2) presence of motivated perpetrators, and 3) presence of effective guardians, or people to prevent crime (Cohen & Felson, 1979). The convergence of these factors is known as criminogenic convergence, or hot spots for crimes in particular locations (Cohen & Felson, 1979). The college setting presents high criminogenic convergence for sexual victimization, but low criminogenic convergence for most other crimes (Schwartz & Pitts, 1995). Specifically, large group alcohol use contexts have high criminogenic convergence for sexual victimization. First, large group contexts have a higher presence of suitable victims than other contexts. In party contexts, individuals tend to be focused on having fun and making social connections. Attention to risk cues is inconsistent with this frame of mind, particularly under the influence of alcohol, when individuals can only consider the most salient information (Norris et al., 2006; Nurius, 2000; Steele & Josephs, 1990).

Second, large group contexts may increase the number of motivated perpetrators (Herman, 1989; O'Sullivan, 1993). The large group alcohol contexts of college settings are often characterized by a rape-supportive culture (Armstrong, Hamilton, & Sweeney 2006). The rape culture hypothesis (Herman, 1989; O'Sullivan, 1993) posits that college party culture supports unrestricted sexual behavior, acceptance of rape myths, heavy episodic alcohol use, and pressure to belong to the heterosexual peer group in which partying is common. This college party culture is prone to victim blaming and normalizes sexual victimization (Armstrong et al., 2006; Sutton & Simons, 2014). The removal of social inhibition

against sexual aggression leads men, especially men who are already predisposed to sexually aggressive behavior, to be at increased risk of being sexually aggressive (Finkel & Eckhardt, 2013). Thus, it is likely that there are more motivated perpetrators in large group alcohol use contexts than in other contexts during college, because this setting may motivate men to be sexually aggressive.

Third, large group contexts may have few effective guardians. Because college party culture tends to blame victims and normalize sexual victimization, students may fail to intervene in risky situations. Students report failing to intervene because they believe a woman is playing 'hard to get' or they do not want to ruin a good time (DeMaria et al., 2015). Students who are more accepting of the rape myths that are characteristic of rape culture tend to be less willing to intervene than students who are less accepting of rape myths (McMahon, 2010).

Sex-related alcohol expectancies may be key factors in sexual victimization risk because women with more positive and less negative sex-related alcohol expectancies may drink alcohol in large group contexts more frequently than women with less positive and more negative sex-related alcohol expectancies (Corbin et al., 2001; Knibbe, 1998). Large group alcohol contexts in college settings tend to be supportive of unrestricted sexual behavior, and therefore, women can make new social connections that may lead to consensual sexual experiences (Armstrong et al., 2006). However, according to the rape culture hypothesis, these social contexts also tend to be rape-supportive, meaning they support acceptance of rape myths and victim blaming (Armstrong et al., 2006; Sutton & Simons, 2004). In the current paper, we use mediation analysis to test whether alcohol use in large group contexts mediates the association between sex-related alcohol expectancies and rape. We expect that alcohol use in large group contexts will mediate this association. That is, we expect that women with more positive and less negative sex-related alcohol expectancies will drink alcohol in large group contexts more frequently, which will be associated with rape during college.

Sexual Victimization History and Alcohol Use Quantity as Covariates

A history of sexual victimization before college is one of the strongest predictors of sexual victimization during college. Women with a victimization history are two to three times more likely to be sexually (re)victimized than women without a victimization history (Adams-Curtis & Forbes, 2004; Gidycz et al., 2007; Noll & Grych, 2011; Norris et al., 2006; Testa & Livingston, 2009). Thus, sexual victimization history is an important component of rape risk during college that must be considered in victimization risk research (Classen, Paresh, & Aggarwal, 2005). In the current paper, we include sexual victimization history as a covariate. We expect that sex-related alcohol expectancies are associated with rape beyond the effects of sexual victimization history.

Alcohol use quantity, or the number of drinks women tend to consume, may also be an important factor in the association between sex-related alcohol expectancies and rape. Women with more positive sex-related alcohol expectancies tend to drink more than women with less positive sex-related alcohol expectancies (Corbin et al., 2001). Alcohol severely reduces women's ability to perceive a situation as threatening (Testa, Livingston, & Collins, 2000), and intoxicated women tend to respond less assertively to potential sexual victimization than sober women (Yeater, McFall, & Viken, 2011). In addition, incapacitation from very large quantities of alcohol (i.e., when victims are unable to move or talk) inhibits women's ability to physically leave a risky situation or to defend themselves against a perpetrator (Testa & Livingston, 2009). Previous scholars have pointed to difficulty separating the effects of alcohol use quantity from the effects of alcohol use contexts (Testa & Livingston, 2009). The current paper will strengthen the literature by separating these effects. We expect that sex-related alcohol expectancies are associated with rape beyond the effects of alcohol use quantity.

The Current Paper

In the current paper, we use mediation analysis to test how alcohol use in large group contexts mediates the association between sex-related alcohol expectancies and rape during three years of college. Specifically, we predict:

- 1) Sex-related alcohol expectancies during the first semester of college will be associated with rape during three years of college.
- 2) Frequency of alcohol use in large group contexts will mediate the association between sex-related alcohol expectancies and rape during three years of college.

Method

Participants

We used data from female participants in the University Life Study, a longitudinal burst design study of college students at a large, Northeastern university (Patrick, Maggs, & Lefkowitz, 2015). Eligible students were first year, first time students who lived within 25 miles of campus and were U.S. citizens or permanent residents under 21 years of age. We used a stratified sampling procedure at Semester 1 (S1) to achieve a diverse sample of first-year students with respect to gender and race/ethnicity. Participants responded to online surveys for seven consecutive semesters beginning in Fall of their first semester. Each semester, they completed a baseline survey and then daily surveys for up to 14 consecutive days. Daily surveys began the day immediately following the baseline survey. A total of 744 participants provided consent and completed the S1 baseline survey, a response rate of 65.6%. In the current paper, we used data from S1, Semester 3 (S3), Semester 5 (S5), and Semester 7 (S7) because participants responded to a question about sexual victimization at these waves. We excluded men ($n = 366$ at S1). Among female participants, we included participants who responded to surveys all four semesters, or who reported rape at least once, even if they did not participate every semester. That is, we excluded participants for whom we could not determine rape status because they did not report experiencing rape at earlier semesters and did not respond at later semesters ($n = 70$). Some data were missing due to participant nonresponse to daily data or questions in the baseline survey ($n = 9$; none of these women had reported being raped by S7). Thus, in our analytic sample, 100% of women who had reported not being raped participated in all semesters, whereas 87.5% of the women who had reported

being raped participated in all semesters. The analytic sample was 299 female students, aged 16-20 at S1 ($M = 18.4$ years, $SD = 0.4$). Participants could identify as more than one race/ethnicity; thus, the sample was 41.5% White/European American, 27.4% Asian/Asian American/Hawaiian/Pacific Islander, 26.8% Hispanic/Latino American, and 25.8% Black/African American.

We performed seven t -tests and five chi-squares to determine whether participants in the analytic sample ($n = 299$) differed from female participants not in the analytic sample ($n = 79$) on S1 variables. Groups did not differ on any tested variables (age, race/ethnicity, sex-related alcohol expectancies, alcohol use in large group contexts frequency, alcohol use quantity, or sexual victimization history).

Procedures

Students received a mailed informational letter that included a \$5 pre-incentive and a pen. Subsequently they received an email message with a link to the first Web-based baseline survey. Students earned \$20-\$40 (depending on semester) for completing the baseline surveys, \$3 per day for completing each daily survey, and an \$8 bonus for completing all 14 daily surveys. The university's Institutional Review Board approved this study. A federal Certificate of Confidentiality protected participant confidentiality.

Measures

Baseline survey.

Experience of rape at least once in three years. At S3, S5, and S7, participants responded to the questions, "In the past 12 months, were you physically forced by someone to have sexual intercourse against your will?" (item was adapted from the National Longitudinal Study of Adolescent to Adult Health; Harris et al., 2009) and "In the past 12 months, have you been in a situation in which you were incapacitated due to alcohol or drugs (that is, passed out or unaware of what was happening) and were not able to prevent unwanted sexual intercourse from taking place?" (item was created for the current

study). Response options were *yes* (1) and *no* (0). Sex-related alcohol expectancies. At S1 and S7, participants responded to items from the Alcohol Expectancies Regarding Sex, Aggression, and Sexual Vulnerability Questionnaire (Abbey et al., 1999) to assess three types of sex-related alcohol expectancies: sexual affect (e.g., “When drinking alcohol, I say and do romantic things”), sexual drive (e.g., “When drinking alcohol, I have a strong sex drive”), and vulnerability to sexual coercion (e.g., “When drinking alcohol, I am more sexually vulnerable”). Participants rated their agreement with each statement on a 5-point scale from *not at all* (0) to *very much* (4). Each subscale had six items. Reliability of the subscales was adequate across semesters: $\alpha = .91 - .93$ for sexual affect, $\alpha = .95 - .96$ for sexual drive, and $\alpha = .92 - .93$ for vulnerability to sexual coercion. Tables 2-1 and 2-2 present changes in sex-related alcohol expectancies across college.

Sexual victimization history. At S1, participants responded to the question, “Were you ever physically forced by someone to have sexual intercourse against your will?” Response options were *yes* (1) or *no* (0).

Daily survey. Participants responded to the following measures for up to 14 consecutive days following each baseline survey. Each survey addressed participants’ behaviors on the previous day.

Frequency of alcohol use in large group contexts. At S1, participants who reported using alcohol responded to the prompt, “Where were you and who were you with when you drank alcohol? (Check all that apply for each venue.)” Participants chose as many options as applied from a grid of various social contexts (who they were with) and various venues. Response options for social context were *Alone*, *With friends*, *Romantic partner*, *Large group*, and *Your parents*. Venue options were *Dorm/Residence Hall*, *Bar/Restaurant*, *Fraternity house*, *Apartment/Home*, *Major entertainment event (sports, tailgate, concert)*, and *Somewhere else*. We created a variable to signify whether or not participants used alcohol in a large group at all, regardless of venue. For example, if a participant reported that they used alcohol both in a *Dorm/Residence Hall Alone* and in a *Bar/Restaurant in a Large group* on the day same, that day

was coded as alcohol use in a large group. In another example, if a participant reported that they used alcohol in a *Dorm/Residence Hall with a Romantic Partner*, that day was coded as no alcohol use in a large group. We created a variable for alcohol use in a large group, Yes (1), or No (0). We then calculated the proportion of days on which participants drank in large groups across 14 days.

Frequency of alcohol use in large group contexts including fraternity house. We also created a second variable for alcohol use in a large group at S1. We created this variable using the same methods as the previous variable. However, the second variable also included *Fraternity house with friends* as a large group context. Fraternity houses have high criminogenic convergence for sexual victimization; as many as one-third of college sexual victimizations happen at fraternity houses, and for sorority members, as many as one-half of sexual victimizations happen in fraternity houses (Copenhaver & Grauerholz, 1991; Minow & Einolf, 2009; Ward, Chapman, Cohn, White, & Williams, 1991). We excluded *Fraternity house alone* because this context is not social. We also excluded *Fraternity house with romantic partner* or *Fraternity house with parents*. We cannot assume these contexts are conceptually similar to a large group context, because individuals in large group contexts tend to focus on making new social connections.

In summary, there were two frequency of alcohol use in large group context variables. The first variable included alcohol use *in a Large group*, regardless of venue. The second variable included alcohol use *in a Large group*, regardless of venue, along with *Fraternity house with friends*. Tables 2-1 and 2-2 describe changes in these two variables across college. Although we conceptualized risky alcohol use contexts in the current paper as large group contexts, there is also evidence that alcohol use in a fraternity house with friends is risky for women, and that these contexts may have similar features to large group contexts (Armstrong et al., 2006; Copenhaver & Grauerholz, 1991; Minow & Einolf, 2009; Ward et al., 1991). Thus, we conducted two separate mediation analyses, one with each variable.

Alcohol use quantity. In S1, participants answered the question, “How many drinks of alcohol

did you drink? By ONE drink we mean half an ounce of absolute alcohol, for example, one 12 ounce can or bottle of beer or cooler, five ounce glass of wine, or a drink containing one shot of liquor or spirits.” We calculated the average number of drinks across 14 days.

Statistical Analyses

To test our hypotheses regarding the associations between sex-related alcohol expectancies, rape, and alcohol use in large group contexts, we performed a mediation analysis using STATA Version 14. Specifically, we used the generalized structural equation modeling command (StataCorp, 2015) because the current model had a dichotomous outcome. Generalized structural equation modeling is suitable for models that contain both linear and logistical regression equations (StataCorp, 2013). Traditional single mediation analysis involves a series of regression analyses and the test of four statistical relationships: 1) the association between independent variable X and dependent variable Y 2) the association between independent variable X and mediator variable M , 3) the association between mediator variable M and dependent variable Y adjusting for the effects of X , and 4) the strength of the mediated, or indirect, effect of X on Y through mediator variable M (Baron & Kenny, 1986; MacKinnon, 2008). The structural equation modeling method differs from traditional mediation analysis because the analysis is conducted in a single step as opposed to a series of separate regression equations.

In the current paper, the theoretical independent variable X was sex-related alcohol expectancies, the theoretical dependent variable Y was rape, and the theoretical mediator variable M was frequency of alcohol use in large group contexts. We present the full models in Figure 2-1. We addressed the three types of sex-related alcohol expectancies separately because of high correlation between scales (see Table 2-3; see also Patrick & Maggs, 2009). We ran two separate sets of analyses. The first set included frequency of alcohol use in large group contexts as the mediator variable, and the second set included frequency of alcohol use in large group contexts including fraternity house. Thus, we ran six separate structural equation models in the current paper. We controlled for victimization

history and alcohol use quantity. In addition, we controlled for race/ethnicity, given that alcohol use patterns may differ between racial and ethnic groups (Borsari, Murphy, & Barnett, 2007). We used maximum likelihood estimation to handle missing data. Generalized structural equation models with maximum likelihood estimation use all available data to produce each regression coefficient (StataCorp, 2013).

We do not present goodness of fit statistics for two reasons. First, most goodness of fit statistics, including the commonly used chi-square test, rely on the assumption that observed variables are normally distributed (Hooper, Coughlan, & Mullen, 2008; StataCorp, 2013). In the current model, our outcome variable, rape, is dichotomous, and therefore not normally distributed. Hence, we cannot compute an accurate χ^2 value for the current models. However, the primary purpose of goodness of fit statistics is to compare several models to pick the model with the best fit (Hooper et al., 2008; StataCorp, 2013). In contrast, our goal was to determine the direct and indirect effects in a specific theoretical model.

Results

We present descriptive statistics in Table 2-4. Approximately 8% ($n = 24$) of the analytic sample reported forcible or incapacitated rape at least once during the first three years of college.

Before testing our hypotheses, we completed preliminary analyses to attempt to replicate previous findings from cross-sectional studies that show an association between sex-related alcohol expectancies and college sexual victimization (Benson et al., 2007; Palmer et al., 2010; Walsh et al., 2013). We performed three *t*-tests to examine differences between women who were raped during college and women who were not raped during college, prior to *S7*, on *S7* sex-related alcohol expectancies about affect, drive, and vulnerability (Table 2-5). These analyses contrast with the analyses that test our hypotheses, in which expectancies preceded rape. We found that women who were raped during college, compared to women who were not raped, had more sex-related alcohol expectancies

about sexual drive at S7. That is, women who were raped during college more strongly believed that intoxication increases their arousal and sexual initiation. We also found that women who were raped during college, compared to women who were not raped, had more sex-related alcohol expectancies about vulnerability to sexual coercion at S7. That is, women who were raped during college more strongly believed that they were at risk of sexual victimization while intoxicated. Thus, these analyses support previous cross-sectional findings (Benson et al., 2007; Palmer et al., 2010; Walsh et al., 2013).

To test our hypotheses, we completed six structural equation models in total. In the first three models (Figure 2-2), we included S1 frequency of alcohol use in large group contexts as the mediator. The models test S1 sex-related alcohol expectancies about affect, drive, and vulnerability, respectively. Women with more positive sex-related alcohol expectancies about affect and drive (beliefs that one is more sensual, affectionate, aroused and more likely to initiate sex while intoxicated) tended to drink alcohol in large groups more frequently than women with less positive expectancies. Contrary to our hypothesis, women with more positive and less negative sex-related alcohol expectancies during the first semester of college were not more likely to be raped during college. Thus, we did not test the fourth step of mediation, the indirect effect through alcohol use in large group contexts. Among the covariates, victimization history was associated with rape, whereas alcohol use quantity and race/ethnicity were not. Among the 13 women who were victimized prior to college, 30.7% were raped at least once during college, whereas among the 286 who were not victimized prior to college, 7.0% were raped at least once during college.

In the second three models, we included frequency of alcohol use in large group contexts, including fraternity house, as the mediator variable. Models showed the same pattern as the models that did not include fraternity house (see Figure 2-3).

Discussion

In the current paper, we hypothesized that sex-related alcohol expectancies during the first

semester of college would be associated with subsequent rape during three years of college, and that alcohol use in large group contexts would mediate this association. In the full prospective model including covariates, women with more positive expectancies about sexual affect and sexual drive tended to more frequently drink alcohol in large groups than other women. However, women with more positive and less negative sex-related alcohol expectancies were not more likely to experience subsequent rape during college. Sexual victimization history predicted subsequent rape. In contrast to the prospective model, we replicated previous cross-sectional research by showing differences in sex-related alcohol expectancies during the fourth year of college between women who had experienced rape during college and women who had not.

We found that women who had stronger beliefs that one is more sensual and affectionate while intoxicated tended to more frequently drink alcohol in large groups than women with weaker beliefs. Similarly, we found that women who had stronger beliefs that one is more aroused and more likely to initiate sex while intoxicated also tended to more frequently drink alcohol in large groups than women with weaker beliefs. Large group alcohol use contexts provide opportunities for sexual and romantic experiences. It is likely that women who hold these beliefs tend to drink alcohol in these contexts because they are seeking such experiences. This finding is consistent with research suggesting that women with more positive sex-related alcohol expectancies drink more, overall, than other women (Corbin et al., 2001).

Previous cross-sectional research has demonstrated an association between sex-related alcohol expectancies and sexual victimization (Benson et al., 2007; Palmer et al., 2010; Walsh et al., 2013). In the current paper, we replicated this research cross-sectionally by showing that women who were raped had more sex-related alcohol expectancies about sexual drive and vulnerability to sexual coercion than women who were not raped during college. However, we did not find this association using longitudinal data in which sex-related alcohol expectancies preceded rape, and including important covariates such

as victimization history. Cross-sectional research cannot determine the temporal ordering of sexual victimization and sex-related alcohol expectancies. Thus, although sex-related alcohol expectancies are often considered a risk factor for sexual victimization, it is also possible that sexual victimization affects women's sex-related alcohol expectancies. For example, a woman who is victimized while under the influence of alcohol may subsequently have stronger expectancies that alcohol makes them vulnerable to sexual victimization (Benson et al., 2007). That our paper did not replicate cross-sectional research longitudinally demonstrates how important it is to establish risk factors using longitudinal research before allocating resources to targeting a particular risk factor (Spring, 2007), and that sex-related alcohol expectancies may not be a factor in sexual victimization risk as previous literature has suggested.

One longitudinal study has demonstrated a weak association between sex-related alcohol expectancies and rape eight months later (Messman-Moore et al., 2008). Our paper differs from this previous study in several important ways that may explain why we did not replicate this previous research. First, our definitions of rape were different. Messman-Moore et al. (2008) included oral penetration as rape, whereas the current paper included only incapacitated or physically forcible sexual intercourse because research suggests it is important to study different forms of sexual victimization (Bryan et al., 2016). Second, whereas Messman-Moore et al. (2008) measured rape across eight months, we measured rape across three years. It may be that three years is too long of a time span to capture the effects of expectancies. However, there are theoretical and prevention-related reasons to measure expectancies during the first semester and rape across college. The transition to college is an important transition in which adolescents develop patterns of attitudes and behaviors that last throughout young adulthood (e.g., Pittman & Richmond, 2008; Small & Waterman, 2017). Because this transition is important, university-sponsored sexual victimization prevention often occurs during the first semester of college. For example, sexual victimization prevention seminars at new student orientation are common (Amar, Strout, Simpson, Cardiello, & Beckford, 2014). Thus, there is utility in understanding the

impact of expectancies during the college transition on risk across college—if expectancies affect victimization risk, they could be targeted during preventative interventions during the first semester of college. Third, in the current paper, we measured sex-related alcohol expectancies about affect, drive, and vulnerability. In previous work, researchers measured general positive sex-related alcohol expectancies (Messman-Moore et al., 2008). This general scale has three items to measure a broad construct (Brown et al., 1987). In contrast, the measure we used built on this previous measurement tool by independently assessing the two specific components of positive sex-related alcohol expectancies, affect and drive, and by including sexual vulnerability (Abbey et al., 1999).

In contrast to sex-related alcohol expectancies, victimization history predicted later rape. Women who had been victimized prior to college were much more likely to be raped in college than women who had not been victimized prior to college. Previous research highlights the frequency of revictimization among college students and other young adults (Adams-Curtis & Forbes, 2004; Gidycz et al., 2007; Noll & Grych, 2011). In general, college sexual victimization prevention predominately consists of psychosocial education and awareness campaigns (Anderson & Whiston, 2005; Vladutiu, Martin, & Macy, 2011). The results of the current paper suggest that more resources should be allotted to combined treatment and prevention for survivors. Combined treatment and prevention strategies are more intensive and personalized than psychosocial education, and may include topics such as emotional and interpersonal regulation, treatment of PTSD symptoms, risk assessment training, or group counseling (Campbell, Wasco, Ahrens, Sefl, & Barnes, 2001; Noll & Grych, 2011).

Limitations and Future Directions

The current paper has limitations and presents several opportunities for future research. First, we focused solely on sex-related alcohol expectancies, not on other alcohol expectancies such as beliefs that one is happier or more relaxed under the influence of alcohol. Previous research has found longitudinal associations between these alcohol expectancies and sexual victimization (Messman-Moore

et al., 2008). Thus, the current paper can only draw conclusions about sex-related alcohol expectancies. Second, we had to collapse across three years of data to obtain a sample that was large enough for statistical tests. Thus, because our rape construct included incidents of rape immediately following the first semester, we could only include sex-related alcohol expectancies at S1 in our model. Future research should use larger samples to assess the effects of changes in expectancies over time on victimization risk. For example, are women whose expectancies increase throughout college more likely to be victimized in later years? Future research may also explore longitudinal associations between sex-related alcohol expectancies and sexual perpetration. Third, in the current paper, we only explored risk factors for rape. However, future research should measure both broad sexual victimization and rape, to examine whether risk factors differ by severity of sexual victimization, or according to how victimization occurred (e.g., physical force, verbal coercion, incapacitation). It may be that sex-related alcohol expectancies are a factor in other forms of sexual victimization, such as coercion. Fourth, we excluded participants for whom we could not determine rape status because they did not report experiencing rape at earlier semesters, but did not respond at later semesters. However, we included women who reported rape at an earlier semester, even if they did not participate in later waves. Thus, the sample of women who had been victimized may be more inclusive than the sample of women who had not have been victimized. Larger samples would allow researchers to exclude victims and nonvictims similarly. Fifth, the current paper focused on women. However, men are also sexually victimized, and research on sexual victimization among men is sorely needed. Future research should focus on risk and protective factors for sexual victimization among men (Davies, 2002).

Conclusions

Our research suggests that sex-related alcohol expectancies are associated with alcohol use in large groups, but not with rape during college. Sex-related alcohol expectancies may not be a factor in sexual victimization risk. Although we replicated past cross-sectional research on the association

between sex-related alcohol expectancies and rape, we did not find a longitudinal association of expectancies preceding rape. Women who were victimized before college were more likely to be raped in college than women who were not victimized before college. Longitudinal research is critical to identify rape risk factors that may be targeted for prevention.

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Table 2-1

Descriptive statistics by semester (n = 299)

Variable	Sex-related alcohol expectancies: Sexual affect ¹	Sex-related alcohol expectancies: Sexual drive ¹	Sex-related alcohol expectancies: Vulnerability ¹	Alcohol use in large group contexts ²	Alcohol use in large group contexts (including fraternity) ²
	<u>Mean (SD)</u>	<u>Mean (SD)</u>	<u>Mean (SD)</u>	<u>Mean (SD)</u>	<u>Mean (SD)</u>
Semester 1	1.53 (1.05)	1.09 (1.11)	0.76 (0.96)	0.05 (0.09)	0.07 (0.11)
Semester 2	1.47 (0.98)	1.10 (1.03)	0.64 (0.83)	0.05 (0.09)	0.07 (0.10)
Semester 3	1.61 (1.02)	1.16 (1.10)	0.60 (0.78)	0.06 (0.10)	0.07 (0.11)
Semester 4	1.53 (0.99)	1.15 (1.10)	0.58 (0.83)	0.07 (0.11)	0.08 (0.12)
Semester 5	1.70 (1.04)	1.30 (1.14)	0.65 (0.80)	0.08 (0.11)	0.08 (0.11)
Semester 6	1.68 (1.05)	1.30 (1.12)	0.58 (0.83)	0.07 (0.11)	0.08 (0.11)
Semester 7	1.71 (1.01)	1.37 (1.12)	0.55 (0.76)	0.07 (0.10)	0.07 (0.10)

Note. ¹Scale ranges from *not at all* (0) to *very much* (4). ²Proportion of days that participants drank alcohol in large group contexts across 14 days. Ranges from .00 to .55.

Table 2-2

Effect of time on sex-related alcohol expectancies and alcohol use in large group contexts (n = 299)

	Sex-related alcohol expectancies: sexual affect	Sex-related alcohol expectancies: sexual drive	Sex-related alcohol expectancies: vulnerability	Alcohol use in large group contexts	Alcohol use in large group contexts (including fraternity)
<i>Fixed Effects</i>					
Intercept	1.452***	1.031***	0.712***	0.047***	0.067***
Time	0.032***	0.042***	-0.030***	0.004***	0.001
<i>Random Effects</i>					
Level-1 effect	0.511***	0.543***	0.346***	0.005***	0.006***
Level-2 effect					
Intercept	0.533***	0.659***	0.339***	0.004***	0.005***

Note. *** $p < .001$

Table 2-3

Correlations between sex-related alcohol expectancies subscales at S1 (n = 299)

Variable	1	2
1. S1 Sexual affect	--	
2. S1 Sexual drive	.81***	--
3. S1 Vulnerability to sexual coercion	.51***	.59***

Note. S1 = Semester 1. *** $p < .001$

Table 2-4

Descriptive statistics (n = 299)

	<i>M (SD)</i>
Sex-related alcohol expectancies ¹	
Sexual affect	1.53 (1.05)
Sexual drive	1.09 (1.11)
Vulnerability to sexual coercion	0.76 (0.96)
Frequency of alcohol use in large group contexts ²	0.05 (0.09)
Frequency of alcohol use in large group contexts, including fraternity house with friends ²	0.07 (0.11)
Alcohol use quantity ³	0.56 (0.81)
	%
Rape	8.03
Sexual victimization history	4.35

Note. ¹Scale ranges from *not at all* (0) to *very much* (4). ²Proportion of days that participants drank alcohol in large group contexts across 14 days. ³Average drinks per day across 14 days.

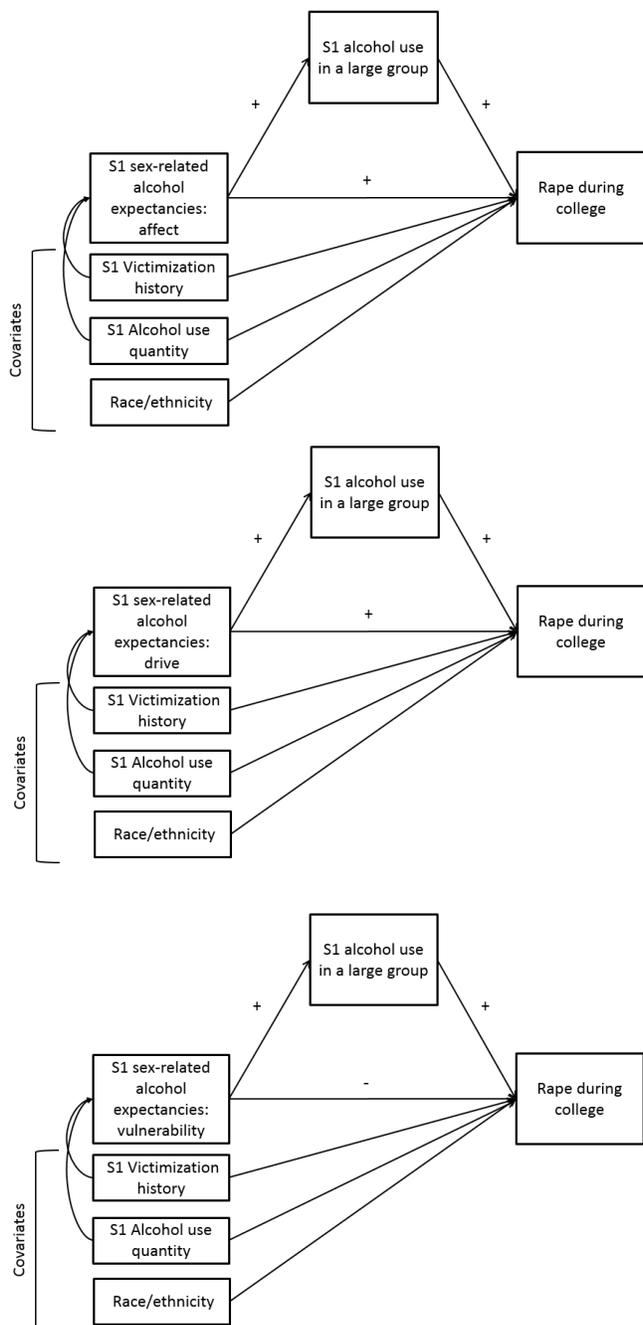
Table 2-5

Differences in sex-related alcohol expectancies according to rape during college

	Rape during college	No rape during college	<i>n</i>	<i>df</i>	<i>t</i> -test
	M (<i>SD</i>)	M (<i>SD</i>)			
S7 Sexual affect	2.02 (1.14)	1.69 (0.99)	294	292	1.49
S7 Sexual drive	1.86 (1.09)	1.33 (1.12)	293	291	2.08*
S7 Vulnerability to sexual coercion	0.98 (0.90)	0.52 (0.74)	293	291	2.71**

Note. * $p < .05$ ** $p < .01$

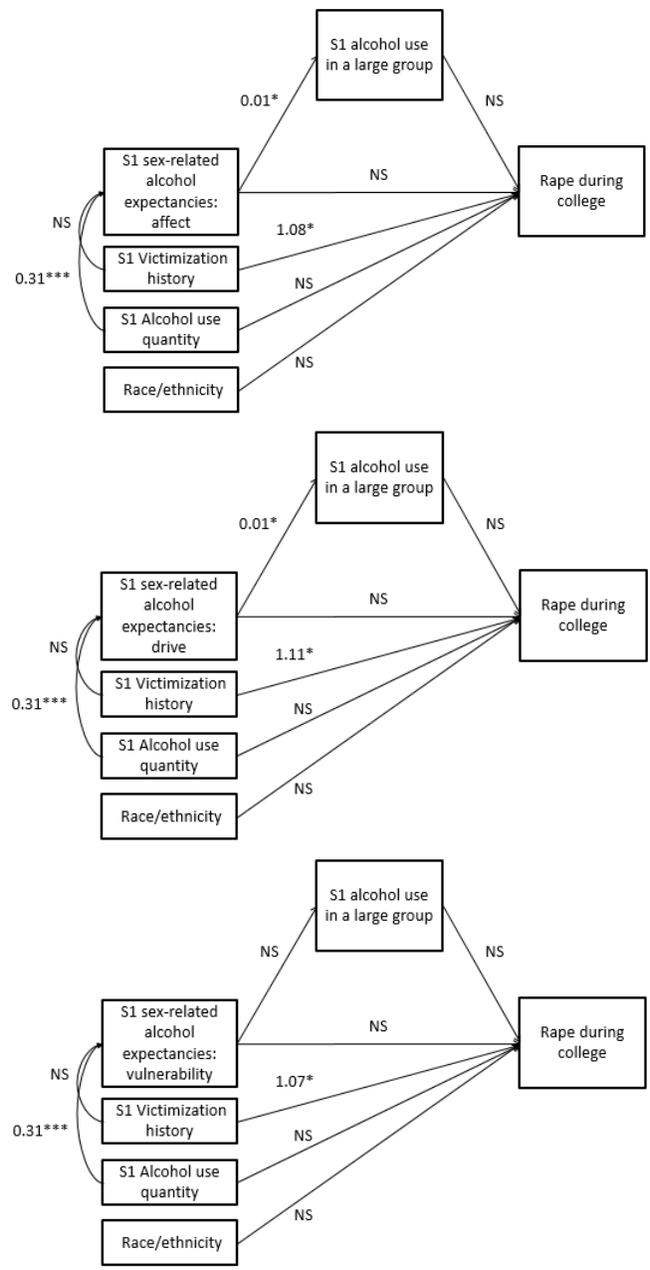
Figure 2-1

Hypothesized models

Note. + = hypothesized significant, positive association. - = hypothesized significant, negative association.

Figure 2-2

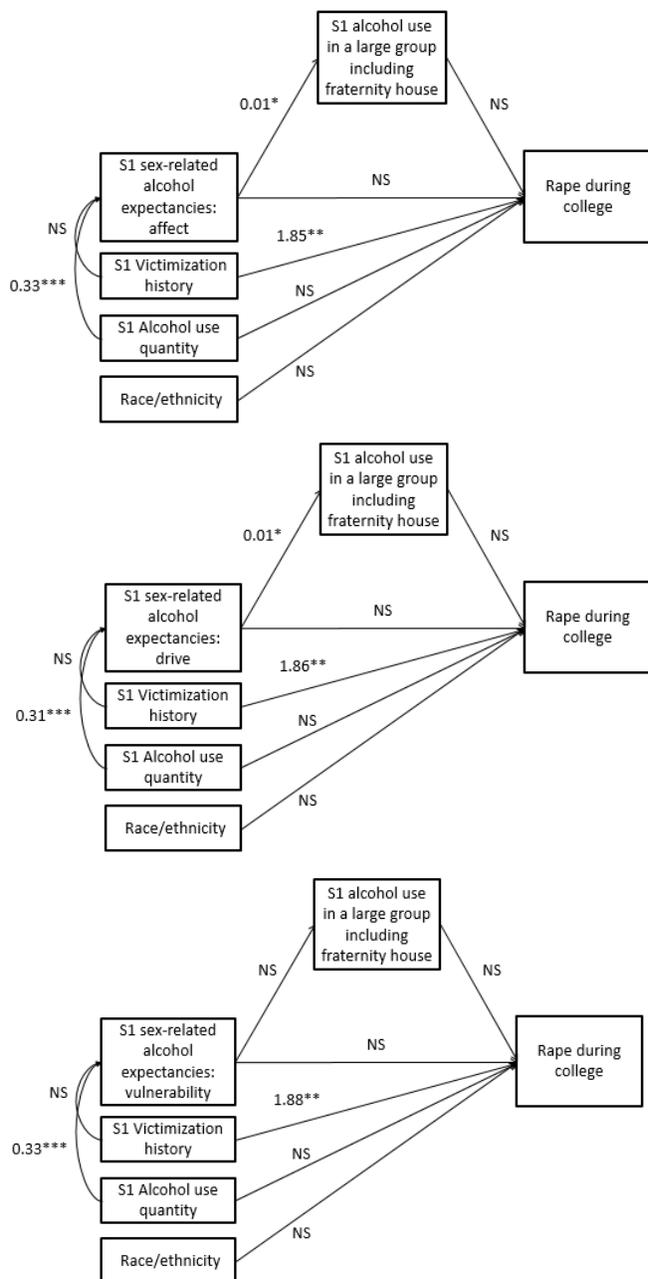
Results (Alcohol use in large groups)



Note. * $p < .05$ *** $p < .001$; NS = hypothesized pathway not significant. We present unstandardized coefficients.

Figure 2-3

Results (Alcohol use in large groups including fraternity house with friends)



Note. * $p < .05$ ** $p < .01$ *** $p < .001$; NS = hypothesized pathway not significant. We present unstandardized coefficients.

Paper 2

Applying the desirability, feasibility, viability framework to prevention science: A case study of sexual violence prevention

This paper will be a multiple-authored work. Emily Waterman will be the first author. She conceptualized the paper, collected the data, and drafted the manuscript. Dr. Meg L. Small will be a co-author. She helped revise the final manuscript. The target journal for publication of this manuscript is *Prevention Science*.

Abstract

A current challenge facing the field of prevention science is scaling up, or disseminating preventative interventions on a large scale (Fishbein, Ridenour, Stahl, & Sussman, 2016; Spoth et al., 2013). In the current paper, we discuss the application of the desirability, feasibility, viability framework, a framework from the field of engineering design that describes that elements of a product, program, or service that has the potential for large scale impact, to the development of preventative interventions (Jones & Samalionis, 2008). Then, in a case study, we apply this framework to design a new intervention and present a method for evaluating the desirability, feasibility, and viability of preventative interventions. Nine team members (student, service providers, and researchers) participated in an activity to generate new ideas for preventing sexual violence on college campuses. We discuss how preventionists may apply this framework and method to increase the potential of their interventions to have large scale impact.

Keywords: sexual violence, sexual assault, interdisciplinary teams, design, prevention

Applying the desirability, feasibility, viability framework to prevention science: A case study of sexual violence prevention

One of the most difficult challenges facing the field of prevention science today is scaling up, or disseminating preventative interventions on a large scale (Fishbein, Ridenour, Stahl, & Sussman, 2016; Spoth et al., 2013). Although the field has been successful in developing effective preventative interventions, these programs have not met their potential for population-level impact (Spoth et al., 2016). To overcome this challenge, prevention scientists may draw on concepts from other fields of study that have been successful in scaling up their products and services (e.g., Kreuter & Bernhart, 2009). In the current paper, we discuss the application of the desirability, feasibility, viability framework, a framework from the field of engineering design, to the development of preventative interventions. This framework describes the elements of innovation and may be useful to evaluate preventative interventions for their potential to scale. We then apply this framework to sexual violence preventative interventions in a case study.

The Desirability, Feasibility, Viability Framework

In the field of engineering design, innovation is defined as “new services that dramatically change the marketplace” (Jones & Samalionis, 2008, p. 20). According to the desirability, feasibility, viability framework, a truly innovative solution is high on three elements: 1) desirability, or the appeal of the solution to the people using it, 2) feasibility, or the potential of the solution to “work”, or to actually solve the problem, and 3) viability, or the ability of the solution to be financially sustainable and spread to different marketplaces (see Figure 3-1; Jones & Samalionis, 2008). According to this framework, services with these three elements have the best potential for large scale impact. All three of these elements are important to preventative interventions. An intervention that lacks desirability may face low participant attendance (Bowen et al., 2009). An intervention that lacks feasibility may not produce the desired outcomes even if participants attend the program (Gottfredson et al, 2015). Finally, an

intervention that lacks viability will not be easily disseminated (Spoth et al., 2013). Thus, prevention scientists should consider desirability, feasibility, and viability from the beginning of intervention development. Ideas for preventative intervention may be evaluated through the lens of this framework to determine their potential for large scale impact.

The desirability, feasibility, viability framework was originally conceptualized by designers who used the human-centered design (HCD) approach for generating solutions. HCD emphasizes observation and understanding of users, integrative thinking, and rapid, iterative experimentation with users, or prototyping (Brown, 2009; Institute of Design at Stanford, n.d.). Many designers in this tradition use the design thinking process, which is a specific process that helps designers implement HCD. The design thinking process has five general phases: 1) Empathize—gain understanding of users, 2) Define—develop an actionable problem statement, 3) Ideate—generate a wide range of possible solutions to the problem, 4) Prototype—create a low-cost prototype of a solution, and 5) Test—test the solution with users to gain further insights and make improvements (Brown, 2008, 2009; Institute of Design at Stanford, n.d.).

Recently, researchers have used the desirability, feasibility, viability framework to evaluate innovations in the healthcare field (Gardner et al., 2015; Kumar & Maskara, 2015; Watkins, Loudon, Gill, & Hall, 2014). For example, a specific interface design for healthcare software called intuitive interface design was found to be more desirable, according to user ratings, than other interface designs (Kumar & Maskara, 2015). In another example, researchers evaluated the feasibility and desirability of video calling for healthcare appointments. They found that although it is feasible to hold healthcare appointments via video calling, video appointments were only desirable for some patients (Gardner et al., 2015). Lastly, in an evaluation of donation-based improvements to African medical equipment, researchers found that donation-based improvements are not viable because many African clinics lack the infrastructure or knowledge to use and maintain new equipment (Watkins et al., 2014). In the

current paper, we present a case study to use desirability, feasibility, viability framework to evaluate ideas for novel solutions to prevent sexual violence.

A Case Study to Apply the Desirability, Feasibility, Viability Framework to Sexual Violence Prevention

Interdisciplinary teams may be important for creating innovative solutions to complex prevention problems that have the potential to scale (Fishbein et al., 2016; Lakhani, Benzies, & Hayden, 2012). We define interdisciplinary teams as teams of professionals and non-professionals with complementary skills and expertise (Nancarrow et al., 2013), who come together to create innovative solutions. Each team member contributes unique skills, expertise, and insight into the problem (Lakhani et al., 2012). Thus, one team member's ideas for a solution likely vary from other team members' ideas on desirability, feasibility, and viability. In the current case study, we use the desirability, feasibility, viability framework (Jones & Samalionis, 2008) to evaluate team members' ideas about prevention of sexual violence. Specifically, we explore the ideas of three major stakeholder groups in addressing sexual violence on campus. The first group is undergraduate college students, who are the recipients of sexual violence preventative interventions. The second group is service providers, such as intervention facilitators at a university, who deliver sexual violence prevention. The third group is researchers, such as postdoctoral research associates, who generate scientific evidence regarding the problem.

Sexual violence on campus is an important prevention problem to solve. One in five college women is a victim of sexual violence during her undergraduate years (Krebs, Lindquist, Warner, Fisher, & Martin, 2009). Sexual violence – unwanted sexual contact including sexual intercourse, anal sex, oral sex, sexual penetration with finger or object, or sexual touching (Krebs et al., 2009) – is an important problem because it negatively impacts women's physical health, mental health, and educational achievement (Gidycz, Orchowski, King, & Rich 2008; Jordan, Combs, & Smith, 2014; Ullman, 2007), and is costly to public health (Miller, Cohen, & Wiersema, 1996; Post, Mezey, Maxwell, & Wilbert, 2002). Sexual violence prevention has lagged far behind other areas of prevention science (Vladutiu, Martin, &

Macy, 2011) such as obesity, aggressive and disruptive behavior, maladaptive parenting, child abuse, depressive symptoms, and illicit drug use (Faggiano et al., 2008; Horowitz & Garber, 2006; Lundahl, Nimer, & Parsons, 2006; Nowak & Heinrichs, 2008; Stice, Shaw, & Marti, 2006; Wilson & Lipsey, 2007). Sexual violence at universities is a complex problem because there are multiple stakeholders interested in prevention of sexual violence on college campuses (e.g., Davidson & Bowen, 2011), competing theories about why the problem occurs (e.g., Cohen & Felson, 1979; Malamuth, Heavey, & Linz, 1996; McPhail, 2016; Sutton & Simons, 2015), and interdependent systems including, but not limited to, campus protocols (Amar, Strout, Simpson, Cardiello, & Beckford, 2014), student party culture (Armstrong, Hamilton, & Sweeney, 2006) and the patriarchal cultural context (McPhail, 2016). Thus, sexual violence prevention is an appropriate context for studying interdisciplinary teams because it is an important and complex problem with multiple stakeholder groups.

The Current Paper

In the current paper, we aim to describe a new framework to address a current challenge facing the field of prevention science—scaling up, or disseminating preventative interventions on a large scale (Fishbein et al., 2016; Spoth et al., 2013). The current paper makes several contributions to the prevention science literature. First, we introduce a framework from the field of human-centered design, the desirability, feasibility, viability, framework, to the field of prevention science. Second, we present a method for evaluating ideas for preventative interventions based on this framework. Third, despite calls for interdisciplinary teams in the prevention science field (Fishbein et al., 2016; Lakhani et al., 2012), little research has examined the contributions of team members from different disciplines. In the current case study, we explore whether students, service providers, and researchers generate ideas that differ from each other on desirability, feasibility, and viability. We address this research question in two different ways. First, we compare the ideas of students, service providers, and researchers on these three elements, according to coders' ratings. Second, we compare the degree to which students, service

providers, and researchers considered these three elements, according to self-report. This case study is exploratory in nature, and thus will serve as a basis for future research on the desirability, feasibility, and viability of solutions to prevention problems.

Method

Participants

Participants were from three categories at a large land-grant university in the Northeast: students, service providers, and researchers. Each participated in one of three intervention design workshops that took place over the course of one week. We recruited students via flyers in academic buildings on campus. Additionally, undergraduate research assistants distributed information about the study via text message, email, and word of mouth to friends and classmates. Students were traditionally-aged (18-24 years) undergraduates at the university. We recruited service providers via email to the university's women's center. Service providers were sexual violence preventative intervention facilitators at this center. We recruited social science researchers via email to academic lab groups that study sexual violence. Examples of researchers include advanced graduate students and post-doctoral fellows. All researchers were experts in sexual violence or intimate partner violence. The recruitment material explained that participants would take part in a 50-minute design thinking workshop to generate ideas to prevent sexual violence, followed by a brief survey.

A total of nine individuals participated: five students, two service providers, and two researchers. Although we made an attempt to recruit both men and women, all participants in the current study were women. The study was approved by the university's Institutional Review Board and participants consented before the study. We compensated participants with a \$20 gift card.

Procedures

An independent facilitator who was not affiliated with the current study led all three design workshops and administered the surveys. The facilitator had experience leading design thinking

workshops. The first author trained this facilitator and provided a manual (see Appendix A). The facilitator led each design team through a 50-minute design workshop followed by a 10-minute survey. Members of the authors' research group piloted the study protocol. Each design workshop included three participants. Design teams were mixed in terms of students, service providers, and researchers. Each team had at least one student and at least one researcher and/or service provider.

After obtaining consent, the facilitator led a brief warm-up activity that helped participants get to know each other and feel more comfortable. The facilitator chose his own warm-up activity based on previous design workshop experience. The facilitator then described seven tips for successful brainstorming, such as "Defer judgement" and "Go for quantity" (OpenIDEO, 2011). The facilitator then provided design teams with background material on campus sexual violence, such as prevalence. Next the facilitator read a 'user story', which is a description of the people who will use the solution (first-year college students), and presented the following design challenge, "Students need to build skills to prevent sexual violence over time during their first year on campus, but they are often distracted by competing demands for their time. How might sexual violence prevention be delivered to students regularly across the first year?" The design team engaged in a structured individual brainstorming activity to generate ideas for this problem. Participants wrote down as many ideas as possible on individual notecards. Notecards were color-coded for later coding purposes. The facilitator helped team members synthesize and consolidate their ideas by grouping them into themes on a whiteboard. Participants then selected a final solution. Finally, participants completed a brief survey to report the degree to which they considered desirability, feasibility, and viability during the individual brainstorming activity. Although the design thinking process has five phases (Brown, 2008, 2009; Institute of Design at Stanford, n.d.), in the current study, participants only completed the Ideate phase.

Measures

Coders' ratings of desirability, feasibility, and viability. During the design workshop,

participants silently brainstormed ideas for solutions. They wrote down each individual idea on a single notecard. Participants generated a total of 54 ideas, across the three workshops. An example of an idea was, "Movie night with discussion in residence hall or greek life (bring in speaker)." (All ideas presented in the current paper are presented exactly as they were written by participants, including grammatical errors.) The first author and two undergraduate coders, trained by the first author, rated each idea on desirability, feasibility, and viability using a five-point scale from *Not at all desirable* (1) to *Quite a lot desirable* (5). We defined desirability of ideas by: "Students would find it appealing and attractive. Students would be likely to use the solution. It would be popular on campus." We defined feasibility of ideas by: "It would cause a decrease in sexual victimization rates. The technology needed to implement the solution exists. The infrastructure needed to implement the solution exists." We defined viability of ideas by: "It is financially sustainable. It can scale. It can sustain over time."

We used pilot data for coder training. Coders met for a training session to discuss the definitions of desirability, feasibility, and viability. Then all three coders individually coded all the pilot data. All coders then attended two additional meetings to discuss inter-rater reliability and discrepancies in coding. Once coders were reliable, they independently rated the data for the current study. All coders rated all responses. Interclass correlations for desirability, feasibility, and viability were .82, .65, and .84, respectively. The final score was the mean of all three coders' scores.

In some cases, coders did not score an idea on desirability, feasibility, or viability because they did not have enough information. If two or three coders skipped the desirability, feasibility, or viability code, it was coded as missing. Of the 54 total ideas, 4 were missing desirability, feasibility, and viability (e.g., "Make anything interactive- safe space to share"). In one case, an idea was missing only viability ("Focus on core issues of SV-consent, bystander intervention, masculinity, stereotypes, etc.").

Self-reported desirability, feasibility, and viability. Participants answered 15 questions about the degree to which they considered desirability, feasibility, and viability during the individual

brainstorming activity. The scale had three subscales with five items each. Response options ranged from *Never* (1) to *Very often* (5). The stem for each question was, "During the individual brainstorm, you generated many ideas to the problem presented by the facilitator. Please respond to the following statements. When generating ideas, I..." Example items were "Reflected on what students would find appealing" (desirability), "Used an academic theory to guide my thinking" (feasibility), and "Wanted a solution that could be easily used at another school" (viability). The scale was adapted from the Prototyping Awareness Scale (Menold, Jablokow, Simpson, & Waterman, 2016). Because the current study lacked a sufficient *N* to complete a factor analysis, we present data from all questions of the scale.

Results

In the current case study, we explored whether students, service providers, and researchers generated ideas that differ from each other on desirability, feasibility, and viability. We addressed this research question in two different ways. First, we compared the ideas of students, service providers, and researchers on these three elements, as rated by coders. Second, we compared the degree to which students, service providers, and researchers considered these three elements when generating ideas.

Desirability, Feasibility, and Viability of Ideas

Coders rated the ideas on desirability, feasibility, and viability. An example of an idea that was high on desirability was, "Have students get incentives (such as priority choice with housing) for attending related events and discussions," whereas an example of an idea that was low on desirability was, "No boys in girls' dorms after 11 pm and vice versa." An example of an idea that was high on feasibility was, "Role playing exercises among student groups," whereas an example of an idea that was low of feasibility was, "Faculty staff member in lobby of all dorms to check in residents and make sure guests are wanted." Lastly, an example of an idea that was high on viability was, "Mandatory/automatically enrolled text alerts," whereas an example of an idea that was low on viability was, "Students required to meet with a CAPS counselor once a semester just for a check-up."

On average, participants generated six ideas during the individual brainstorming activity. Students generated three to eight ideas, the two service providers generated six and nine ideas, and the two researchers generated four and eight ideas. We calculated the mean desirability, feasibility, and viability of ideas for students, service providers, and researchers (see Table 3-1 and Appendix B). Coders rated service providers' ideas almost a point higher on desirability than students' and researchers' ideas. Coders rated service providers' ideas 0.7 higher than students' ideas and 0.4 higher than researchers' ideas on feasibility. On viability, coders rated service providers' ideas 0.3 higher than students' ideas a point higher than researchers' ideas.

Self-reported Desirability, Feasibility, and Viability

Table 3-2 presents means for students', service providers', and researchers' self-reported desirability, feasibility, and viability (see Appendix B for figures).

Self-reported desirability. No one group reported more consideration of desirability than another group. For example, in response to the prompt "Considered whether students would be likely to use the solution", students' mean was 0.3 higher than both service providers' and researchers' means. However, in response to the prompt "Thought about students' daily lives", service providers' mean was almost a point and a half higher than both students' and researchers' means.

Self-reported feasibility. Overall, service providers reported more consideration of feasibility than did students or researchers, with the exception of using an academic theory, which researchers considered more than service providers or students. For example, service providers' mean was almost 1.5 points higher than students' and researchers' mean in the response to the prompt "Thought about the infrastructure needed to implement the solution at the university". Researchers' mean was a point higher than students' mean, and a 1.5 points higher than service providers' means, in response to the prompt "Used an academic theory to guide my thinking."

Self-reported viability. With one exception, service providers were highest on items of self-

reported viability. For example, service providers' mean was 1.2 points higher than students' mean and 3 points higher than researchers' mean in response to the prompt "Thought about financial sustainability." In another example, in response to the prompt "Thought about whether the solution could continue over time," service providers' mean was 0.3 higher than students' mean and 1.5 points higher than researchers' mean. Overall, participants reported more consideration of desirability than feasibility or viability.

We also coded the delivery modalities of the ideas to explore the frequency of types of ideas. We present these frequencies in Appendix C.

Discussion

In the current paper, we discuss the application of the desirability, feasibility, viability framework to prevention science. Then, in a case study, we present a method for evaluating the desirability, feasibility, and viability of preventative interventions. The desirability, feasibility, viability framework describes the elements of a product, program, or service that have the potential for large scale impact. This framework may help preventionists evaluate their preventative interventions for their potential to have population level impact (Spoth et al., 2013). Preventionists might use the desirability, feasibility, viability framework in two ways. First, preventionists may consider these three elements when developing new interventions. Second, existing, effective interventions may be re-designed for desirability, feasibility, and viability, while retaining the core components of the original intervention.

Method for Evaluating Ideas for Preventative Interventions

In the current case study, we present a method for evaluating the desirability, feasibility, and viability of ideas for preventative interventions. Overall, participants in the study generated 54 ideas. Thus, we had enough data to identify ideas that were high and low on each factor, and enough data to establish reliability among coders.

Replication in real-world settings. The current case study took place in a laboratory setting.

However, the case study led to several insights that may inform replication of this method to evaluate preventative interventions in real-world settings. First, we suggest that desirability be evaluated by potential users of the preventative intervention in the future. In the current study, the first author, a researcher, was coding desirability to students. However, the first author is not an undergraduate student does not necessarily know what is desirable to students. Second, many interventions need to be desirable to more than one stakeholder group. For example, school-based interventions should be desirable both to teachers, who deliver the program, and to students, who are the recipients of the program. Thus, it is important to document desirability to all stakeholder groups in the future. Third, we coded for desirability, feasibility, and viability based on a five-point scale. However, other metrics may also measure these factors. For example, desirability of an online intervention could be measured by number of downloads. Feasibility of a bystander training program could be measured with pre- and post-intervention survey to evaluate bystander behavior. Viability could be measured with a cost effectiveness evaluation. The metrics on which to measure these factors may vary depending on the project.

Coding and definition of feasibility. Coder reliability for feasibility was lower than for desirability and viability, indicating that feasibility was more difficult to assess than desirability or viability. This challenge likely arises from the difficulty defining feasibility in a prevention context. In an engineering context, feasibility is typically defined as technical feasibility, or whether an idea is possible given available technology (Jones & Samalionis, 2008). However, in a prevention context, technical feasibility is of less concern compared to efficacy feasibility, or the potential for the solution to solve a prevention problem or impact a particular behavior. Some ideas in the current study appeared to be high on technical feasibility, but low on efficacy feasibility. For example, one participant wrote, “Mandatory/automatically enrolled text alerts.” This solution is technically feasible, but unlikely to prevent sexual violence based on current evidence. In the current study, we conceptualized feasibility as

one construct. However, in hindsight, some items measured technical feasibility (e.g., “Considered whether the solution would cause a decrease in sexual violence rates”) and some items measured efficacy feasibility (e.g., “Used an academic theory to guide my thinking”). Thus, when applying the desirability, feasibility, viability framework to preventative interventions, preventionists may want to consider two types of feasibility: technical feasibility and efficacy feasibility (Figure 3-2).

Limitations and Future Directions

The current paper has several limitations and presents opportunities for future research. First, the current case study has a small sample size. Thus, although we were able to describe a method for evaluating desirability, feasibility, and viability, we could not test for statistically significant differences between students’, service providers’, and researchers’ coder-rated ideas or self-report data. A larger sample size is necessary to test for statistically significant differences between these groups. Second, in a real-world scenario, interdisciplinary teams may assemble for months or years to create a solution to prevent sexual violence on their campus, implement that solution, and determine its effectiveness. In these situations, team members build on each other’s ideas over time. In contrast, in the current study, team members only assembled for an hour. Future studies may expand on the current study by examining current interdisciplinary teams in the sexual violence field, or by following teams over time from their conception. Third, although we made an attempt to recruit men for the current study, all the participants were women. Our difficulty recruiting men for the current study reflects the fact that women tend to be more involved in sexual violence prevention activities than men (Flood, 2015). Future studies should recruit male participants because male students are the users of many sexual violence preventative interventions. Fourth, the current study focused on the individual ideas of members of an interdisciplinary team. Future studies should examine whether the final solutions generated by an interdisciplinary team are more innovative (as measured by desirability, feasibility, and viability) than the final solution generated by a single-discipline team.

Conclusion

In the current paper, we applied the desirability, feasibility, viability framework to the prevention context. We present a method to evaluate the desirability, feasibility, and viability of interventions. Preventionists may apply this method to real-world settings asking members of all stakeholder groups to evaluate the desirability of an intervention, choosing the appropriate metric for evaluating the desirability, feasibility, and viability of an intervention, and by considering both technical and efficacy feasibility. By developing interventions with these three factors, preventionists may increase interventions' potential for large scale impact.

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Table 3-1

Coders' ratings of desirability, feasibility, and viability of students', service providers' and researchers' ideas

	Students	Service providers	Researchers
	<u>M (SD)</u>	<u>M (SD)</u>	<u>M (SD)</u>
Desirability	2.3 (0.5)	3.2 (0.2)	2.2 (1.0)
Feasibility	3.1 (0.5)	3.8 (0.3)	3.4 (0.0)
Viability	4.1 (0.6)	4.4 (0.0)	3.4 (0.6)

Note. All scales ranged from 1-5.

Table 3-2

Self-reported desirability, feasibility, and viability

	Students	Service providers	Researchers
	<u>M (Min, Max)</u>	<u>M (Min, Max)</u>	<u>M (Min, Max)</u>
<u>Desirability</u>			
1. Reflected on what students would find appealing.	4.4 (4, 5)	4.5 (4, 5)	4.0 (4, 4)
2. Considered whether students would be likely to use the solution.	4.8 (4, 5)	4.5 (4, 5)	4.5 (4, 5)
3. Wanted solutions that would be popular on campus.	4.8 (4, 5)	4.5 (4, 5)	3.5 (3, 4)
4. Thought about students' daily lives.	4.4 (3, 5)	5.0 (5, 5)	4.0 (4, 4)
5. Cared about the attractiveness of the solution to students.	4.4 (4, 5)	4.0 (4, 4)	4.5 (4, 5)
<u>Feasibility</u>			
6. Used an academic theory to guide my thinking.	3.0 (1, 5)	2.5 (2, 3)	4.0 (3, 5)
7. Considered whether the solution would cause a decrease in sexual victimization rates.	4.2 (3, 5)	5.0 (5, 5)	3.5 (3, 4)
8. Considered the technology needed to implement the solution.	3.6 (1, 5)	3.5 (3, 4)	3.0 (3, 3)
9. Thought about the infrastructure needed to implement the solution at the university.	3.6 (2, 5)	5.0 (5, 5)	3.5 (3, 4)
10. Wanted a realistic solution.	4.6 (3, 5)	5.0 (5, 5)	4.0 (4, 4)
<u>Viability</u>			
11. Thought about financial sustainability.	2.8 (1, 5)	4.0 (3, 5)	1.0 (1, 1)
12. Considered how my solution would grow to other populations.	3.8 (2, 5)	4.0 (4, 4)	3.5 (3, 4)
13. Wanted a solution that could be easily used at another university.	3.0 (2, 5)	3.5 (3, 4)	2.5 (2, 3)
14. Knew about how much the solution would cost, relative to how much impact it would have.	3.0 (1, 5)	3.0 (2, 4)	2.0 (1, 3)
15. Thought about whether the solution could continue over time.	4.2 (2, 5)	4.5 (4, 5)	3.0 (3, 3)
	<u>M (SD)</u>	<u>M (SD)</u>	<u>M (SD)</u>
<u>Overall means</u>			
Desirability	4.6 (0.3)	4.5 (0.4)	4.1 (0.1)
Feasibility	3.8 (1.0)	4.2 (0.3)	3.6 (0.3)
Viability	3.4 (0.9)	3.8 (0.6)	2.4 (0.3)

Note. All scales ranged 1-5.

Figure 3-1

The desirability, feasibility, viability framework (IDEO U, 2017)

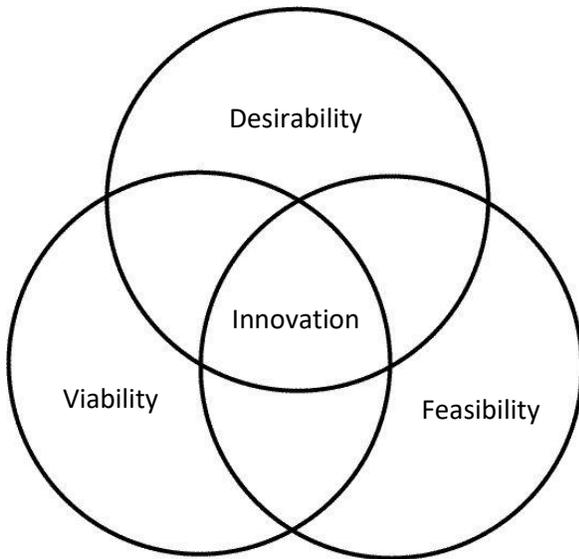
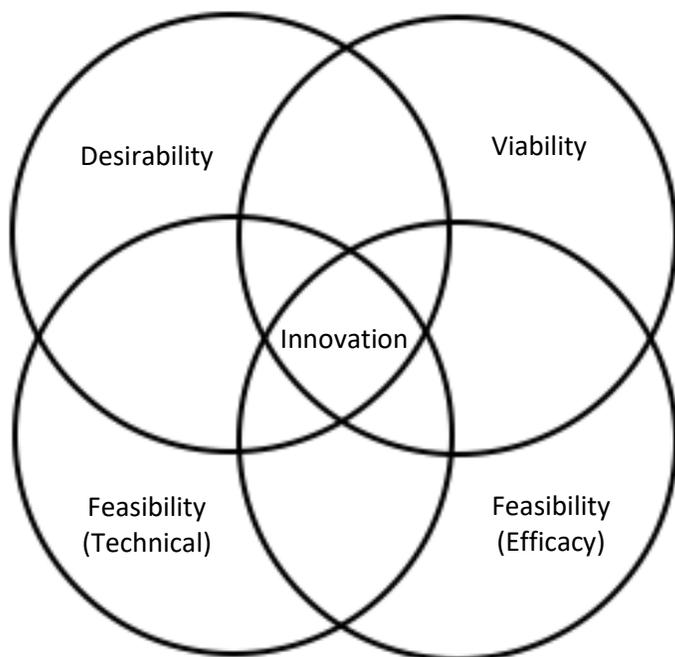


Figure 3-2

The desirability, feasibility, viability framework as applied to prevention science



Discussion

Prevention scientists who focus on sexual violence may improve their ability to turn empirical findings into public health impact by considering multiple stages of translational research in their work (Fishbein, Ridenour, Stahl, & Sussman, 2016). Sexual violence prevention can be addressed at all stages of the translational spectrum (See Table 4-1 for definitions of translational stages and examples from sexual violence prevention.) In the current dissertation, I focused on Type 0 (T0) and Type 1 (T1) translation. T0 translation includes identifying risk and protective factors, and informing etiological theories (Fishbein et al., 2016; Naton et al., 2006). T1 translation includes preventative intervention development. In paper one, I focused on T0 translation by exploring the longitudinal association between sex-related alcohol expectancies, alcohol use in large groups, and rape during college. In paper two, I focused on T1 translation by describing a case study in which we applied the desirability, feasibility, viability framework to prevention science. Research conducted at one translational stage provides implications for the other stages (Fishbein et al., 2016; Wandersman, Imm, Chinman, & Kaftarian, 2000). Thus, the implications from the current dissertation may inform multiple stages of the translational spectrum for sexual violence prevention. Contributions to translation in the current dissertation include 1) strengthening methodology to establish temporal associations of risk and protective factors, and 2) the application of a new framework to increase the potential for preventive interventions to have large scale impact.

Sexual Violence Definitions Affect Translation

In T0 research, it is important to narrow and define terminology because the exact conceptualization of each construct may impact results (Bryan et al., 2016). In contrast, in T1-T5 research, it is important to take a broad approach because prevention that incorporates all three sexual violence prevention strategies (although there is overlap in the strategies, primary prevention primarily aims to reduce sexual aggression, risk reduction primarily aims to sexual victimization risk, and

bystander training primarily aims increase the effectiveness of bystanders) is likely to be more impactful than prevention that narrowly focuses on one prevention strategy (McMahon & Banyard, 2012; Menning & Holtzman, 2015; Schewe, 2007). Thus, in paper one, I focused specifically on rape, a type of sexual victimization in the form of incapacitated or physically forcible sexual intercourse (Bagwell-Gray, Messing, & Baldwin-White, 2015; Messman-Moore, Coates, Gaffey, & Johnson, 2008). In contrast, in paper two, I asked participants to generate ideas to prevent sexual violence more broadly than the definition of sexual victimization in paper one. I wanted participants to be able to generate ideas that focused on any of the three types of strategies, including but not limited to risk reduction to prevent rape. Indeed, in paper two, participants did generate ideas for all three strategies, with ideas for primary prevention such as seminars given by guest speakers, ideas for risk reduction such as encouraging a buddy system, and ideas for bystander intervention such as trainings in residence halls. Although T0 research requires specific definitions of terminology, preventionists working on T1-T5 should broaden their definition of sexual violence and consider multiple strategies to prevent sexual violence.

Identifying Sexual Victimization Risk and Protective Factors

The importance of longitudinal research. In paper one, I examined risk factors for sexual victimization. I predicted that, consistent with cross-sectional research on sex-related alcohol expectancies and sexual victimization risk (Benson, Gohm, & Gross, 2007; Palmer, McMahon, Rounsaville, & Ball, 2010; Walsh et al., 2013), sex-related alcohol expectancies during the first semester of college would be associated with rape during the subsequent three years of college. I replicated past research on the cross-sectional association between sex-related alcohol expectancies and rape. However, I did not find this association in a longitudinal design in which expectancies preceded rape. This research highlights the importance of longitudinal designs for T0 translation. Risk factors that precede the behavior or social problem in development may be targeted with preventative interventions (Nation et al., 2003). Without these designs, preventionists cannot determine whether a

construct that is associated with the social problem actually precedes that problem, or whether the construct is an outcome of the problem.

Despite the importance of longitudinal research, much of the existing research on interpersonal violence, including both sexual victimization and perpetration, is cross-sectional (Adams-Curtis & Forbes, 2004; Capaldi, Knoble, Shortt, & Kim, 2012; Tharp et al., 2012). Longitudinal studies are expensive to conduct compared to cross-sectional studies (Tharp et al., 2012), due in part to the cost of compensating and retaining participants for two or more waves of data collection. This cost affects the sample size of longitudinal studies, which tend to have fewer participants than cross-sectional studies (Capaldi et al., 2012). However, studies on sexual victimization risk factors require large enough samples of victims to provide sufficient power. For instance, in paper one, I had to collapse across three years of data to obtain a large enough sample to perform statistical tests with enough power to detect differences between victims and nonvictims. In spite of the barriers to longitudinal research on risk factors, a growing number of studies use a longitudinal design to examine interpersonal violence (Capaldi et al., 2012; Tharp et al., 2012). These studies will contribute to more rigorous identification of risk factors to target for preventative interventions. Longitudinal designs are also important for intervention evaluation, where they can be used to measure the impact of interventions over time. The findings of paper two indicate that service providers may be successful in creating innovative preventative interventions. Partnerships between service providers with innovative interventions and researchers who have knowledge of longitudinal designs to evaluate this intervention may be beneficial to translation.

Prevention of revictimization. Women with a history of victimization are two to three times more likely to be sexually victimized than women without a history of victimization (Adams-Curtis & Forbes, 2004; Gidycz et al., 2007; Noll & Grych, 2011; Norris et al., 2006; Testa & Livingston, 2009). Although not a primary hypothesis, in paper one I found, consistent with previous literature, that sexual

victimization before college predicted subsequent rape during college. Expanding on previous research, I found that victimization history was an important factor even in the context of attitudinal and behavioral factors. Based on this research, it is important that preventionists develop preventative interventions for victims that integrate treatment and revictimization prevention (Campbell, Wasco, Ahrens, Sefl, & Barnes, 2001; Noll & Grych, 2011). Most current sexual violence prevention is universal prevention (Vladutiu, Martin, & Macy, 2011). However, prevention of a social problem may range from universal prevention with an entire population to selected intervention with individuals already affected by the problem (Weisz, Sandler, Durlak, & Anton, 2005). Thus, interventions for victims should be part of a broader sexual violence prevention strategy that includes both universal and selected intervention.

In paper two, participants did not generate any ideas that specifically included treatment and prevention for prior victims, despite the evidence that revictimization is common. Responses may have focused on universal prevention because I asked participants to generate ideas to prevent sexual violence that could be used generally by first-year students. In the future, preventionists at T1-T5 translation should base their work on the findings of T0 prevention science by developing interventions for victims. These preventative interventions are a necessary part of the prevention spectrum (Weisz et al, 2005).

Contributions to Routine Activities Theory. In addition to the identification of risk and protective factors, a primary goal of T0 translation is to inform etiological theories (Fishbein et al., 2016; Nation et al., 2006). Routine Activities Theory (Cohen & Felson, 1979; Schwartz & Pitts, 1995) served as a base for research questions in paper one. The college setting presents high criminogenic convergence for sexual victimization, in that this setting has high presence of suitable victims and motivated perpetrators, but low presence of effective guardians (Schwartz & Pitts, 1995). I predicted that frequency of alcohol use in large group contexts would be associated with subsequent rape, because large group contexts may also have high presence of suitable victims (Nurius, 2000), high presence of

motivated perpetrators (Armstrong, Hamilton, & Sweeney 2006), and low presence of effective guardians (DeMaria et al., 2015). However, I did not find support for this hypothesis. Although paper one builds on prior work by using longitudinal methodology, the methods I used in paper one could be further strengthened with a within-person daily design. That is, after accounting for an individual's overall rate of drinking in large groups, she may be more at risk on days when she is drinking in large groups than on days when she is not. This type of design would be a better test of Routine Activities Theory than the design in paper one where drinking in large groups preceded, but did not necessarily occur on the same day as, sexual victimization. This methodological limitation in paper one may explain why the findings were not congruent with my hypothesis. In addition, to inform Routine Activities Theory, future research may examine other features of college settings, such as rape myth prevalence (Armstrong et al., 2006; Herman, 1989; McMahan, 2010; O'Sullivan, 1993) and bystander behavior frequency (DeMaria et al., 2015; McMahan, 2010), that may impact criminogenic convergence for sexual victimization.

Routine Activities Theory is a useful framework to emphasize the importance of using all three prevention strategies to prevent sexual violence. Primary prevention aims to reduce the number of potential perpetrators, risk reduction aims to reduce the number of suitable victims, and bystander training aims to increase the number of effective guardians (Schwartz & Pitts, 1995). Considering the prevention ideas generated by participants in paper two, all the ideas focused on one or more of the three strategies to prevent sexual violence (McMahan & Banyard, 2012; Menning & Holtzman, 2015; Schewe, 2007), although none of the participants explicitly cited Routine Activities Theory.

Improving Sexual Victimization Prevention Across the Translational Spectrum

Utility of the desirability, feasibility, viability framework. In paper two, I described the utility of the desirability, feasibility, viability framework to prevention science. According to this framework, a truly innovative solution is high on all three elements (Jones & Samalionis, 2008). Products, programs,

and services with these three elements may have the best potential for large scale impact. This framework may help preventionists scale up interventions for broader impact. Then, in a case study, I explored coder-rated desirability, feasibility, and viability of ideas to prevent sexual violence on campus. Participants generated ideas in a design workshop. In the future, interventionists using this method could connect design workshops to TO research findings. For example, given the findings in paper one, an evidence-based design question might be, “How might we deliver revictimization prevention to first-year college students who have been sexually victimized?”

Using a diversity of intervention settings to innovate. Prevention can be delivered in a wide variety of settings, including, but not limited to, home, school, neighborhood agencies, mental health clinics, and peer groups (Weisz et al., 2005). In paper two, the ideas participants generated were mostly limited to group-based interventions such as seminars and technology-based solutions such as text messaging or email. In addition, there were some ideas that considered the campus party environment such as encouraging the buddy system. However, sexual violence prevention can occur in more settings that were not considered by participants. For example, in prior research, a parent-based intervention that emphasized communication about alcohol’s role in sexual victimization risk was efficacious to prevent rape (Testa, Hoffman, Livingston, & Turrisi, 2010). In addition, only one participant-generated idea involved the campus counseling center, which would be a potential setting for revictimization prevention. Lastly, participants did not generate any ideas that utilized multiple settings, which are more effective than single-setting preventative interventions (Nation et al., 2003). A useful brainstorming activity for future intervention development would be to generate ideas for new intervention settings. After innovative intervention settings have been identified, preventionists can use previous research to develop intervention content.

Addressing college sexual victimization with early prevention. The two most effective sexual violence preventative interventions are *Shifting Boundaries* for 6th and 7th graders and *Safe Dates* for 8th

and 9th graders (DeGue et al., 2014). The effects of *Safe Dates* last for at least four years, which indicates that this intervention may affect sexual violence during the college transition (DeGue et al., 2014). In addition, given that women who are victimized before college are more likely to be victimized during college than other women, preventing victimization before college may reduce women's risk of being victimized during college. However, there is limited discussion in the field about addressing college sexual violence with early prevention (Schewe, 2007). In paper two, the design question prompted participants to generate ideas for sexual violence prevention to be delivered in the first year of college. Thus, participants did not consider early prevention. Early prevention requires a concerted effort by implementers and high school administrators to focus on early sexual violence prevention. Testing the efficacy of such prevention strategies requires long-term evaluation of early preventative interventions on sexual violence through the college years.

There are several benefits to early prevention. First, interventions for adolescents are often delivered over multiple class periods, and thus tend to provide a higher dosage than intervention for young adults (DeGue et al., 2014). Higher dosage is important for intervention effectiveness (Nation et al., 2003). Second, preventative interventions for adolescents may be more developmentally appropriate, because middle-schoolers may be more attentive to curriculum-based interventions and are still developing their beliefs about sex and relationships. An important best practice for prevention is appropriately timed intervention. Appropriately timed prevention occurs during the developmental period in which prevention will have maximum impact. Intervention that are too late may occur after the onset of an attitude or behavior. The purpose of early prevention is to change participants' pattern of risky attitudes, beliefs, and behaviors that lead to undesired outcomes (Nation et al., 2003), such as sexual violence. Given that early sexual violence prevention has effects to the end of high school (DeGue et al., 2014), early prevention may be an impactful way to address sexual violence in young adulthood. Lastly, early prevention has the additional benefit of preventing sexual violence among *all* young adults,

not just young adults who transition to college.

Future Directions in My Program of Research

T0 translation. The conclusions from the current dissertation indicate several areas for future research. Specific to T0 translation, there are two directions I would like to pursue. First, in paper one, I focused on understanding risk factors for sexual victimization among women. However, I would like to explore risk factors for sexual perpetration among men. Specifically, research shows that college men in fraternities are more likely to be sexually aggressive and to exhibit behaviors and attitudes that are associated with sexual aggression than other men (Adams-Curtis & Forbes, 2004; Loh, Gidycz, Lobo, & Luthra, 2005; McMahon, 2010; Murnen, Wright, & Kaluzny, 2002; Tharp et al., 2012). However, it is unclear if fraternity members are at high risk because of socialization effects of fraternities, or if sexually aggressive men self-select into fraternities (Murnen & Kohlman, 2007). In a future paper, I plan to use two pre-existing, longitudinal datasets to understand the effects of socialization and self-selection among fraternity men. This paper will be based on the Confluence Model to explain sexual perpetration risk (Malamuth, Heavey, & Linz, 1996; Malamuth, Sockloskie, Koss, & Tanaka, 1991).

Second, in the current dissertation, I focused on sexual violence among college students. I chose this population because young adults are at particular risk of sexual victimization (Sinozich & Langton, 2014) and because of national attention to sexual assault on college campuses (Lierman, 2014). However, some research indicates that, in young adulthood, nonstudent women are at higher risk of sexual victimization than student women (Sinozich & Langton, 2014). Thus, in the future I would like to collect data to examine risk factors for sexual victimization and perpetration among nonstudent young adults. I would like to use social media to target nonstudent young adults for a cross-sectional, self-report survey that would serve as preliminary data for a large, longitudinal study.

T1 translation. In paper one, I showed that victimization before college was the strongest risk factor for sexual victimization during college. This finding suggests a need for combined treatment and

prevention for college women who have been victimized. This year, I worked as part of an interdisciplinary team to adapt a body mapping program for sexual violence survivors. Body mapping is a group therapy technique that emphasizes mindful awareness of stress in the body and social support among victims. As a post-doctoral scholar in the Prevention Research Center next year, I will help pilot this program. I will analyze data from pre-post surveys, salivary hormones, cheek cells, cardiovascular reactivity, and interviews to explore the potential effects of this program. Our team will help Penn State's Center for Women Students build the capacity to continue the program, and we hope that this program will contribute to the services on campus for sexual violence victims.

T2 translation. Early prevention is a key part of sexual violence prevention (DeGue et al., 2014; Schewe, 2007). In my next position, I will conduct an evaluation of the Penn State Athletes Take Action (PSATA) program for sixth grade students. This program was developed by the Centre County Women's Resource Center (CCWRC) as a primary prevention strategy to promote prosocial behavior and address interpersonal violence. This year, I worked with the CCWRC to improve PSATA content to address core risk and protective factors for interpersonal violence as stated by the Centers for Disease Control (CDC, 2008). In collaboration with CCWRC, we will complete a pilot evaluation in the summer of 2017. Next year, I will lead formal evaluation efforts, including a pre-post design and comparison group, to evaluate the effects of the improved program. This partnership reflects the findings in paper two, in which I concluded that service providers may contribute more innovative ideas than researchers, but researchers contribute valuable knowledge about theory on risk and protective factors and evaluation methods. In the PSATA project, the prevention staff from the CCWRC developed an innovative preventative intervention, whereas I consulted on theory, risk and protective factors, and scientific evaluation.

T3 translation. In an effort to work across the translational spectrum, I will work in an interdisciplinary team to scale and disseminate the PSATA program. We will use the desirability,

feasibility, viability framework to design a version of the PSATA program that can be scaled to other areas.

Conclusion

The current dissertation contributes to the field of sexual violence prevention in multiple ways. First, I discuss how sexual violence definitions affect T0 and T1 translation. Second, the results of the current dissertation suggest a need for rigorous, longitudinal research to establish temporal associations of sexual victimization risk factors. Using rigorous T0 research, preventative intervention developers can create evidence-based interventions that can scale for public health impact. Third, I identified victimization history as the strongest predictor of subsequent victimization. Thus, the current dissertation highlights a need to work across the prevention spectrum, not only developing universal preventative interventions but also revictimization preventative interventions (Weisz et al., 2005). Third, in line with calls for interdisciplinary teamwork in prevention science (Fishbein et al., 2016; Lakhani, Benzies, & Hayden 2012), the current dissertation adapts an engineering design framework (Jones & Samalionis, 2008) to inform the preventive intervention development process. The desirability, feasibility, viability framework may be useful to prevention scientists as a way to determine the likelihood that a preventative intervention will move up the translational spectrum.

In this dissertation, I identify risk factors for sexual victimization and apply a framework for developing innovative prevention programs. To address sexual violence with evidence-based preventative interventions, preventionists need to work on multiple phases of the translational spectrum.

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Table 4-1

Examples of sexual violence work across the translational spectrum

Level	Type (Fishbein et al., 2016)	Example
T0	Discovery science	Identification of risk and protective factors of perpetration, victimization, and bystander behavior (Adam-Curtis & Forbes, 2004)
T1	Methods and program development	Exploring innovative settings for sexual violence preventative interventions (McMahon, Postmus, Warrener, & Koenick, 2014)
T2	Efficacy and effectiveness trials	Testing preventative interventions with randomized controlled trials in both controlled and 'real-world' settings (DeGue et al., 2014)
T3	Real world applications and dissemination	Implementation of a bystander training intervention at three universities (Coker et al., 2015)
T4	Scaling and policy reform	Partnership between federal funding agency, state government, and local stakeholders to disseminate a series of preventative interventions throughout a state (Cook-Craig et al., 2014)
T5	Globalization and public opinion	Public opinion campaign from federal government to raise awareness about sexual violence (Lierman, 2014)

Appendix A

Protocol Manual

Protocol manual:

Examining the contributions of interdisciplinary team members within the feasibility, viability, and desirability framework

by Emily A. Waterman, M.S.

Preparation

- Thank you for facilitating the study.
- Below is a preparation checklist. All the materials will be provided to you ahead of time in [REDACTED], where the study will take place.
 - Consent forms (to be signed and returned)
 - This training manual
 - Copies of user stories and design challenge
 - Notecards for ideation (4 sets; will be colored-coded with participants' names on the top, which they should discard)
 - Prototyping vehicle (available in the lab)
 - Surveys (4 sets; participants should discard the first page with their name on it)
 - Video tape: Will be ready, just need to press 'record'

Welcome and consent

- Welcome participants to the study.
 - We are excited to hear their solutions to a sexual violence related design problem.
 - This activity is meant to be interactive and fun.
 - Introduce yourself and have participants introduce themselves.
- They will have been provided with a consent form and information. However, remind them:
 - Your ideas, comments, and surveys answers are confidential.
 - You may remove yourself from the study at any time. You will still receive a gift card.
 - Although today's activity is interactive and fun, please be aware that the topic matter is sensitive. Treat team members with respect and consider their thoughts and feelings.
 - Please see the resources on the back of the consent form if you need to talk to someone about sexual violence.
- Collect consent forms from the design members.
- Start the video only AFTER consent has been provided
 - Encourage participants to forget about the video- it's mostly there to monitor workshop safety

Warm-up Activities (8 minutes)

- To be determined. Here are some examples:
 - **Yes, BUT... vs. Yes, AND:** Have people form pairs or small groups (3-4) and tell them they are going to plan an activity (a trip, a party). The first round, every time someone proposes an idea, someone else should answer with "Yes, BUT...(reason why that is not going to work)". On the second round, the response should be "Yes, AND... (add something that builds on the first idea)". Debrief about the group energy and what kind of ideas came out in each round.
 - **Alphabet.** Everyone stands in a circle. The goal is to recite the alphabet one person at a time, in no particular order. The catch is that if two (or more) people say the same letter at the same time, you have to start over from "A". It makes everyone be very aware of everyone else in the group. You have to really concentrate and look at everyone to make the decision of whether to chime in with the next letter.

IDEO's 7 brainstorming tips (5 minutes)

- Defer judgement
- Encourage wild ideas
- Build on the ideas of others
- Stay focused on the topic
- One conversation at a time
- Be visual
- Go for quantity

Design challenge information (6 min)

- First, give the participants some background on the design challenge.
- *As we all know, sexual violence is a major problem on college campuses. 1 in 5 women are sexually assaulted during college, and more and more men are coming forward to say they have been victimized as well.*
- *Lots of student groups, researchers, and university and community professionals are thinking about how we can reduce sexual violence. One way to reduce sexual violence is to promote healthy relationships among first-year students.*
- *For example, read this user story:*
 - *Consider a typical, 18-year-old freshman. Students' time is often filled with learning their way around campus, such as finding class locations. Many are still unsure about their major. Students may spend a lot of time making new friends. In addition, they often worry about their current living situation and about finding a living arrangement for the next year.*
 - *The university sends texts to all students and staff about sex offenses on campus, but not all students have signed up for text alerts. Although there is a session on sexual violence during orientation, there is so much information at orientation, it is difficult to remember anything. Many students don't think sexual violence prevention relates to their lives- they might say things like "I'm not that kind of guy" or "That wouldn't happen to me because I'm careful."*

Design challenge statement (4 min)

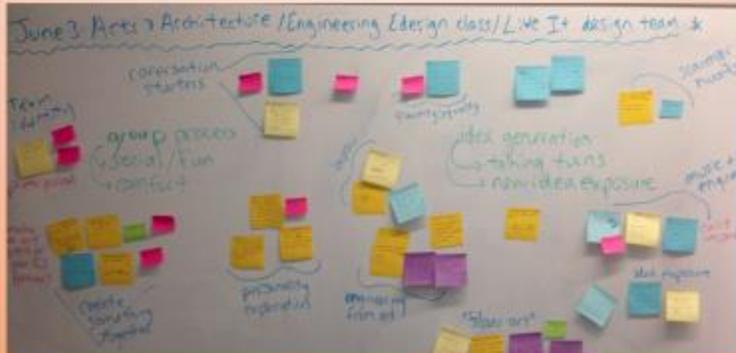
- In this workshop, we are going to brainstorm solutions to the following design problem:
- ***Students need to build skills to prevent sexual violence over time during their first year on campus, but they are often distracted by competing demands for their time. How might sexual violence prevention be delivered to students regularly across the first year?***
- Any questions about the design problem?

Ideation (10 minutes)

- Step 1: Build trust
 - Agree as a team that the room is a no-judgement zone.
 - Go over the brainstorm rules (attached).
- Step 2: Silent brainstorming
 - Everyone should take 5 minutes to create solutions on their own. They should write one idea on each post it note, using the pad of post-its assigned to them.
 - Encourage them to go to quantity, not just quality.
 - Stress to the group that creativity is encouraged.
 - Play music.

Synthesize (10 minutes)

- Step 3: Synthesize
 - On a white board, merge the team's ideas. Ask team members to share their ideas and group them by similar theme on the board. You can also write on the board. It will look something like this:



Create a solution (5 minutes)

- Step 1: Choose a solution
 - Give the team 5 minutes to discuss what solution they think is the best solution.
 - Quickly write or draw out the solution.
- Step 2: Debrief
 - Have the team tell you about their solution. Would they make changes to their solution?

Survey (rest of time)

- Thank you!
 - If anyone has any questions, they can use the contact information on the consent form.
- Survey
 - Surveys will have names on the first page. Have participants rip off that page and discard it.
 - Once the survey is complete, they can go!
 - Give them their gift card on the way out.

Last points

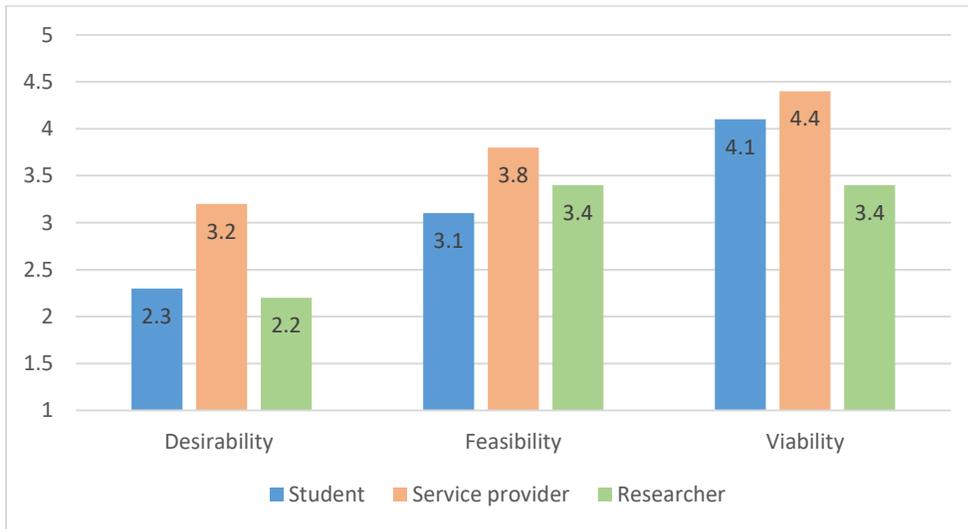
- Remember this is a study about participants' ideation process. To retain the integrity of the study, try not to insert your own ideas. Focus on facilitating.
- Participants probably won't know each other, so do introductions and maybe a short warm-up activity. Use music to create a more casual environment.
- Thank you! You will also get a \$20 gift card!

Appendix B

Figures of Paper Two Results

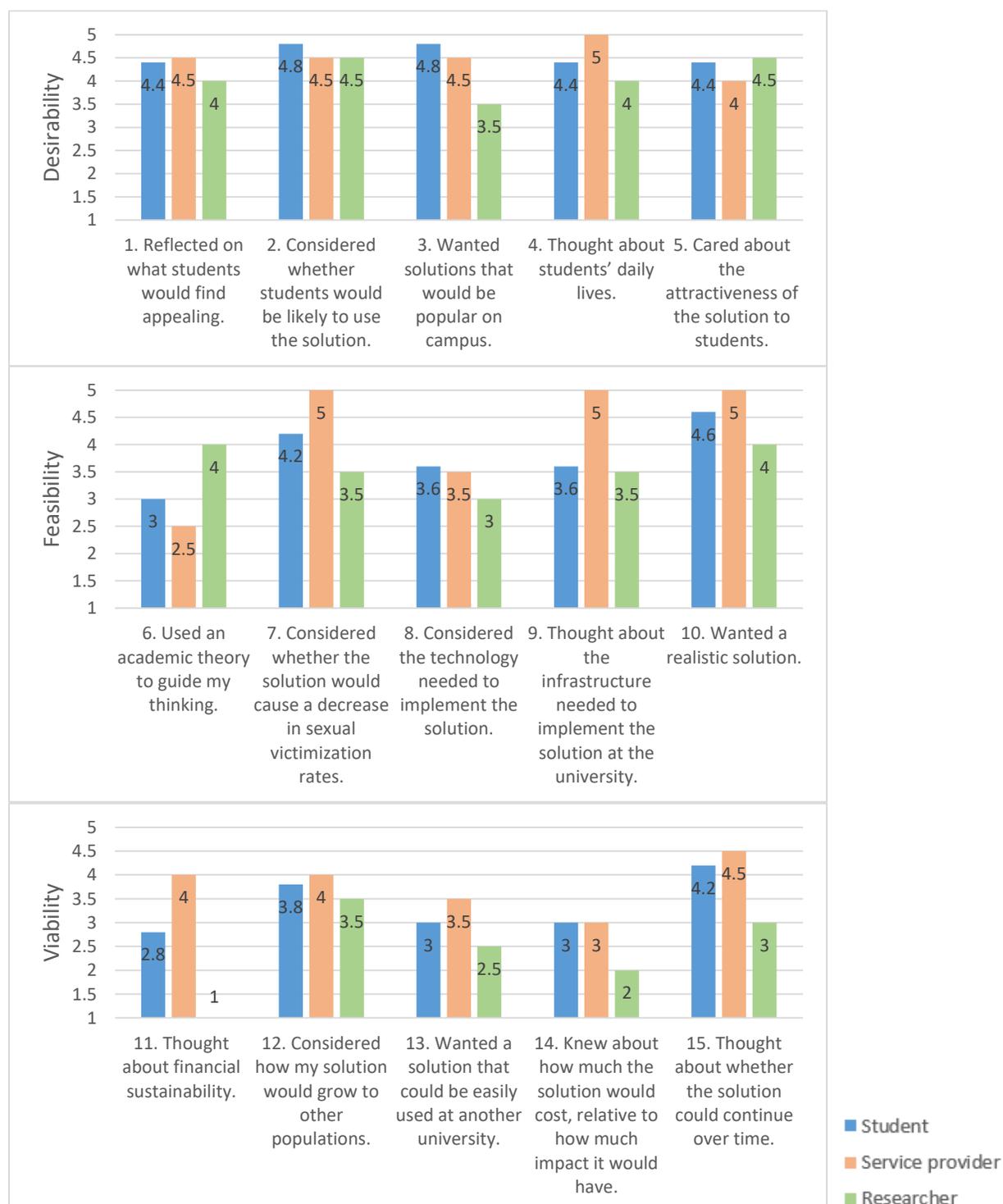
Coders' ratings of desirability, feasibility, and viability of students', service providers' and researchers'

ideas



Note. All scales ranged 1-5.

Self-reported consideration of desirability, feasibility, and viability



Note. All scales ranged 1-5.

Appendix C

Coding of delivery modalities: Themes, examples, reliability, and frequency

Delivery modality	Example	Kappa	Frequency	Student	Service provider	Researcher
Special events	“Have a speaker come in and talk about sexual violence and prevention. (celebrity to attract students, incentives?-free shirts, bags, etc)”	.41	11	6	4	1
Residence hall	“Include passive and interactive educational opportunities in residence halls. For example, discussions about bystander intervention with Ra's/floor”	.91	8	6	1	1
Late-night and fun activities	“Maximize exposure to prevention content through fun activities (ex: speed dating event)”	.56	6	2	2	2
First-year seminar	“Make lessons part of first year seminar classes”	.81	5	4	1	0
Peers	“Offer sexual violence training for students on campus to counsel their peers when they want to talk”	.46	5	3	1	1
Classes (other than first-year seminar)	“Meet students where they are. No added time-go to classes”	.65	4	2	1	1
Student organizations	“Outreach with other organizations on campus”	1.00	4	2	0	2
Email	“Requiring all students to receive emails when a sexual assault occurs”	1.00	3	3	0	0
New student orientation	“Make sure that a part of orientation is dedicated to signs of sexual violence people in relationships often over-look”	.65	3	2	1	1
Online modules/videos	“Along with alcohol education (taken before arriving on campus and mandatory) include learning modules on sexual violence safety and prevention”	1.00	3	1	0	2

Social media	“Since students become numb to texts/emails and the content in them doesn't always get read the school should start trying to reach students through alternate method- on twitter?”	.49	3	2	0	1
Text message	“Mandatory/automatically enrolled text alerts”	.79	3	3	0	0
Greek life	“Many first year students choose to join Greek Life. Panhell/IFC should have mandatory seminars/sessions educating Greek life students on sexual violence prevention”	1.00	2	1	0	1
Applications	“App to report sexual violence quickly and efficiently (download at orientation)”	.66	1	1	0	0
Counseling center	“Students required to meet with a [counseling center] counselor once a semester just for a check-up”	1.00	1	1	0	0
No delivery modality: Content only	“Target January as much as August (relationships at home end over winter break)”	.61	10	0	6	4

Note. There were 54 total ideas. Ideas are exactly as they were written by participants, including grammatical errors.

VITA

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EDUCATION

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M.S., Human Development and Family Studies, The Pennsylvania State University **2014**
B.A., Psychology, Summa Cum Laude with Honors, Siena College **2012**

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Waterman, E. A., Wesche, R., Leavitt, C. E., Jones, D. E., & Lefkowitz, E. S. (in press). Long-distance dating relationships, relationship dissolution, and college adjustment. *Emerging Adulthood*.

Small, M. L., & **Waterman, E. A.** (in press). Predictors of engaged scholarship among college students. *Journal of College Student Development*.

Waterman, E. A., & Lefkowitz, E. S. (in press). Sexuality. In M. Bornstein, M. Artberry, K. Fingerma, & J. E. Lansford (Eds.), *The Sage encyclopedia of lifespan human development*.

Lefkowitz, E. S., **Waterman, E. A.**, Morgan, N., & Maggs, J. L. (2016). College students' perceptions of the links between alcohol use and sex. *Emerging Adulthood*, 4, 272-283.

Waterman, E. A., & Lefkowitz, E. S. (2016). Are mothers' and fathers' parenting characteristics associated with emerging adults' academic engagement? *Journal of Family Issues*, advance online publication.

Waterman, E. A., Small, M. L., Newman, S., & Steich, S. P. (2016). Increasing students' familiarity with curricular experiences: A pilot trial. *Journal of College Student Development*, 57, 892-897.

FELLOWSHIPS AND AWARDS

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