2019

STUDENTS ON THE MARGINS: INTERSECTIONALITY AND COLLEGE CAMPUS SEXUAL ASSAULT

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Digital Object Identifier: https://doi.org/10.13023/etd.2019.175

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STUDENTS ON THE MARGINS:
INTERSECTIONALITY AND COLLEGE CAMPUS SEXUAL ASSAULT

DISSERTATION

A dissertation submitted in partial fulfillment of the
requirements for the degree of Doctor of Philosophy in the
College of Arts and Sciences
at the University of Kentucky

By
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2019

ABSTRACT OF DISSERTATION

STUDENTS ON THE MARGINS:
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This three-paper dissertation quantitatively identifies and examines three different substantive areas using data from the American College Health Association's Fall of 2016 National College Health Assessment (ACHA-NCHA). Specific areas of inquiry include, marginalized populations and college campus sexual assault, intersectional analyses of risk factors for college campus sexual assault, and drinking protective behavioral strategies as prevention tools for college campus sexual assault. Paper one, titled, "College Campus Sexual Assault and Students with Disabilities," explores a particular marginalized group of students that have been largely left out of college campus sexual assault studies: female college students with disabilities. The logistic regression analyses find that having any disability increases risk for any type of college campus sexual assault more than other commonly cited risk factors such as binge drinking, or Greek affiliation. Moreover, the study indicates that odds for female students with disabilities are varied depending on the type of assault, completed, attempted, or relationship, as well as the specific type of disability. Results are discussed, and policy implications, limitations, and opportunities for future research are delineated.

Paper two, titled, "College Campus Sexual Assault: Moving Toward a More Intersectional Quantitative Analysis," is guided by an intersectional theoretical framework. The study employs classification and regression tree analyses (CART) to identify more specific groups of students that are at disproportionate risk for sexual assault beyond singular variables or even interaction effects. Unlike traditional regression techniques, CART does not assume a linear relationship, and can simultaneously account for independent variables relationship to one another while determining which variables have the most explanatory power for the dependent variable and for which unique groups of students. The study discusses results of analyses in relationship to intersectional research both theoretically and methodologically, as well as future research, and policy implications.

Alcohol consumption, particularly binge drinking, has been consistently linked to greater risk for college campus sexual assault victimization. However, there is a lack of

college campus violence prevention and intervention programming that addresses alcohol consumption in relation to campus sexual assault. As such, paper three, titled, “Drinking Protective Behavioral Strategies and College Campus Sexual Assault,” uses logistic regression to explore whether or not the use of drinking protective behavioral strategies (PBS) lowers risk for sexual assault in female college students that drink alcohol. The study examines both the main effects of drinking PBS on sexual assault risk, as well as whether or not the use of drinking PBS moderates the risk of frequent alcohol consumption, and binge drinking on college campus sexual assault. The paper discusses findings, limitations, policy implications, and avenues for future research.

KEYWORDS: College Campus Sexual Assault, Intersectionality, Feminist Criminology, Violence Against Women

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04/19/2019

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ACKNOWLEDGMENTS

This project, though an individual work, would not have been possible without the mentorship, support, encouragement, and insights of many people. Although I am sure I will not be able to adequately convey my gratitude, I need to express many thanks to the following individuals who have been invaluable throughout the last four years of this doctoral adventure. First, of course, I need to thank my Dissertation Chair and mentor, Claire Renzetti. Claire has been a tireless advocate for my success throughout the last four years. Without her guidance this dissertation and my completion of the program would not have been possible. Next, the rest of my dissertation committee, Diane Follingstad, Carrie Oser, and Joe Ferrare. Each person on my committee provided instrumental feedback throughout the dissertation process. I also need to thank my outside reader, Chen Chung, who came in at the eleventh hour allowing me to defend my dissertation as scheduled. I need to thank Janet Stamatel for helping me learn to love statistics. To both Janet Stamatel and Ana Liberato for their wonderful support in the role of DGS over my time in the program.

I've had a wonderful collegial support network outside of faculty as well. I need to give special thanks to several members of my cohort. Julia Miller, Chenghui Zhang, Katie Ratajczak, and Henry Zonio have been sources of support, laughter, and direction, and who have been there for me whenever I needed them. Other colleagues who've been instrumental in my success and general well-being include Margaret McGladrey, Kathryn Engle, Joe Calvert, Caihong Li, Jaspreet Chahal, and Emily Bonistall-Postel. Without these folks, my time spent in the program would have been much more arduous, I am honestly not sure how I would've made it through without this group. I also have a wonderful group of friends outside of the university that have been there for me continually. We moved here for me to

pursue my doctoral degree, but we gained so much more with this superb group of friends: Jen Meunier, Mike Wilkinson, Stacy and Matt Hodges, Manny and Kinga Mnich, and all of their dogs. These great people have reminded me to have fun, have cheered me on, and made our move to Kentucky much sweeter.

Next if it were not for my parents, Rollo Campe and Kathryn Rowan, who moved us across the country (twice), who found us a house, who have believed in me and supported me my entire life, this project, and really any of my accomplishments would not have come to fruition. Their love for their children knows no bounds, and I am so fortunate to have them as my parents. I need to thank my brother, Jeffrey Campe, who is always good for a laugh, and to remind me to stop taking things so seriously. I also have the best in-laws. Mary and Dave, have provided my husband Adam and I with tremendous support and love throughout our marriage and I could not be more grateful. Adam's brothers and their partners, Matt, Tracy, Eric, Jess, Patrick, and Liz, have been rooting for me throughout this endeavor and I am so grateful for them. I need to thank my husband, Adam Brusven, who left the mountains for me, who thinks I can do anything, who keeps me sane, makes me laugh, and loves me dearly. Much thanks and love to our daughter, Veya, who will not remember this time, but gives me hope and amazes me daily. Lastly, I need to give gratitude to my dog, Fran, who was my sidekick and best friend for twelve years, and always knew how to lift my spirits and keep me on my toes.

Finally, this project would not have been possible without funding from PEACE OUTside Campus: The Lindsey M. Bonistall Foundation. Thank you to the board members and to Lindsey's family for honoring her legacy by combatting campus violence through programming and research.

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CHAPTER 1. INTRODUCTION

College campus sexual assault has been identified as a pervasive problem and has been highlighted on the national policy agenda since President Obama's 2011 Dear Colleague Letter (DCL). However, long before 2011 feminist scholars and activists recognized college campus sexual assault as a pervasive problem. Accordingly, though Betsy Devos and the Department of Education under the Trump administration have rescinded the 2011 DCL, the research and activism continues. Scholars have documented the adverse effects that campus sexual assault has on student victims, including, but not limited to, sexual dysfunction, depression, substance abuse, suicide, dropping out of college, and poor academic performance (Kilpatrick et al. 2007; Mengo, and Black 2016; Messman-Moore, Long, and Siegfried 2000; Perilloux, Duntley, and Buss 2012; Tyler, Schmitz, and Adams 2017). Risk factors for college campus sexual assault have also been well-documented, and include alcohol consumption, especially binge drinking, being female, prior victimization, Greek affiliation, being earlier on in collegiate experience, and living on campus (Fisher, Cullen, and Turner 2000; Franklin et al. 2012; Krebs et al. 2007; Mohler-Kuo et al. 2004; Schwartz, and Pitts 1995). Despite the solid foundation of research documenting prevalence rates, adverse outcomes, and risk factors for college campus sexual assault, there are still gaps in the literature that need to be addressed. This three-paper dissertation quantitatively analyzes and addresses three different substantive areas using data from the American College Health Association's Fall of 2016 National College Health Assessment (ACHA-NCHA). Specific areas of inquiry include, marginalized populations and college campus sexual assault, intersectional analyses of

risk factors for college campus sexual assault, and drinking protective behavioral strategies as prevention tools for college campus sexual assault.

Given that being female is the most commonly cited risk factor for sexual assault during college, paper one used the female respondents from the Fall 2016 ACHA-NCHA data to explore a particular marginalized group that has been largely left out of college campus sexual assault studies, female students with disabilities. An intersectional framework was used to guide the inquiry and analysis of college campus sexual assault and female students with disabilities. The analysis found that having any disability is associated with increased odds for any type of college campus sexual assault more than other commonly cited risk factors such as binge drinking, or Greek affiliation. Further, the study indicates that these higher odds for female students with disabilities being sexually assaulted are varied depending on the type of assault, completed, attempted, or relationship, as well as the specific type of disability. The findings have important implications for college campus sexual assault prevention and response. Suggestions for possible collaboration or coalition building across campus offices to better serve female students with disabilities are discussed. Moreover, avenues for future research on students with disabilities and other marginalized groups of students are delineated.

Intersectionality is a core principle in feminist research (see, for example, Hesse-Biber 2013), yet often research on college campus sexual assault overlooks the intersecting identity characteristics of college students, focusing on individual risk factors. The importance of such individual factors should not be understated, but often the literature often does not go beyond linear relationships between these individual characteristics and risk for campus sexual assault. Social locating factors operate

simultaneously, and are comprised of more than individual demographic characteristics such as race, or sex. Paper two applies an intersectional theoretical framework to quantitative methods to examine the ways in which individual level variables, social behavioral variables, and institutional level variables relate to one another, and how those relationships influence risk for college campus sexual assault. Using the Fall of 2016 ACHA-NCHA data, paper two employs classification and regression tree analyses (CART) to identify more specific groups of students that are at disproportionate risk for sexual assault beyond singular variables or even interaction effects. Unlike traditional regression analyses, CART does not assume a linear relationship between independent and dependent variables. Rather, CART takes into account all variables simultaneously, identifying the variables that are most important in predicting college campus sexual assault. As such, unique groups at disproportionate risk for sexual assault are identified, beyond singular variables or even interaction effects. Results of the analyses are discussed in relation to the extant literature, implications for intervention and prevention programming, and future research opportunities.

While it is important to propel college campus sexual assault research beyond the familiar prevalence rates and risk factors, it is also important to take the well-documented and empirically supported data that has been produced over the last 30 years, and use it to inform prevention and intervention programming. Alcohol use has been continuously cited as a risk factor in campus sexual assault (see, for example, Cantor et al. 2015; Fisher, Daigle, and Cullen 2010; Krebs et al. 2007; Krebs et al. 2016). Male peer support theory aligns with the research on alcohol and campus sexual assault, suggesting that college campuses are spaces where rape culture and party culture, including alcohol

consumption, coalesce (DeKeseredy, and Schwartz 2013). Despite the underscored association between campus sexual assault and alcohol few college campuses have prevention programming that includes a focus on alcohol. As such, paper three examines the efficacy of drinking protective behavioral strategies (PBS) in lowering the risk of college campus sexual assault victimization for female students who drink alcohol. With Fall of 2016 ACHA-NCHA data, paper three uses logistic regression to explore whether or not drinking (PBS), lower risk for sexual assault in female students that drink alcohol, and whether or not these strategies moderate the positive association between frequent alcohol use, binge drinking, and college campus sexual assault.

The dissertation concludes with a brief discussion of the overarching gaps each manuscript addresses, and a discussion of which journals papers two and three may be appropriate to submit to for publication. Paper one has been accepted by the Journal of Interpersonal Violence with publication forthcoming.

CHAPTER 2. COLLEGE CAMPUS SEXUAL ASSAULT AND STUDENTS WITH DISABILITIES

More than 30 years of research have been invested in uncovering sexual violence on college campuses (Fedina, Holmes, and Backes 2016; Fisher, Daigle, and Cullen 2010). Actual prevalence findings from research vary, depending on how broadly researchers define and measure sexual violence (Hipp, and Cook 2017), but the most frequently cited statistic is that one in five college women experience some type of sexual assault during their collegiate careers (Krebs et al. 2007). Although high rates of sexual assault affecting college women have been well documented, research focused on female students with disabilities and college campus sexual assault is in its infancy. This is somewhat surprising considering that compared to the general population, women with disabilities are at similar or increased risk for all types of abuse, including sexual abuse (McCormack 1991; Plummer and Findley 2012). The present study contributes to this emerging literature by using data from the Fall 2016 American College Health Association's National College Health Assessment (ACHA-NCHA) to address research questions regarding the relationship between students with disabilities and college campus sexual assault.

COLLEGE CAMPUS SEXUAL ASSAULT

As mentioned, there is no scarcity of research documenting the pervasiveness of college campus sexual assault. Scholars have also identified several risk factors for victimization. Being a female is consistently the first and biggest risk factor for victimization (Fisher, Turner, and Cullen 2000; Krebs et al. 2009). But many studies have also identified alcohol use, specifically binge drinking, frequent partying, drug use, sorority membership, being a freshman or sophomore, and living on campus as among

the most significant risk factors for sexual assault of college women (Fisher, et al. 2000; Franklin 2012; Krebs et al. 2007). Though the foundation of research supporting both the pervasiveness of and risk factors for college campus sexual assault is solid, feminist scholars have criticized the over-use of quantitative analysis in these studies, maintaining that it generalizes women's unique lived experiences and ignores marginalized populations of students (Bell 2013). However, policy makers often look to quantitative research for empirical guidance. Given the focus feminist scholars also place on research that connects to social justice initiatives, often coming through policy change, it may not be possible or advisable for feminist scholars to abandon quantitative research on violence against women (Miner and Jayrante 2013).

STUDENTS WITH DISABILITIES

The Americans with Disabilities Act defines disability as, "a physical or mental impairment that substantially limits one or more major life activities of such individual; a record of such an impairment; or being regarded as having such an impairment" (Americans with Disabilities Act of 1990, 2008, Section 12102, para. 1). According to the U.S. Department of Education's National Center for Education Statistics (2013) in 2011-2012, students with disabilities made up approximately 11% of college students in the United States. As Hong (2015) notes, the National Council on Disability (2003) reported that the number of college students with disabilities tripled over the prior 20 years, and these students spent twice as long finishing their degrees. With an increasing number of students with disabilities attending college, and staying in college longer than students without disabilities, taking a closer look at the way college campus sexual assault affects these students is certainly warranted.

INTERSECTIONAL FEMINISM

The present study is embedded primarily in an intersectional feminist framework. Intersectionality, coined by Crenshaw (1989) and elaborated by Collins (2009) and multiple other scholars (see, for example, Baca Zinn and Thornton Dill, 1996; Cho, Crenshaw, and McCall 2013), maintains that individuals and groups hold unique social locations created and maintained through overlapping and intersecting axes of oppression, which inform these individuals' and groups' opportunities and barriers on an individual and structural level. Intersectional feminism demands that scholars pay attention to *whose* stories are told through research and *which* groups are the focus of programming and policy (Hesse-Biber 2013). Moreover, a feminist intersectional framework invites academics and practitioners to bring marginalized populations to the center of research, suggesting that understanding the experiences of marginalized individuals and groups will aid in a better understanding of social problems (Naples and Gurr 2013).

By approaching college campus sexual assault from an intersectional feminist lens, the present analysis acknowledges that college students have qualitatively different experiences and social locations that influence their risk for sexual assault victimization. Furthermore, focusing specifically on students with disabilities recognizes these students' marginalized positions on college campuses, examining what that might mean in terms of risk for sexual assault victimization. Though this research is guided by intersectional feminism, by no means does this study claim to be an exhaustive intersectional study of college campus sexual assault. Rather, the present study asserts that marginalized

populations' experiences, and specifically in this study, students with disabilities, have been largely left out of research on college campus sexual assault.

COLLEGE CAMPUS SEXUAL ASSAULT AND STUDENTS WITH DISABILITIES

Plummer and Findley (2012) conducted an exhaustive literature review on the topic of women with disabilities and abuse. This review was not focused solely on college women, or solely on sexual assault. Nonetheless, their findings bolster the imperative for the present study. Other subjects explored include personal assistance workers and abuse, intimate partner violence, and service/resource availability. Plummer and Findley (2012) note that results of these studies show prevalence rates of sexual and physical abuse of women with disabilities as equal to or higher than women without disabilities (Casteel et al. 2008; Coker et al. 2005; Martin, et al. 2006), but that prevalence rates have not been clearly established. They emphasize that women with disabilities may be particularly vulnerable to multiple kinds of abuse and rates could actually be much higher.

Of the 24 qualitative and quantitative studies examined by Plummer and Findley (2012), ten of the studies focus on sexual abuse in some regard. Studies that looked at prevalence rates of sexual abuse for women with disabilities findings varied. Both Casteel et al. (2008) and Martin et al. (2006) found that women with disabilities were four times more likely to experience sexual abuse than women without disabilities. Oktay and Tompkins (2004), in a sample of 84 men and women with disabilities who use personal assistance (PA) services, found that 3% experienced sexual abuse by their PA, and 8% experienced sexual abuse by another person. Milberger, Israel, and LeRoy (2003) interviewed 85 women with disabilities and found that 66% reported sexual abuse. Nosek

and colleagues (2001) found that 62% of women with disabilities in their study experienced some type of abuse; however, rates for women without disabilities were the same in those findings.

In their review, Plummer and Findley (2012) categorized risk factors into five general categories: isolation; role of perpetrators; dependency; lack of identification; system and cultural barriers. Women who were more isolated, either physically or socially, were more likely to experience abuse (Gilson et al. 2001; Nosek et al. 2006). The most commonly identified perpetrators included live-in partners or husbands (Milberger, Israel, and Leroy 2003). The authors note that people with disabilities may make attractive targets for perpetrators because of their perceived vulnerability (Martin et al. 2006; Plummer, and Findley 2012). Women with disabilities are also often more dependent on chronic abusers, whether they be their spouse/partner, a caregiver, or family member, making it difficult to report abuse. They also report feeling unworthy of relationships and have poor self-esteem, which may prevent them from leaving abusive romantic relationships (Gilson et al. 2001; Hassouneth-Phillips, and McNeff 2005). Women with disabilities may find it difficult to recognize abuse and be unclear on how or where to report abuse (Gilson et al. 2001). Even if these women reach out for services or help, there is often a lack of appropriate, accessible services available (Plummer and Findley 2012).

There have been two recent studies that look specifically at college students with disabilities and sexual assault (Findley, Plummer, and McMahon 2016; Snyder 2015). These studies show an increased or comparable risk of sexual assault victimization for students with disabilities compared to students without a disability. Using data from the

Fall 2008 ACHA-NCHA with a sample size of 26,685 male and female students from 40 different universities and colleges, Snyder (2015) found that female students with attention deficit hyperactivity disorder (ADHD) were at significantly higher risk for unwanted sexual touching and rape than female students without ADHD. ADHD is only one disability college students may experience, which underscores the need for more research on students with an array of disabilities, and the relationship between different types of disabilities and risk for sexual assault.

Findley, Plummer, and McMahon (2016) conducted a cross-sectional survey of 36 male and 65 female students with disabilities from a large northeastern public university about their experiences with abuse. The authors found 5% of the women reported experiencing forced sex in the past year; no men reported forced sex in the past year. A finding of 5% may seem low, but this study had only 101 participants and was measuring sexual assault based on the question, "In the last year has anyone forced you to have sexual activities?" This question measures sexual assault only in terms of force and leaves much room for interpretation as to what constitutes "forced" sexual activities. This study was limited to one university, and as Findley and colleagues (2016) point out, their study was the first of its kind, stressing the need to explore further the relationship between students with disabilities and sexual assault on college campuses.

THE PRESENT STUDY

Few studies have looked specifically at the intersectional identity of female students with disabilities in terms of risk for college campus sexual assault. Moreover, the studies that have are small (Findley et al. 2016), or have a much narrower disability focus, (e.g. Snyder, 2015). As such, there is relatively little to be found regarding

disability status generally or for multiple specific disabilities, and risk for college campus sexual assault for female students, leaving the foundation of literature on college campus sexual assault and disability status very thin.

Additionally, there is no research that specifically looks at the relationship between some of the commonly cited, and empirically supported risk factors for college campus sexual assault that have dominated the literature over the past three decades such as alcohol use, illicit drug use, marijuana use, Greek affiliation, and being earlier on in the collegiate career. The heavy focus on these risk factors in the college campus sexual assault literature (see, for example, Fisher, Cullen, and Turner 2000; Fisher et al. 2010; Franklin 2012; Krebs et al. 2007) casts a broad net often looking at these risk factors for college women generally, without specific acknowledgement that these may differ depending on one's social identity characteristics, such as disability status.

The present study addressed gaps in the research and adds to the literature in four specific ways. First, using a series of logistic regression analyses, the study explored the relationship between female students' disability status overall and risk for college campus sexual assault, adding to the foundation of literature on college campus sexual assault of female students and disability status more broadly. Secondly, the study explored whether or not certain types of disabilities put students more at risk for sexual assault, which highlights areas for future research, but also adds specificity to the emerging body of research on this topic. Third, the study interrogated the robustness of other risk factors by examining whether or not the relationship between these risk factors (e.g. alcohol use, Greek affiliations etc.) and college campus sexual assault held true for the marginalized population of female students with disabilities. Finally, the focus on female students with

disabilities and college campus sexual assault begins to apply a more intersectional lens to quantitative work on college campus sexual assault.

Research Questions and Hypotheses

With the relative scarcity of research on college students with disabilities and sexual assault, the present study intended to add to the foundation of this literature by exploring the following research questions:

1) Are female students with disabilities at greater risk for experiencing sexual assault than female college students without disabilities?
2) Do previously identified risk factors such as alcohol and drug use also increase odds of sexual assault for female students with disabilities?
3) Does the type of disability impact the odds for sexual assault victimization of female students?

While there is not a large body of previous research to draw on, Plummer and Findley's (2012) review asserts that women with disabilities are at equal or increased risk for abuse generally, compared to women without disabilities. College women have consistently high rates of sexual assault. Therefore, regarding research question one, I hypothesized that female college students with disabilities will have higher odds for sexual assault than female college students without disabilities. Much of the last three decades' worth of research has identified several risk factors, including drug and alcohol use and Greek life, that increase risk for sexual assault victimization of female college students (Fisher et al. 2000; Franklin et al. 2012; Krebs et al. 2007). Consequently, I hypothesized that the greater vulnerability that female students with disabilities experience would be compounded by the risk factors of drug and alcohol use as well as

participation in Greek life. The last research question was meant to be exploratory, and therefore a specific hypothesis related to this question was not developed.

Methods

Data

The data used for the present study came from the ACHA-NCHA of Fall 2016. The ACHA-NCHA is a national research survey designed to assist schools that choose to participate in collecting data about student health, behaviors, and perceptions (American College Health Association [ACHA], 2019). The survey focuses on questions regarding: 1) alcohol, tobacco, and other drug use; 2) sexual health; 3) weight, nutrition, and exercise; 4) mental health; and 5) personal safety and violence (ACHA, 2019, Survey with the Broadest Reach Section, para. 1). The original Fall 2016 data include responses from students at 51 colleges and universities around the U.S., with an N=33,512. However, because college campus sexual assault disproportionately affects women, this analysis only looked at female college students' experiences; all students that indicated they were assigned male at birth were dropped from the analysis, resulting in N=22,828.

Variables and measures

Sexual assault victimization was measured by combining responses from three different survey items designed to measure sexual assault victimization within the past 12 months. These items included the following questions: 1) Was sexual penetration attempted (vaginal, anal, oral) without your consent? 2) Were you sexually penetrated (vaginal, anal, oral) without your consent? 3) Have you been in an intimate (coupled/partnered) relationship that was sexually abusive (e.g., forced to have sex when you didn't want it, forced to perform or have an unwanted sexual act performed on you)?

A dummy variable based on responses to the above three survey items was created. All models were also run with the dependent variable broken down into the three different types of sexual assault asked about on the survey, *completed sexual assault, attempted sexual assault,* and *relationship sexual assault,* where each type of assault was measured independently as a dummy variable.

Disability status was measured from participant responses to nine survey items that ask students about disabilities. These survey items asked students to respond yes or no, indicating whether or not they self-identified as having one of the following disabilities: 1) Attention Deficit and Hyperactivity Disorder (ADHD), 2) Chronic illness (e.g., cancer, diabetes, auto-immune disorders), 3) Deafness/Hearing loss, 4) Learning disability, 5) Mobility/Dexterity disability, 6) Partial sightedness/Blindness, 7) Psychiatric condition, 8) Speech or language disorder, or 9) Other disability. Variables for disability status by individual type were created by separating responses for each of the above survey items, and creating separate dummy variables.

Control variables included the following seven demographic variables. *Year in school,* an ordinal variable coded 1=1st year undergraduate, 2= 2nd year undergraduate, 3= 3rd year undergraduate, 4=4th year undergraduate, 5= 5th year undergraduate, and 6=Graduate/Professional. The other demographic variables were dichotomous measures for *campus residence, Greek life, non-white, heterosexual*, *international status*, and *veteran status*.

Two variables related to alcohol consumption were included, along with variables measuring illicit drug use, and marijuana use. The ACHA-NCHA Fall 2016 survey provided a definition for one drink of alcohol before students answered questions related

to drinking alcohol: “One drink of alcohol is defined as a 12 oz. can or bottle of beer or wine cooler, a 4 oz glass of wine, or a shot of liquor straight or in a mixed drink.” *Binge drinking* is a continuous variable measured through a survey item that asked: Over the last two weeks, how many times have you had five or more drinks of alcohol at a sitting? Response categories ranged from 0-11 with 0=N/A, don’t drink, 1=none, 2=1 time, 3=2 times, 4=3 times, 5=4 times, 6=5 times, 7=6 times, 8=7 times, 9=8 times, 10= 9 times, 11=10 or more times. *Alcohol frequency* is an ordinal variable measured by a survey item that asked: Within the last 30 days, on how many days did you use alcohol (beer, wine, liquor)? Response categories were 0=Never, 1=Have used, but not in last 30 days, 2=1-2 days, 3=3-5 days, 4=6-9 days, 5=10-19 days, 6=20-29 days, 7=Used daily. *Marijuana frequency* was measured using the same response categories. Though federally illegal, marijuana use is legal in many states and therefore was treated as independent from illicit drug use. *Illicit drug frequency*, combined responses from the survey items that ask: Within the last 30 days, on how many days did you use: Cocaine, Methamphetamine, Other amphetamines, Sedatives, Hallucinogens, Opiates, Inhalants, MDMA, Other club drugs, Other illegal drugs. Response categories are the same as *alcohol frequency* and *marijuana frequency*. Descriptive statistics were broken down for all female students, those female students with disabilities, and those female students without, and can be found in Table 1.

Table 1 Descriptive Statistics for Variables Used in Analyses for Female Students

	Full Sample (N=22,828)	Students with Disabilities (N=5,319)	Students without Disabilities (N=16,693)
Variable	Percent	Percent	Percent
Any Sexual Assault	6.17	10.49	4.86
Completed Sexual Assault	3.00	5.87	2.14
Attempted Sexual Assault	4.61	8.15	3.53
Relationship Sexual Assault	2.79	5.06	2.11
Disability Status (any)	23.30	--	--
ADHD	6.86	29.44	--
Chronic Illness	6.18	26.53	--
Deaf/Hard of Hearing	1.62	6.96	--
Learning Disability	4.21	18.07	--
Mobility/Dexterity Disability	0.85	3.65	--
Blind/Partial Sightedness	2.36	10.13	--
Psychiatric Condition	8.96	38.47	--
Speech or Language Disorder	0.66	2.82	--
Other Disability	2.19	9.42	--
Binge Drinking			
N/A Don't Drink	24.92	22.15	25.76
None	45.89	46.64	45.86
1 time	14.67	15.17	14.59
2 times	7.13	7.50	6.95
3 times	3.19	3.52	3.10
4 times	2.05	2.52	1.92
5 times	0.82	1.11	0.72
6 times	0.48	0.41	0.52
7 times	0.22	0.32	0.19
8 times	0.11	0.13	0.11
9 times	0.04	0.08	0.04
10 or more times	0.15	0.26	0.11
Alcohol Use Past 30 days			
Never Used	20.37	15.45	21.75
Not in Last 30 days	14.76	15.51	14.46

Table 1 (continued)			
1-2 days	19.48	19.68	19.49
3-5 days	17.51	18.74	17.32
6-9 days	14.03	14.03	14.11
10-19 days	10.47	12.52	9.85
20-29 days	2.47	3.05	2.29
Used Daily	0.57	0.77	0.50
Marijuana Use Past 30 days			
Never Used	63.06	53.19	66.20
Not in Last 30 days	19.29	22.60	18.35
1-2 days	6.86	8.65	6.36
3-5 days	3.11	4.02	2.85
6-9 days	2.05	2.76	1.81
10-19 days	2.21	3.31	1.86
20-29 days	1.16	1.71	0.96
Used Daily	1.86	3.44	1.34
Illicit Drug Use			
Never Used	97.06	94.83	97.96
Not in Last 30 days	2.28	4.40	1.62
1-2 days	0.25	0.36	0.19
3-5 days	0.11	0.11	0.08
6-9 days	0.04	0.06	0.02
10-19 days	0.03	0.08	0.02
20-29 days	0.02	0.00	0.02
Used Daily	0.04	0.09	0.01
Greek Affiliation	11.17	12.01	11.09
Year In School			
1st year	24.80	22.37	25.66
2nd year	18.54	18.14	18.86
3rd year	18.62	20.42	18.29
4th year	16.92	28.27	16.81
5th or more undergraduate	5.30	6.49	5.03
Graduate or Professional	13.86	13.01	14.24
International Student	5.83	2.71	6.71
Veteran	1.01	1.07	1.02
White/Caucasian	68.91	79.17	66.69
Heterosexual	79.00	70.20	82.44
On-Campus	43.52	43.77	43.94

Analytic Plan

A series of logistic regressions were then run with any type of *sexual assault victimization* as the dependent variable in the first set of regressions, and sexual assault victimization broken down by type: *Completed sexual assault, attempted sexual assault,* and *relationship sexual assault* in subsequent models. The rationale for this stemmed from the idea that like students with unique social locations, different types of sexual assaults may have different significant risk factors.

To address the first research question, whether or not female students with disabilities are at greater risk for experiencing sexual assault than female students without disabilities, the initial models included an independent variable measuring any kind of disability. Additional logistic regressions were completed to address research question two. In these models, *disability status* was included with all other independent variables. However, in addition to the main effects, interaction terms were included to discern whether or not commonly cited risk factors compound the odds of college campus sexual assault victimization for female students with disabilities. In separate interaction terms *disability status* was multiplied with the variables measuring *binge drinking*; *alcohol frequency; marijuana frequency; illicit drug frequency; Greek life; sexual orientation;* and *year in school*. To address research question three, each type of disability was included as a standalone independent variable in the models to determine whether or not certain types of disability may be more or less likely to put students at increased risk for sexual assault victimization.

In short, different models were run to look at disability status and college campus sexual assault overall, the moderating effects of other risk factors on disability status in

relation to sexual assault victimization, and more specifically, which types of disabilities, if any, increase risk for sexual assault. Odds-ratios, which demonstrate the level of increased or decreased odds of sexual assault victimization for each independent variable, were reported for each model. Variance inflation factor measures were obtained, none of which showed scores above 2.5, indicating that multicollinearity was not an issue. In each model listwise deletion was used to drop observations with missing data. Classification tests were run as well and each model showed correct classification of greater than 90%, indicating good model fit.

RESULTS

Model 1, in Table 2.1, in the first set of regression analyses shows several significant variables that increase odds for any sexual assault victimization of college female students, but *disability status* shows the greatest increased odds (OR=1.96; $p <$ .001) for *any sexual assault* victimization compared to female students without disabilities. *Binge drinking*, *alcohol frequency*, and *marijuana frequency* were also significant for increased odds of sexual assault victimization, but with much lower odds-ratios than *disability status*. *Binge drinking* showed increased odds for sexual assault (OR=1.11; $p<.001$) for every 1-day increase in binge drinking over the prior two weeks; *alcohol frequency* (OR=1.19; $p<.001$) and *marijuana frequency* increased odds by a factor of 1.13 (OR=1.13; $p<.001$) for each unit increase in use over the last 30 days. *Illicit drug* use was only significant in the dependent variable *any sexual assault* (OR=1.16; $p<.05$). Those female students with a *Greek life* affiliation showed increased odds for sexual assault (OR=1.21; $p<.05$). *Year in school* was significant, and showed that with each subsequent year in college odds of sexual assault victimization decreased

(OR=0.85; $p < .001$). *Sexual orientation* also showed significance, with heterosexual students being at decreased odds for *any sexual assault* (OR=0.70; $p<.001$) compared to non-heterosexual students.

Model 2, which used completed assaults as the dependent variable shows similar results in terms of significance, but increased odds for students with disabilities became higher for *completed sexual assaults* (OR= 2.34 $p < .001$). Model 3 used *attempted sexual assault* victimization as the dependent variable, and outcomes were very similar to Model 1. Model 4, which used *relationship sexual assault* as the dependent variable showed increased odds of *relationship sexual assault* for students with disabilities (OR=2.22; $p <.001$) compared to those without disabilities. *Greek life* and *alcohol frequency* were *not* significant for *relationship Sexual assault.* See Table 2.2 for odds-ratios and detailed results of each model.

Table 2 Female College Campus Sexual Assault (SA)

Independent Var.	Any SA		Completed SA		Attempted SA		Relationship SA	
	b(se)	OR	b(se)	OR	b(se)	OR	b(se)	OR
Disability status	.67***	1.96	.85***	2.34	.71***	2.03	.80***	2.22
	(.12)		(.20)		(.14)		(.19)	
Binge drinking	.11***	1.11	.10***	1.11	.11***	1.11	.10***	1.12
	(.02)		(.03)		(.02)		(.03)	
Alcohol use	.18***	1.19	.19***	1.21	.21***	1.23	.06	1.06
	(.03)		(.04)		(.03)		(.03)	
Illicit drug use	.08*	1.16	.14	1.15	.14	1.15	.07	1.07
	(.16)		(.11)		(.09)		(.12)	
Marijuana use	.12***	1.13	.10***	1.11	.14***	1.15	.09***	1.09
	(.02)		(.02)		(.02)		(.03)	
Greek life	.19*	1.21	.35***	1.42	.21*	1.24	-.02	0.98
	(.10)		(.15)		(.11)		(.13)	
Year in school	-.16***	0.85	-.15***	0.86	-.15***	0.86	-.18***	0.84
	(.02)		(.03)		(.02)		(.03)	

Table 2
(continued)

International status	.01	1.01	-.24	0.79	-.21	0.81	.07	1.08
	(.16)		(.20)		(.16)		(.23)	
Veteran status	-.68	0.87	.07	1.07	.08	1.08	-.98	0.37
	(.51)		(.45)		(.38)		(.27)	
White/Caucasian (vs. non-White)	0.01	1.01	-.10	0.91	.02	0.97	-.02	0.98
	(.07)		(.09)		(.08)		(.10)	
Heterosexual	-.36***	0.70	-.43***	0.65	-.30***	0.74	-.49***	0.61
	(.05)		(.06)		(.06)		(.06)	
On-campus	.11	1.12	-.05	1.05	.14	1.15	.02	1.02
	(.08)		(.10)		(.09)		(.10)	
% Correctly Classified	93.90%		96.92%		95.27%		97.15%	
Log-likelihood	-4612.27		-2688.08		-3703.48		-2606.57	
Pseudo R-squared	0.07		0.08		0.08		0.05	
N	21116.00		21116.00		21116.00		21116.00	

Logistic regression model estimate. Standard errors in parentheses. Whether or not female college students with disabilities or other socio-demographic characteristics are at higher odds of being sexually assaulted during college. *p<.05, **p<.01, ***p<.00

The next set of analyses involved several models that incorporated different interaction terms in addition to the main effects to explore whether the effects of disability status were compounded by other previously cited risk factors. *Disability status* was therefore included with the following variables as interaction terms in separate logistic regression models: *Binge drinking*; *alcohol frequency; marijuana frequency; illicit drug frequency; Greek life; sexual orientation;* and *year in school.* Each model contained the same control variables as Model 1.

The only significant interactions with *disability status* included *binge drinking, alcohol frequency, and marijuana frequency*. While *binge drinking, frequent alcohol use,* and *marijuana use* did increase odds of sexual assault for students with disabilities, increased odds for students *without* disabilities were significantly higher. This held true across the different types of sexual assault as well as the variable measuring any type of sexual assault. See figures 1-3 for predicted probabilities for *any sexual assault.* These results were contrary to the hypothesis that other risk factors would compound the effects of disability status as compared to students without disabilities.

Figure 1: Frequent Drinking, Disability Status and Probability of A

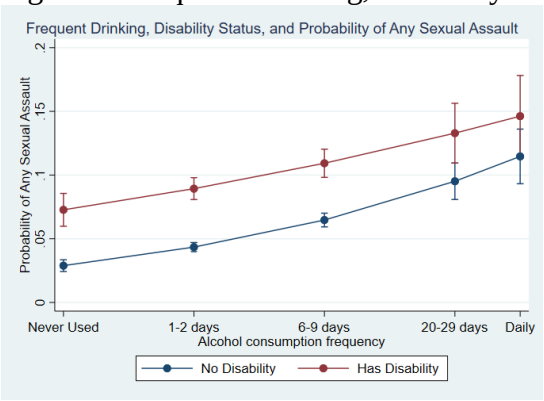


Figure 2: Binge Drinking, Disability Status, and Probability of Any Sexual Assault

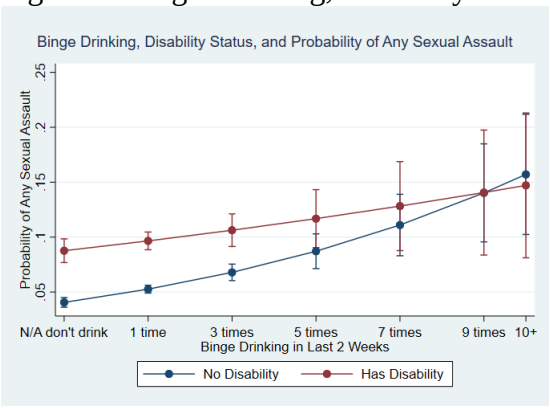
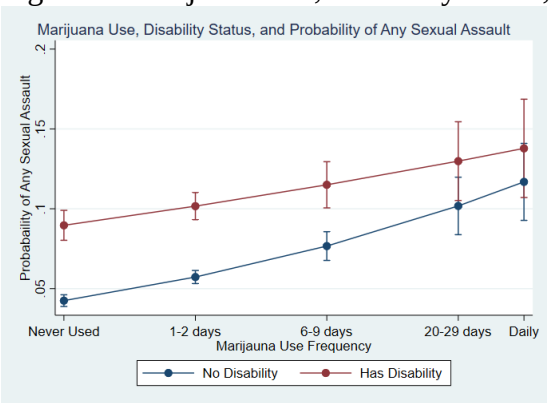


Figure 3: Marijuana Use, Disability Status, and Probability of Any Sexual Assault



The final set of logistic regression models were run with disability statuses broken down by type of disability into individual dummy variables to examine whether certain types of disabilities were more likely to increase odds for sexual assault victimization. These models were run with the same control variables as previous models, and again, models with the four different measures of sexual assault victimization, any *sexual assault, completed sexual assaults, attempted sexual assaults,* and *relationship sexual assaults* as separate dependent variables. For complete results see Table 3.

Table 3 Female College Campus Sexual Assault (SA)

Independent Var.	Any SA		Completed SA		Attempted SA		Relationship SA	
	b(se)	OR	b(se)	OR	b(se)	OR	b(se)	OR
Chronic Illness	.20	1.23	.24	1.28	.30*	1.36	.04	1.03
	(.14)		(.19)		(.16)		(.17)	
Speech	.17	1.19	.20	1.22	.04	1.04	.61	1.84
	(.36)		(.48)		(.36)		(.64)	
Blindness	.35*	1.42	.31	1.36	.23	1.25	.54**	1.71
	(.23)		(.30)		(.23)		(.35)	
Deafness	.04	1.04	-.27	0.76	.13	1.13	.02	1.02
	(.21)		(.23)		(.26)		(.29)	
Learning dis.	.42***	1.52	.31	1.36	.47***	1.60	.29	1.34
	(.19)		(.23)		(.22)		(.23)	
ADHD	.20	1.21	.36**	1.43	.22*	1.24	.22	1.25
	(.12)		(.18)		(.14)		(.18)	
Mobility dis.	.29	1.34	.41	1.50	.19	1.21	.30	1.34
	(.36)		(.50)		(.37)		(.47)	

Table 3 (continued)

Psychiatric dis.	.67***	1.95	.82***	2.27	.67***	1.95	.74***	2.09
	(.16)		(.24)		(.18)		(.24)	
Other dis.	.27**	1.31	.45*	1.57	.28	1.32	.41	1.50
	(.22)		(.32)		(.25)		(.32)	
% Correctly Classified	93.74%		96.94%		95.29%		97.18%	
Log-likelihood	-4523.94		-2633.57		-3633.69		-2546.11	
Pseudo R-squared	0.07		0.08		0.08		0.05	
N	20880.00		20880.00		20880.00		20880.00	

Logistic regression model estimate. Standard errors in parentheses. Whether or not female college students with specific types of disabilities have increased odds for sexual assault. This table excludes control variables, but betas and odds-ratios are representative of entire model. Control variables included in the entire model are the same as those in previous analyses, and include: binge drinking; frequent alcohol use; illicit drug use; frequent marijuana use; Greek life; year in school; international status; veteran status; white (vs. not); sexual orientation; and living on campus. *p<.o5, **p<.01, ***p<.001

Analyses of the various types of disabilities with all types of sexual assault as the dependent variable showed that students who identified as being *blind or partially sighted*, had increased odds of any type of *any sexual assault* (OR=1.42 (p <.05). Students with a *learning disability* had increased odds for *any sexual Assault* (OR=1.52; p < .001), and students who identified as having a *psychiatric condition* had increased odds (OR=1.95; p < .001) for *any sexual assault*. Other significant variables were similar to previous models with *Binge drinking, Alcohol frequency,* and *marijuana frequency* increasing risk for *sexual assault.* Again, as students' *year in school* increased, their likelihood of being sexually assault decreased. Additionally, *sexual orientation* was significant. Heterosexual students had decreased odds of sexual assault victimization compared to non-heterosexual students.

When using *completed sexual assaults* as the dependent variable, additional types of disability status became significant. Having a *learning disability* remained significant, increasing odds of *completed sexual assault* (OR=1.36; p < .05). *Attention deficit hyperactivity disorder* (ADHD) was also significant and increased odds (OR=1.43; p < .01) for *completed sexual assault*. *Psychiatric conditions* remained significant, but with higher increased odds (OR=2.27; p <.001). The same alcohol and substance abuse variables remained significant. As in prior models, *heterosexual* students had decreased odds of sexual assault victimization compared to non-heterosexual students, and students' odds of completed sexual assault decreased as their *year in school* increased. Like *any sexual assault, Greek life* also increased risk for *completed sexual assaults*.

With *attempted sexual assault* as the dependent variable, again, *learning disabilities, and psychiatric conditions* were significant. However, *chronic illness* also became significant. Those students with *chronic illness* had increased odds of *attempted sexual assault* (OR=1.36; $p<.05$); those with *learning disabilities* had increased odds (OR=1.60; $p < .001$), and ADHD (OR=1.43; $p<.05$) also increased odds. Those with *psychiatric conditions* had increased odds (OR=1.95; $p< .001$) for experiencing *attempted sexual assault.*

With *relationship sexual assault* as the dependent variable, *blindness or partial sightedness* became significant. For students with *blindness or partial sightedness,* odds of *relationship sexual assault* increased (OR=1.71; $p < .01$). Unlike results from prior models, *chronic illness, ADHD, and Greek life* involvement, were *not* significant for relationship sexual assaults. Similar to other models, those with *psychiatric conditions* had odds increase (OR=2.09; $p< .001$) of *relationship sexual assault* victimization. All results were obtained while holding all other variables constant.

DISCUSSION

Several of the findings from this study add to previous research. *binge drinking, frequent alcohol use,* and *marijuana use* were significant, all increasing odds for *sexual assault* overall, c*ompleted sexual assault, attempted sexual assault,* and *relationship sexual assault*. This held true in models in which disability was examined in the aggregate, and in models in which different types of disabilities were examined individually. In all models and for all types of assault, being *heterosexual* as compared to not heterosexual decreased risk of sexual assault. As *year in school* increased, odds of sexual assault decreased across all models for all types of sexual assault. These findings

are not surprising, considering that previous research has consistently found that alcohol and drug use is associated with sexual assault victimization as well as perpetration (Fisher, Daigle, &, Cullen 2010; Franklin, 2012; Krebs et al. 2007). The present study's findings are also consistent with prior findings that odds for assault decrease as students' progress in their studies, showing that younger and/or newer students are more likely to be victims of sexual assault (see, for example, Cantor et al., 2015; Krebs et al., 2007; Krebs et al., 2009).

Hypothesis one, that female students with disabilities would have significantly higher increased odds for sexual assault than female students without disabilities, was supported. The analysis found that female students with disabilities had much higher odds of being sexually assaulted, regardless of the type of assault (completed, attempted, or relationship) compared to female students without disabilities. This finding supports the work of other researchers such as Cantor and colleagues (2015), whose report for the Association of American Universities (AAU), that 31.6% of undergraduate females with a disability reported nonconsensual sexual contact, compared to 18.4% of other undergraduate female students. The present study found that approximately 10.5% of female college students with a disability had been victims of some type of sexual assault, compared to 4.9% of female college students without a disability. While these numbers are significantly lower than those reported by Cantor et al. (2015), the present analysis showed that female students with disabilities made up 23.3% of the female student population but accounted for 39.6% of all sexual assaults. These findings suggest that female students with disabilities are disproportionately experiencing sexual assault during their collegiate careers.

Hypothesis two, that female students with disabilities odds of sexual assault victimization would be compounded if they also engaged in *binge drinking, frequent alcohol use, marijuana use, illicit drug use*, or were involved in *Greek life*, was not supported. First, *Greek life*, and *illicit drug use* interaction terms did not yield any significant results. However, when looking at *alcohol frequency, binge drinking, and marijuana frequency*, there were significant interactions. However, these interactions showed that while binge drinking, frequent alcohol consumption, and marijuana use did increase odds for sexual assault victimization in females with disabilities, these increased odds were significantly lower, compared to female students without disabilities. Further research would be needed to explore the relationship between disability status and substance use.

Finally, when the aggregate disability variable was broken down into different disability types as individual variables, several potentially important differences emerged. Female students with *psychiatric conditions* were at increased odds for sexual assault victimization across all three types of assault. However, students with *chronic illness* were at increased odds for only *attempted sexual assaults.* students with *ADHD* did not show increased odds for assault overall, but students with *ADHD* were at increased odds of experiencing a *completed sexual assault* and *attempted assault*.

Female students with *blindness or partial sightedness*, had significant increased odds for *sexual assault* overall, and even greater increased odds for *relationship assault*. However, *blindness or partial sightedness* was not significant for *completed* or *attempted assaults*. These differences suggest that *relationship assaults* may be at least to some degree qualitatively different than non-relationship assaults. Although other disabilities

included in the analysis that may be readily visible were not significant, *speech or language disorders* approached significance (OR=1.84; *p*=.078) with *relationship assault*. It may be the case that relationship assaults are linked with more obvious disabilities, (e.g. visible or audible disabilities) compared to non-relationship assaults. Although Plummer and Findley's (2012) review of disabilities and abuse focused on *all* types of abuse as opposed to just sexual assault or relationship sexual assault, they found that husbands or intimate partners are most often the perpetrators of abuse, and that these perpetrators may seek out women with disabilities due to their perceived vulnerability.

The results suggested that female students with disabilities are at increased odds for sexual assault victimization compared to female students without disabilities. But clearly, aggregating all students with disabilities into a single category when analyzing sexual assault victimization masks important differences in students' experiences. Treating sexual assault as a singular type of experience may also have adverse consequences. As seen in this analysis, disabilities are diverse and may well have varying implications in terms of risk for different types of assault. Aggregating diverse disabilities into one homogenous category misses the nuanced relationships that various disabilities have with the different types of sexual assault risk. In addition, the analysis showed that other risk factors such as binge drinking, frequent alcohol consumption, and marijuana use, did increase the odds for sexual assault among students with disabilities, but at a disproportionately lower rate compared to students without disabilities.

Consequently, continuing to research college campus sexual assault without using an intersectional lens that takes diversity into account may result in over-stating, or under-stating, the importance of different risk factors for different groups and thereby

miss targeted prevention and intervention opportunities for groups that are at significantly greater victimization risk. An intersectional theoretical framework shows utility in terms of expanding research on college campus sexual assault beyond just looking at women, alcohol and drug use, and Greek affiliation, which have seemingly become the status quo. Certainly, the finding that college women with disabilities are at increased odds for sexual assault victimization compared to college women without disabilities is not in and of itself an exhaustive intersectional analysis. But, the analysis does begin to lay the groundwork for continued exploration into the question of *which* women are the focus of campus sexual assault research, and how intersecting axes of oppression and marginalities beyond just being female may influence one's odds for sexual assault victimization on campus.

Policy Implications

These results certainly point toward a fairly obvious policy implication: college campus sexual assault and intimate partner violence prevention and intervention programs should collaborate with disabilities services offices on college campuses. Prior research suggests that women with disabilities who do reach out for services related to violence against women often find these services inaccessible, insensitive, or unhelpful (Hassouney-Phillips and McNeff 2005; Milberger et al. 2003; Nosek et al. 2001; Plummer and Findley 2012). This type of collaboration could increase the chances that students with disabilities who are victims of sexual assault will know what resources are available or be referred to appropriate resources. In addition, working with disabilities services may help violence prevention and intervention centers or programs tailor their

responses to victims with disabilities in a more helpful, appropriate, and accessible manner.

Women with disabilities may not be able to readily identify abusive behavior and may fear not being believed if they report sexual assault or other abuse (Gilson 2001; Plummer and Findley 2012). Collaboration across offices may help educate students with disabilities about increased risk for sexual assault and safety planning. For instance, ADHD has been linked to risky behavior and impulsivity as well as increased substance use and abuse (Kaye et al. 2014; Molina and Pelham 2014); violence prevention and intervention offices and disabilities resource centers could work in tandem to incorporate a focus on identifying risky scenarios, and harm reduction with alcohol and substance use when meeting with students who have disabilities. With regard to prevention, many feminist scholars and practitioners might take issue with focusing on potential victims with prevention activities, as opposed to working toward dismantling rape culture on college campuses, but these two prevention tactics are not mutually exclusive. Broad campaigns to educate college students about rape culture, and policies that combat rape culture, can be implemented while also acknowledging and educating students about risk factors for victimization in a non-victim-blaming manner. This may be doubly important for vulnerable populations such as college women with disabilities.

Limitations

As mentioned, the survey instrument used presented some measurement limitations. The measure of sexual assault did not provide a detailed set of experiences that constitute sexual assault. Thus, students responding may have experienced a completed or attempted assault, but not have recognized it as such based on the survey

questions. Therefore, the respondents in this dataset that identified as having been sexually assaulted in the past year may not be an entirely accurate representation of the sexual assault victims in the sample. Relatedly, the survey items measuring the different types of sexual assault were not mutually exclusive. Therefore, a student may have reported a completed sexual assault, but also reported a relationship sexual assault that were the same incident. Additionally, while the survey instrument does include specific disabilities, there are not corresponding definitions. Disabilities such as ADHD are quite specific and may be easy for a respondent to identify whether they have ADHD, some of the other disabilities included are not as explicit. For instance, the survey includes psychiatric condition, chronic illness, and learning disability as well. This poses a couple of measurement problems. First, it is not clear what exactly constitutes a psychiatric condition, this could be interpreted very differently by different students thereby combining very different conditions into one variable. Finally, the ACHA-NCHA data is cross-sectional and not generalizable to all students. The sample is large, but it is not nationally representative. Any conclusions drawn from this study cannot be applied across all U.S. college students and analysis limited in terms of identifying causal or predicting factors for college campus sexual assault.

Finally, this study incorporated an intersectional framework by concentrating on a marginalized, and under-represented population in college campus sexual assault literature, female students with disabilities. But, in no way did this study claim to be completely intersectional. The focus of the study was narrow with the purpose of adding to the groundwork of empirical research on the topic of students with disabilities and college campus sexual assault. As such, other important variables were overlooked, such

as race beyond a binary white vs. non-white categorization or looking at experiences of those who are gender non-conforming.

Future Research

By design, the term disability is a broad one encompassing a vast array of possible impairments. Consequently, the finding that female college students with disabilities are at increased risk for sexual assault remains somewhat vague. More research is needed, therefore, to tease out the various ways that specific types of impairments may influence risk for different types of sexual assault victimization. For instance, the present study findings indicate that women with speech or language disorders and blindness or partial sightedness are at higher risk for sexual assault. These findings may suggest that women who have disabilities that are visually or audibly apparent upon interaction with others may be more susceptible to perpetrators of relationship violence. However, being deaf or hard of hearing, or having a mobility disability, both of which are often easily detectable in social interaction, did not significantly increase risk for any type of sexual assault in the present study.

Students with ADHD had greater odds of experiencing completed sexual assault and attempted assault. Previous research has shown that ADHD is linked to impulsivity and risk-taking behavior (Kaye et al. 2014). ADHD has also been associated with increased risk for substance use disorders (Molina and Pelham 2014). Substance use, particularly alcohol and marijuana use, has been consistently cited as a risk factor for sexual assault. Female students with learning disabilities also had elevated risk for completed and attempted sexual assaults, and psychiatric conditions were significant across categories of assault. But ADHD is a specific diagnosis, while “learning

disabilities" and "psychiatric conditions" leave broad room for interpretation among survey participants. More research is needed that explores specific learning disabilities and/or psychiatric conditions, their similarities to or differences from ADHD in terms of risk-taking behavior, including alcohol and substance use, and the relationship of all of these factors to risk for college campus sexual assault victimization.

It appears as though social group belonging may be more important for non-relationship assault; as Greek life membership was not significant for relationship assault but was significant for all other types of sexual assault. These findings may have to do with the fact that women with disabilities experiencing relationship abuse are more isolated, and less likely to have extended social networks beyond their perpetrators (Gilson et al. 2001; Nosek et al. 2006; Plummer and Findley 2012). Again, more research is needed to clarify the role of social group belonging to sexual assault victimization risk.

The survey instrument used for this study provided a vague explanation of sexual assault. Campus climate surveys, such as the *AAU Campus Climate Survey on Sexual Assault and Sexual Misconduct* by Cantor et al. (2015), or the *Campus Sexual Assault (CSA) Study* by Krebs et al. (2007), ask more detailed questions related to sexual assault, provide descriptions of specific behaviors that constitute sexual assault, and explore incapacitated and/or drug and alcohol facilitated sexual assault. Studies such as the AAU study and the CSA, are specifically looking to measure college campus sexual assault, while the ACHA-NCHA study that focuses on a wide range of college student health outcomes, only briefly touching on sexual assault. But these campus climate surveys do not ask about specific disability types; rather, they only ask if the student has a disability. Surveys such as the CSA and the AAU campus climate survey should add items asking

about specific types of disabilities in order to more fully gauge the relationship between disability status and college campus sexual assault risk. This seems particularly prudent considering the present study showed disability status increasing sexual assault victimization risk at higher percentages than other previously identified risk factors such as binge drinking, or drug use that have been a central focus of previous research.

Finally, college campus sexual assault research should be undertaken with an intersectional lens. Quantitative researchers may consider developing alternative statistical analyses that get at the more specific social locations of their survey participants. Mixed-methods approaches should be used to add context to new findings, particularly for the burgeoning subfield of college campus sexual assault and students with disabilities. For instance, the present study found that alcohol and drug use increased odds for assault at a higher percentage for students without disabilities, than for students with disabilities. Focus groups on the topics of alcohol consumption, binge drinking, and drug use with students that have disabilities, and students that do not have disabilities might yield some insight into this statistical finding.

Research findings that show female students with disabilities at increased odds of being sexually assaulted while attending college are important in and of themselves as they add to the scarce literature available on the topic of students with disabilities and college campus sexual assault. The present study also points to the possibility that commonly-cited risk factors such as drug and alcohol use, may not be as central to sexual assault victimization risk for students with disabilities as they are to college women without disabilities. Accordingly, despite the many limitations, this study does underscore the imperative for continued rigorous empirical research into college campus

sexual assault and female students with disabilities and offers several avenues for future research.

CHAPTER 3. COLLEGE CAMPUS SEXUAL ASSAULT: MOVING TOWARD A MORE INTERSECTIONAL QUANTITATIVE ANALYSIS

College campus sexual assault continues to be documented at alarmingly high rates. Prevalence rates vary based on measurement and definition of sexual assault (see, Follingstad 2018), but several studies suggest that between 20-30% of college women are sexually assaulted during their collegiate careers (Fisher, Daigle, and Cullen 2010). A number of risk factors for college campus sexual assault have been identified through rigorous empirical research and some of the risk factors that have been consistently identified across a variety of studies include being female, alcohol and/or drug use, Greek affiliation, being earlier on in one's collegiate career, and living on campus (Fisher, Cullen, and Turner 2000; Franklin 2012; Krebs et al. 2007; Mohler-Kuo et al. 2004; Schwartz and Pitts 1995). The detrimental effects of college campus sexual assault victimization have also been well-documented, including sexual dysfunction (Perilloux, Duntley, and Buss 2012), depression (Messman-Moore, Long, and Siegfried 2000) substance abuse (Kilpatrick et al. 2007; Tyler, Schmitz, and Adams 2017), PTSD (Herres et al. 2018), dropping out of college, and poor academic performance (Mengo and Black 2016).

The prevalence and negative outcomes for victims of college campus sexual assault alone warrant more empirical research to inform prevention and intervention policies. However, much of the work done on college campus sexual assault fails to account for the experiences of marginalized populations, and unique or minority social locating factors. Moreover, much of the research has focused on individual-level characteristics or situational variables in terms of risk factors. It is for precisely these reasons that feminist scholars have been critical of the over use of quantitative methods in

examining violence against women and have called for more intersectional approaches (Bell 2013). In the same vein, feminist scholars call for research to be connected to social justice initiatives and to have tangible effects on policy and programming (Collins 2012). The challenge, then, is to do intersectional research that provides policy makers with quantitative evidence related to risk for, prevention of, and intervention to address violence against women.

The present study used classification and regression tree analysis as a methodological tool to explore the possibilities of incorporating a more intersectional framework into quantitative analysis of college campus sexual assault. Using the American College Health Association's National College Health Assessment (ACHA-NCHA) data from Fall of 2016, the study contributes to the literature by taking into account individual, social-behavioral, and institutional variables and participants' positionality to all these variables simultaneously to identify groups of students who are disproportionately at risk for college campus sexual assault. Furthermore, the analysis goes beyond specifying one risk factor at a time, or identification of moderating variables, and instead drills down to specific social locations that increase likelihood of experiencing sexual assault. Discussion of results, policy implications, study limitations, and suggestions for future research are included.

INTERSECTIONALITY

Intersectionality, informed by critical race theory and Black feminism (Burgess-Proctor 2006; Collins 2000; Carbado et al. 2013), was coined by Kimberle Crenshaw (1989). Intersectionality refers to the multiple intersecting oppressions such as race, class, gender, sexual orientation, and ability status, that are mutually constitutive, coming

together in a multiplicative fashion, creating unique lived experiences for the individuals and groups occupying these different identity characteristics (Crenshaw 1991; Collins 2009). Intersectionality emerged on the heels of second-wave feminism, when Black women, lesbian women, and other marginalized groups of women criticized what they called white middle-class feminism, or "hegemonic feminism," as not being representative of their experiences (Baca Zinn and Thornton Dill 1996; Burgess-Proctor 2006; Collins 2000; Flavin and Artz 2013; Renzetti 2013). Intersectionality impels feminist criminologists to take into account issues of inequality and power when theorizing violence against women (Burgess-Proctor 2006), but it also demands research methods that incorporate an intersectional lens, as well as for scholars and activists be vigilant in the pursuit of social justice as it relates to intersectional inequality. Intersectionality operates on both micro and macro levels, since the axes of oppression are embedded in social structure as well as social interaction (Burgess-Proctor 2006).

Intersectionality maintains that social structures such as race, class, gender, sexuality cannot be studied in a value-neutral fashion. It is precisely the overlapping and intersecting forces of these social constructions that highlight the hierarchical value put on different social locations (Collins 2009). Bringing an intersectional lens to research on college campus sexual assault can guide the research such that scholars begin to interrogate which women are being studied, and whose experiences of sexual assault are being studied, taking into consideration that multiple identity characteristics may be shaping risk and protective factors.

Intersectional research (as well as feminist research) calls for scholars to investigate these values through listening and privileging subjugated knowledge to

understand and dismantle the power that upholds inequalities steeped in individual and group social location (Hesse-Biber 2013). Though qualitative methods often offer a way to get at individual lived experiences in more depth, feminist researchers should be careful not to view intersectionality and corresponding methods as accomplished or decided (Carbado et al. 2013; Choo and Ferree 2010). Intersectionality, like other theoretical frameworks, continues to evolve as a work-in-progress (Carbado et al. 2013). Intersectional research challenges feminist scholars to look beyond the familiar methods that are heavily qualitative, and recognize that while it might not be identified as such intersectional work is being done in a wide variety of disciplines using a wide variety of methods (Carbado et al. 2013). For example, Goff and Kahn (2013) note that in the last ten years' psychology has begun to examine human phenomena and experiences in relation to intersectional identities as opposed to universal human experiences.

Quantitative research can be done using an intersectional approach, and may be advisable particularly for studying college campus sexual assault, as policy and prevention and intervention programming funds are often tied to evidence-based approaches that are validated, at least partially, through quantitative evaluation (Miner and Jayrante 2013). As Currie (2007) points out, much criminological research has had very little impact on and in the communities in which it is done. An intersectional approach to college campus sexual assault will be critical of which students are being studied, whether or not marginalized populations are being overlooked, and will have tangible policy implications for prevention and intervention programs. Classification and regression tree (CART) analysis may be one such way to incorporate a more intersectional framework into quantitative research.

CART

An intersectional framework suggests that relationships and social locations are not linear in nature. Rather, many overlapping variables on individual, interactional, and structural levels come together to create unique social locations that simultaneously may limit or enhance individual and group opportunities and barriers. CART operates in a complimentary fashion and does not assume a linear relationship, taking into account the effects of multiple independent variables on one another while calculating each variable's explanatory power in relation to the dependent variable. Additionally, CART can easily incorporate categorical variables, separating which categories are important in explaining the dependent variable outcome, and for which groups of people. This has particular importance to studying college campus sexual assault because much of the research to date does not address specific risk factors for marginalized populations, including students of color, LGBTQ students, and students with disabilities. But even when campus sexual assault is addressed in relation to marginalized populations, the literature often does not do so in a way that addresses specific risk factors for these populations. Rather, the analyses are presented such that being a member of one of these groups is (or is not) a risk factor independent of other variables. For instance, Krebs and colleagues (2016) report that non heterosexual students were more likely to be victims of sexual assault, but do not expand on what other variables may contribute to this risk. CART can determine whether these social identity characteristics are risk factors in and of themselves, and what other variables may or may not increase risk for these specific populations, giving researchers and practitioners more specific information for targeted policy prevention and intervention.

DEMOGRAPHIC ANALYSES

Demographic variables include individual-level characteristics: e.g., race, ethnicity, socioeconomic status, sexual orientation, gender identity, and sex. Research related to college campus sexual assault has focused primarily on sex due to the overwhelming number of studies that highlight female college students as disproportionately victimized by college campus sexual assault (Fedina, Holmes, and Backes 2016; Fisher et al. 2010). However, several studies have also suggested that LGBTQ students are also at increased risk for college campus sexual assault (Cantor et al. 2015; Coulter and Rankin 2017; Perez and Hussey 2014). For example, Cantor and colleagues (2015) found that both those who identify as transgender, genderqueer, gender non-conforming, questioning, or gender not listed (TGQN) as well as those who identify their sexual orientation as non-heterosexual, had substantially higher rates of nonconsensual sexual contact involving physical force as well as nonconsensual sexual contact involving absence of affirmative consent.

Little research has been focused on race or ethnicity differences among college campus sexual assault victims (Krebs et al. 2007). The relative absence of research related to race and college campus sexual assault may be attributable to low numbers of these students being included in samples measuring college campus sexual assault (Krebs et al. 2007). Also, survey instruments designed to examine college campus sexual assault are not consistent in how race/ethnicity is measured. Cantor and colleagues (2015) use five categories: Hispanic, White, Black, Other race, and Nonresident alien, but another prominent study by Krebs and colleagues (2016) used White, Black, Other, Hispanic origin, Hispanic, and Non-Hispanic. The inconsistency in how race and ethnicity is

measured across studies makes it difficult to determine whether or not findings related to race and college campus sexual assault are an artifact of the differences in measurement as opposed to a factor related to risk for college campus sexual assault. Despite the trouble with different measurement, inclusion of race and ethnicity in studies examining college campus sexual assault is important, particularly as the racial makeup of U.S. college students continues to expand (National Center of Education Statistics [NCES] 2018).

Additionally, there have been few studies that look at disability status and college campus sexual assault, despite research showing increasing numbers of students with disabilities attending college and people with disabilities at increased risk for all types of abuse throughout the life course (McCormack 1991; Plummer and Findley 2012). Students with disabilities made up 11% or of the college population in the United States in 2011-2012 (NCES 2013). The two studies that have looked specifically at college campus sexual assault and disability have been narrowly focused on a single disability or have had relatively small localized samples. For instance, Snyder (2015) looked at students with ADHD using ACHA-NCHA data from fall of 2008 (N=26,685) and found that female students with ADHD had increased odds of rape and unwanted touching. Findley, Plummer, and McMahon (2016) administered a much smaller cross-sectional survey at a northeastern public university to 36 male and 65 female students with disabilities finding that 5% of the women reported forced sex in the past year. With only two studies looking specifically at college students with disabilities and sexual assault, additional research is needed to determine if students with disabilities are disproportionately at risk for college campus sexual assault, such that campus

administrators can ensure resources are accessible and to inform prevention programming.

Further research is needed to account for marginalized populations experiences of college campus sexual assault that have been largely ignored in the extant literature; but also research needs to account for the way demographic identity characteristics intersect and what that means for individuals as well as groups that occupy these social locations. Moreover, scholars need to examine how these characteristics intersect with social-behavioral variables, as well as institutional-level variables. Certainly, historically and presently, identity markers such as race or disability status may influence organizational membership, extra-curricular activities, substance use (Collins 2009; Crenshaw 1995). Additionally, these characteristics affect how one experiences institutions, including higher education institutions (Collins 2009; Crenshaw 1995). Thus, a complex web of demographic identity markers, social-behavioral variables, and structural institutions and systems are important when considering social and criminological phenomena such as college campus sexual assault.

SOCIAL-BEHAVIORAL ANALYSES

Social-behavioral variables identified as risk factors for college campus sexual assault have overwhelmingly focused on alcohol consumption, particularly binge drinking; Greek affiliation; athletics affiliation; and illicit drug use (Martin 2016; Moylan and Javorka 2018). Studies have consistently shown that alcohol use, including binge drinking increases risk for sexual assault, with studies estimating that well over 50% of campus sexual assaults involve the victim, perpetrator or both using alcohol (Abbey et al. 2004; Krebs et al. 2009; Krebs et al. 2016; Mellins et al. 2017). Some studies have also

linked female sorority membership with increased risk for sexual assault compared to female students who are not in a sorority (see, for example, Kalof 1993; Minow and Einolf 2009).

Comparatively little research has focused specifically on marijuana use. This may be due to marijuana having been lumped in with other illicit drugs, (see, for example, Mohler-Kuo et al. 2004). However, studies that have looked at marijuana use individually have shown a correlation between marijuana use and sexual assault victimization (Krebs et al 2007; Messman-Moore, Coates, Gaffey, and Johnson 2008; Testa et al. 2003). In the Campus Sexual Assault (CSA) Study, Krebs and colleagues (2007) found that female students who had used marijuana since entering college were at increased risk for alcohol or other drug enabled sexual assault. In another study, of 1,014 women aged 18-30 in Buffalo, NY, marijuana use before age 18 was positively associated with experiencing both incapacitated and forcible rape (Testa 2003). In a study of 276 college women who completed self-report studies, marijuana use in the prior 2 months was positively associated with rape (Messman-Moore et al. 2008). Although studies that have looked at marijuana use and campus sexual assault have shown positive associations, there has been little discussion to follow about the possible reasons for the associations. With several states having legalized medical and recreational use of marijuana since these studies were conducted, and over half the nation in favor of marijuana legalization (Swift 2016), attitudes and public opinion about the risks of marijuana seem to be changing (Subbaraman and Kerr 2017). Due to the sparse discussion, and relatively small number of studies examining marijuana use and college campus sexual assault specifically, more

research is needed to look at the context in which college students are using marijuana, and for which students' marijuana is a risk factor for sexual assault victimization.

INSTIUTIONAL-LEVEL ANALYSES

Some research suggests that institutional-level variables, similar to demographic variables, may influence sexual assault prevalence. Cass (2007) suggests that a more populous geographic location of campuses may increase risk, but larger student enrollment on the actual campus may decrease risk. Mohler-Kuo and colleagues (2004) conducted research that suggested that female students on rural campuses were at higher risk, as well as female student students attending colleges in the south, or north central regions of the U.S compared to other locations. In a more recent study conducted by Cantor and colleagues (2015) findings indicated undergraduates attending private universities may be more at risk than those attending public universities. To better understand the context in which college campus sexual assault takes place additional research is needed to determine how or if institutional-level variables relate to individual risk factors and social-behavioral activity (e.g., parties, drinking, organizational membership) on campuses.

Although research on college campus sexual assault has a solid foundation, the work has focused heavily on prevalence, and has also underscored the same risk factors time, and time again. To that end, research examining college campus sexual assault does not address marginalized populations, and how risk factors such as alcohol consumption, may differentially impact students depending on their social location. Further, quantitative research on campus sexual assault is largely done assuming linear relationships between risk factors and sexual assault. In reality, students' lives are not

held constant, therefore examining risk factors without taking into consideration the myriad ways in which other variables may be affecting these risk factors may result in an over or under estimation of the importance of certain variables for particular groups of students.

THE PRESENT STUDY

Given the scant literature that integrates individual, social-behavioral, and institutional-level variables when evaluating risk factors for college campus sexual assault, the present study used CART analysis to explore the non-linear and multiplicative relationships between all three levels of variables. CART allowed us to see how different levels of variables (e.g., demographic, social-behavioral, and institutional) interact such that the analysis identifies homogenous groups comprised of multiple different variables that are more, or less, at risk for college campus sexual assault. The study looks at four different measures of sexual assault: 1) any type of assault, 2) completed assaults, 3) attempted assaults, and 4) relationship assaults, to determine if the unique social locations of students differentially influenced risk for assault based on the type of assault.

Based on the available survey items, previously cited risk factors, and gaps identified in the literature, several demographic, social-behavioral, and institutional-level variables were included in each model as independent variables of interest. Demographic variables included were: disability status, race, sex, transgender status, gender non-conforming status, sexual orientation, year in school, housing status, veteran status, relationship status, marital status, and age. Social-behavioral variables included in the models were: frequency of alcohol use in prior 30 days, frequency of marijuana use in

prior 30 days, illicit drug use (besides marijuana) in the prior 30 days, binge drinking in the prior two weeks, participation in intramural athletics, club athletics, varsity athletics, work hours per week, volunteer hours per week, and GPA. Finally, a number of institutional-level variables were included: campus size, region, geographic location size, Carnegie classification, type of institution, public vs. private, and students' feelings of safety on campuses, and in surrounding community.

In the original study design, analyses were only going to be conducted on the female subsample. However, it was determined that this may fail to account for the differential experiences of gender non-conforming, trans, or other marginalized students, ultimately making the study less intersectional. Therefore, as part of the analyses, the study sought to document any substantial differences between the entire sample, and the female subsample for each dependent variable. Accordingly, each model was run on the entire sample including all genders and both male and female sexes, as well as on the subsample of only students assigned female sex at birth.

This study was exploratory in that the goal was to incorporate CART as a more intersectional quantitative method to study college campus violence against women, with the hope of identifying specific groups of students that may be at disproportionate risk for sexual assault. However, the study was undertaken with some overarching hypotheses. As being a female is the cited as the biggest risk factor in the majority of college campus sexual assault literature (see, for example, Cantor et al. 2015; Fisher et al. 2010; Krebs et al. 2007; Krebs et al. 2016), the first hypothesis was that being female would be the first, and most important variable in analyses that used the entire sample for all dependent variables measuring sexual assault regardless of the type of assault. The second

hypothesis was that risk factors that have been frequently identified in the literature, particularly frequent alcohol use, and binge drinking, Greek involvement, would be important in all models (see, for example, Cantor et al. 2015; Krebs et al. 2007; Krebs et al. 2016). Additionally, given more recent research that suggests disability status is a risk factor for college campus sexual assault I hypothesized that disability status would be important in all models (Findley, Plummer, and McMahon, 2016; Snyder, 2015). The relative dearth of literature on institutional-level risk factors prevented any specific hypotheses related to institutional-level variables, but overall the thought was that if institutional-level variables became important in any models, these would appear secondarily or further down the tree structure in terms of importance compared to demographic and social-behavioral variables.

Methods

Participants

Participants included 33,512 college students from the Fall of 2016 American College Health Association's National College Health Assessment. This includes respondents from 51 colleges and universities. The majority of participants were female (N=22871), with an average age of 22.13 (SD = 6.0). The racial distribution of the sample was 62.7% White, 5.9% Black, 10.7% Hispanic/Latino(a), 11.6% Asian, 1.8% American Indian, 3.6% Bi/multiracial, and 2.6% identified as Other. Descriptive statistics for all variables used in the analysis can be found in the appendix.

Measures

Sexual assault variables

Sexual assault victimization was constructed by combining responses from three different survey items designed to measure sexual assault victimization within the past 12 months. These items asked the following questions: 1) Was sexual penetration attempted (vaginal, anal, oral) without your consent? 2) Were you sexually penetrated (vaginal, anal, oral) without your consent? 3) Have you been in an intimate (coupled/partnered) relationship that was sexually abusive (e.g., forced to have sex when you didn't want it, forced to perform or have an unwanted sexual act performed on you)? A dummy variable based on responses to the above three survey items was coded 1 if respondents answered yes to one or more of these questions, and 0 if they answered no to all three. All models were also run with the sexual assault broken down into individual variables measuring the three different types of sexual assault asked about on the survey--*completed sexual assault, attempted sexual assault,* and *relationship sexual assault*--where each type of assault was measured independently as a dummy variable (1 = the student had experienced that specific type of assault in the last 12 months, and 0 = the student had not).

Demographic variables

- *Disability status* was constructed from participant responses to nine survey items that ask students whether or not they self-identify as having the following disabilities: 1) Attention Deficit and Hyperactivity Disorder (ADHD), 2) Chronic illness (e.g., cancer, diabetes, auto-immune disorders), 3) Deafness/Hearing loss, 4) Learning disability, 5) Mobility/Dexterity disability, 6) Partial

sightedness/Blindness, 7) Psychiatric condition, 8) Speech or language disorder, or 9) Other disability. For the purposes of this study, the disability variable was collapsed into a binary variable coded 0= No disability, 1= Any disability[1].

- *Race* was included as a categorical variable coded 1=White, 2=Black,3=Hispanic/Latino(a), 4= Asian or Pacific Islander, 5= American Indian, Alaskan Native, or Native Hawaiian, 6= Biracial or Multiracial, 7=Other race.
- *Year in school* was included as an ordinal variable coded 1=1st year undergraduate, 2= 2nd year undergraduate, 3= 3rd year undergraduate, 4=4th year undergraduate, 5= 5th year undergraduate, and 6=Graduate/Professional.
- *Housing* was included as a categorical variable coded 1= campus or residence hall, 2=Fraternity/Sorority house, 3=Other campus housing, 4=parent or guardian's home, 5= other off-campus housing, 6= other.
- *Relationship status* was included as a categorical variable coded 1=not in a relationship, 2= in a relationship, not living together, and 3=in a relationship, living together.
- *Marital status* was a categorical variable coded 1=single, 2=married/partnered, 3=separated, 4=divorced, 5=other.
- *Enrollment status* was included as a dummy variable coded 0=not full time; 1=fulltime

[1] In an attempt to yield more specific results, analyses were also run with disability status as a categorical variable collapsed into four categories, no disability, physical disability, learning disability, and psychiatric disability, with participants who only checked 'other disability' dropped. However, models using the categorical variable split along the same lines as the binary variable, yielding no substantially different results. Therefore, the binary disability status variable was included for ease of interpretation.

- *Gender non-conforming* was a dummy variable that was constructed by coding all students who identified as male or female 0, and all who identified as another gender, 1; the variable was then coded 0=not gender-nonconforming, 1=gender non-conforming.
- *Sexual orientation* was included as a dummy variable coded 0=heterosexual, 1=non-heterosexual.
- *Veteran status* was included as a dummy variable coded 0=non-veteran, and 1=veteran.
- *Transgender status* was included as a dummy variable coded 0= not trans, 1=trans, which was constructed from survey item asking, "Do you identify as transgender?"
- *Sex* was coded 0= non-female, and 1=female, and was derived from the survey item that asks, "What sex were you assigned at birth, such as on an original birth certificate?"
- *Age* was included as a continuous variable.

Social Behavioral Variables

- *Alcohol frequency* was included as an ordinal variable measured by a survey item asking: Within the last 30 days, on how many days did you use alcohol (beer, wine, liquor)? Response categories are 0=Never, 1=Have used, but not in last 30 days, 2=1-2 days, 3=3-5 days, 4=6-9 days, 5=10-19 days, 6=20-29 days, 7=Used daily.

- *Marijuana frequency* was measured using the same response categories as alcohol use frequency. Though federally illegal, marijuana use is legal in many states and therefore was treated as independent from illicit drug use.
- *Illicit drug frequency* combined responses from the survey items that ask: Within the last 30 days, on how many days did you use: Cocaine, Methamphetamine, Other amphetamines, Sedatives, Hallucinogens, Opiates, Inhalants, MDMA, Other club drugs, Other illegal drugs? Response categories are the same as Alcohol Use Frequency and Marijuana Use Frequency.
- *Binge drinking* was included as a dummy variable, was constructed from the survey item asking, "Over the last two weeks, how many times have you had five or more drinks of alcohol in a sitting?", and coded 0=none, 1= any.
- *Varsity, intramural*, or *club athletics*, or membership in a *Greek* organization were included as separate dummy variables coded 0=no participation or membership, and 1= participant or member.
- *Work* and *volunteer* hours per week were included as two separate variables, both categorical and coded, 1=0 hours, 2=1-9 hours, 3=10-19 hours, 4=20-29 hours, 5=30-39 hours, 6=40 hours, and 7= more than 40 hours.
- *GPA* was included and coded 1=A, 2=B, 3=C,4=D/F, 5=N/A.

Institutional Variables

- *Campus size* was included as a categorical variable, is coded 1=less than 2,500, 2=2,500-4,999, 3=5,000-9,999, 4=10,000-19,999, and 5=20,000 or more.
- *Region*, a categorical variable, is coded 1=Northeast, 2=Midwest, 3=South, 4=West, 5=outside U.S.

- *Locale size* was included as a categorical variable, is coded 1= more than 500,000, 2= 250,000-499,999, 3=50,000-249,999, 4=10,000-49,999, 5=2500-9,999, 6= less than 2,500.
- *Carnegie classification* was included as a categorical variable is coded 1= associates' college, 2= baccalaureate college, 3=masters' colleges and universities, 4=doctoral universities, 5=special focus institutions, 6=miscellaneous, and 7=baccalaureate associates colleges.
- *Type of institution* was included as a categorical variable, is coded 1=two year, 2=4 year or more.
- *Public/Private* was included as a categorical variable, is coded 1=public, 2=private.
- Feelings of safety variables were included as well, with *Daytime campus safety*, *Nighttime campus safety*, *Daytime community safety*, and *Nighttime community safety*, all included separately as categorical variables and coded 1=Not safe at all, 2 somewhat unsafe, 3=somewhat safe, and 4=very safe.

Procedure and Analyses

CART analyses were employed using SPSS software. CART offers a cogent method for explaining the ways in which different risk factors are related to the dependent variable, in this case, college campus sexual assault. CART is a partitioning method that identifies the ways in which different variables interact simultaneously, subsequently showing which previously identified risk and/or protective factors are most important for different subgroups (Ross and Kearney 2017; Zhang and Singer 2010). CART partitions data by starting with a parent node, and then splits the parent node into

child nodes using the variable in the model that reduces the variation in the dependent variable the most, then splits each of those child nodes into groups based on the remaining independent variables that reduce variation the most, continuing to do so until there are no more important independent variables (Ross and Kearney 2017). The resulting classification tree then tells a story based on the interactions of the independent variables. While traditional regression techniques can also tell a story, CART can be much more specific, identifying which variables and at what level are important for different groups of people.

Multiple classification trees were run in an iterative process to identify which demographic, social-behavioral, and institutional-level variables best predict[2] any type of sexual assault, completed sexual assault, attempted sexual assault, and relationship sexual assault when considered concurrently. Importance is determined by which independent variable created the greatest Gini improvement score, or the most reduction in variability. First, with the full sample, all the variables were put into a separate CART analysis for each dependent variable--any type of sexual assault, completed sexual assault, attempted sexual assault, and relationship sexual assault--to see which variables remain important when all variables in each category are considered simultaneously and in relation to one another. The process was then repeated using just the subsample of female students. This process resulted in a total of eight regression trees. Missing observations in all parent nodes were < = .6% of the sample, and creating surrogates or using multiple imputation

[2] Although the data being used in the analyses is cross-sectional and therefore predicting outcomes is not possible, the term 'predict' and variations of that term is standard practice in CART even when using cross-sectional data (Ma 2018). Therefore, the present study uses the term when explicating the analyses throughout the paper.

would not yield significantly different results, as such missing observations were dropped.

Balancing and Pruning the Data

In classification analysis, the algorithm tends toward classifying observations with the majority category in the root node; therefore, datasets with highly unbalanced categories, such as the one used for the present study, require a balance correction (Breiman, Friedman, Olshen, and Stone 1984; Ma 2018). Balancing the data is much of a trial-and-error process, and there are no hard-and-fast rules as to how this is done. The present study chose to avoid over- and under-sampling, as part of the aim of the analyses was to identify unique groups of college students that are disproportionately experiencing sexual assault. Over- or under-sampling would balance the data but would not yield easily interpretable proportions or Gini coefficients. Additionally, while over- or under-sampling may also produce a lower risk estimate, or higher accuracy of prediction outside the sample, the sample being used in this analysis is not random or representative of all U.S. college students. Therefore, the goal of the analysis is not necessarily generalizability, but rather to explore what unique social locations emerge within the sample as disproportionately at risk for sexual assault to suggest avenues for more intersectional quantitative research on college campus sexual assault in the future. Thus, the analyses used a combination of incorporating costs and priors. Costs apply a penalty to the algorithm if it misclassifies a certain observation. Priors take into consideration prior knowledge about the proportion of each category included in the root node and which informs the algorithm as it classifies each observation (Ma, 2018).

For each model, then, costs were applied in SPSS if the model misclassified those that were observed to have experienced sexual assault, as having not been sexually assaulted. While there is no statistical way to calculate what cost should be applied to each misclassification, generally, the larger the imbalance in the categories of the dependent variable, the higher the cost will need to be (see, Breiman et al. 1984 and Ma 2018, for more information on costs and priors). For each model, the penalty weight was decided such that the majority of participants that did experience sexual assault were classified as such, the majority of participants who did not experience sexual assault were classified as such, and the majority of total observations were correctly classified. Additionally, priors were included in each model to inform the model as to the approximate percentage of observations that should be classified as having experienced sexual assault. These were chosen based on the number of reported assaults in the sample data, therefore priors indicating that approximately 5% of students reported experiencing sexual assault, and 95% did not were inputted into SPSS to inform each model.

However, when applying costs and priors, the percent correctly classified for those who were sexually assaulted (the minority group) goes up and the percent correctly classified for those who were not (the majority group) goes down. Deciding whether or not a model is 'good' based on percent correctly classified is complicated because a model could be correctly classifying 98% of cases, but be misclassifying every case in the minority category of the dependent variable, which makes the model useless. However, with CART being relatively new to the social sciences, a search was conducted for other social and behavioral science research studies to compare the present study's results to models that were published in reputable peer-reviewed journals. Both percent

correctly classified, and the models accuracy in prediction outside the sample were examined for comparison to the present study. The majority of the results were studies from the medical field, but three studies related to post-traumatic stress, school absenteeism (see, Skedgell and Kearney 2018; Ross and Kearny 2017) and child maltreatment were reviewed (Sledjeski et al. 2008). Skedgell and Kearney's (2018) study examining predictors of school absenteeism, published in *Children and Youth Services Review,* had models with prediction accuracy ranging from 67%-69.5%, and percent correctly classified ranging from 74.1-82.7%. Ross and Kearny's (2017) study examining predictors for posttraumatic symptoms in maltreated youth, published in *Child Abuse and Neglect,* obtained models with prediction accuracy ranging from 64%-71%, and their study did not report percent correctly classified. The study by Sledjeski and colleagues (2008) published in *Prevention Science*, obtained two models with 65%, and 87% of cases correctly classified, with prediction accuracy scores of 64% and 74%. Each model in the present study had comparable prediction accuracy and percent correctly classified. In addition to the risk estimate and overall percentage correctly classified, to provide more information as to the quality of each model, a pseudo R-squared for each model was also calculated to show how much better the classification tree is than a null tree (Ma 2018).

One common limitation of CART analysis is overfitting. Post-pruning, which the present study used, is one way to avoid overfitting, where each model is allowed to grow until the impurity standard (.0001) is met in each split, there is fewer than the minimum number of observations set for continued growth (50), or the maximum tree depth has

been reached (4) (Ma 2018)[3]. Then the tree is pruned to the smallest sub tree with an acceptable amount of risk (+/- 1 standard error of the minimum error) (IBM 2013; Ma 2018). Post-pruning, essentially, provides more succinct and simpler trees, which aids in the analysis of the tree and helps avoid spurious importance in regression trees. Another limitation of CART is that each model may be highly sensitive, meaning changing specification of the model, omitting or adding variables, or outliers in the data have the potential to alter results greatly. Thus, all models were cross-validated, meaning the model is run on random subsamples to test the model and make sure the model is robust, before pruning. Additional models were run with different variables omitted after post-pruning as a second check for robustness.

RESULTS

All Types of Sexual Assault: Full Sample

The results are presented such that each tree is presented first using the full dataset and then using only the females to highlight any differences in the tree composition between the full sample and the subsample of female students. Each tree is followed by a table presenting IF-THEN rules table for each model. An IF-THEN rules table explains what the probability is for the dependent variable, in this case sexual assault, for the specific population listed. For instance, in table 1.1 we see that if the student is *female* and has *ever used marijuana* (node 4) her probability of experiencing any type of sexual assault in the prior 12 months was 10.0%. Following each IF-THEN

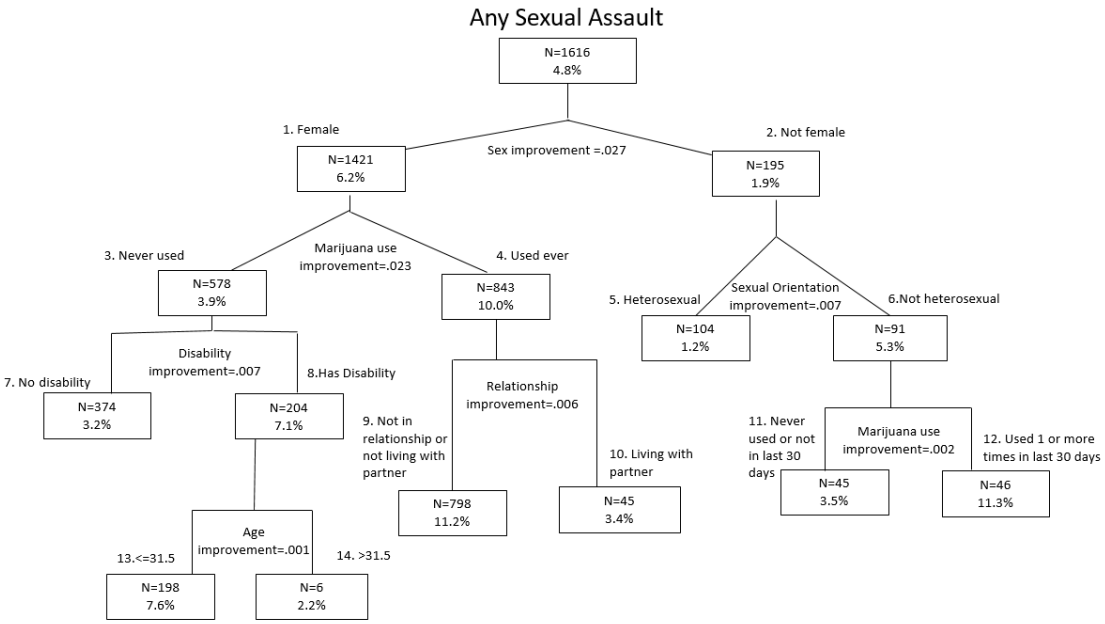
[3] The automatic maximum depth of a classification tree is 5 unless otherwise specified. The present study used a maximum depth of 4 in each model for tree simplicity, and because a depth of 5 seemed to produce a problem of overfitting despite pruning.

table, a table showing specific populations that are disproportionately at risk for sexual assault victimization is provided.

All Types of Sexual Assault: Entire Sample

The first tree utilizes the full sample and any type of sexual assault victimization as the dependent variable. Figure 4: Model 1 below identified six predictors that best differentiated between those students who experienced *any type of sexual assault*: 1) *sex,* 2) *marijuana frequency*, 3) *sexual orientation,* 4) *disability,* 5) *relationship status*, and 6) *age*. The model's accuracy in predicting whether a college student outside this sample will be sexually assaulted was 68.3% (r=.317; SE=.002). The model correctly classified 71.0% of all students in the sample. The pseudo R-squared was .717, meaning the model can be interpreted as 71.7% better than a null model. In other words, model one explains the variance in any college campus sexual assault 71.7% better than a model with no important variables (Ma 2018). Eight subgroups (identified by the terminal nodes) with varied risk for experiencing *any type of sexual assault* emerged. Model one below shows the tree structure. Between each split the Gini improvement is listed for the variable being split, inside each node the number (N) of observations that experienced sexual assault is presented, and the percentage of the population represented by that node that experienced assault. For example, in node 3,578 students who are *female*, and *have never used marijuana* were sexually assaulted. Those 578 students account for 3.9% of all students in the sample who are female and have never used marijuana.

Figure 4:Model 1



The IF-THEN rules regarding a college student's probability of experiencing *any type of sexual assault* in the prior 12 months using the entire sample are presented in Table 4. The split that best differentiated college students who experienced assault (root node) was *sex* (Gini improvement =.027). Subsequent splits included *marijuana frequency* (Gini improvement = .023; .002[4]), *sexual orientation* (Gini improvement= .007), *disability status* (Gini improvement= .007), *relationship status* (Gini improvement= .006), and *age* (Gini improvement=.001).

[4] Gini improvement scores are listed together, consecutively, for variables that appear more than once in the trees.

Table 4: IF-THEN Rules for the Probability of Experiencing Some Type of Sexual Assault in the Prior 12 Months Using Full Sample

	IF	THEN
Node 2	Not female	1.9% probability
Node 5	Not female AND Heterosexual	1.2% probability
Node 6	Not female AND Not Heterosexual	5.3% probability
Node 11	Not female AND Not Heterosexual AND Never used marijuana or not in prior 30 days	3.4% probability
Node 12	Not female AND Not Heterosexual AND Used marijuana 1 or more times in past 30 days	11.3% probability
Node 1	Female	6.2% probability
Node 4	Female AND Used marijuana ever	10.0% probability
Node 9	Female AND Used marijuana ever AND Not in a relationship, or not living with partner	11.2% probability
Node 10	Female AND Used marijuana ever AND In a relationship living together	3.4% probability
Node 3	Female AND Never used	3.9% probability
Node 7	Female AND Never used AND No disability	3.2% probability
Node 8	Female AND Never used AND Has disability	7.1% probability
Node 13	Female AND Never used AND Has disability AND <=31.5 years	7.6% probability
Node 14	Female AND Never used AND Has disability AND >31.5 years	2.2% probability

Terminal nodes are in bold face type.

Students identified as being disproportionately at risk for experiencing sexual assault are presented in Table 5. Disproportionate risk was determined by comparing how much of the total sample population a specific population accounted for, to the percentage of sexual assaults that same specific population accounted for. If a specific population was over-represented in sexual assault victimization by double, or close to double, that of their percent of the total sample, that group was deemed to be at a high disproportionate risk for sexual assault. For example, in Table 5, females who have ever used marijuana account for approximately 25% of the sample, but account for over 50% of any sexual assault.

Table 5:Students at Disproportionate Risk for Any Sexual Assault

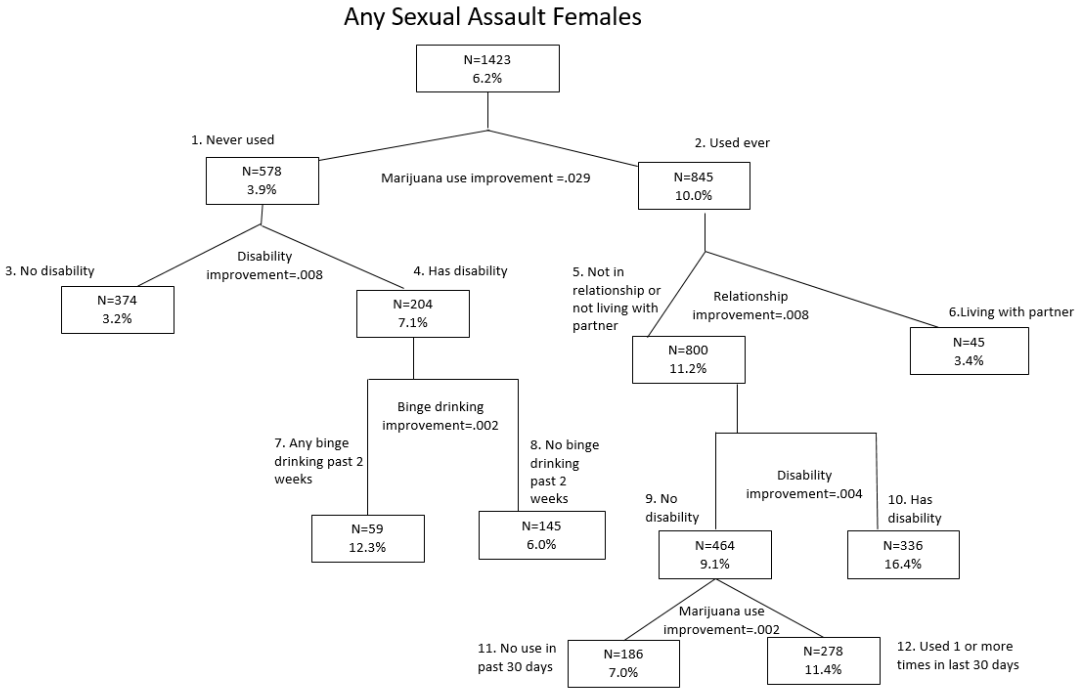
Specific Student Population	% Sample	% SA Victims
Not female AND Not Heterosexual AND Used marijuana 1 or more times in past 30 days	1.2%	2.8%
Female AND Used marijuana ever	25.3	52.2%
Female AND Use marijuana ever AND Not in a relationship or not living with partner	21.4%	49.4%

All Types of Sexual Assault: Female Subsample

The second tree utilizes the subsample of female students only and *any type of sexual assault* victimization as the dependent variable. The entire model is very similar to the female branch of the full sample, but *binge drinking* becomes important, and *age* is not important in this model. Model two below identified four predictors that best differentiated between those female students who experienced *any type of sexual assault*: 1) *marijuana frequency*, 2) *disability*, 3) *relationship status*, and 4) *binge drinking*. The

model's accuracy in predicting whether a female college student outside this sample will be sexually assaulted was 66.6% (r=.342; SE=.003). The model correctly classified 78.1% of all students in the sample and the pseudo R-squared was .710. Seven subgroups (identified by the terminal nodes) with varied risk for experiencing *any type of sexual assault* emerged.

Figure 5: Model 2



The IF-THEN rules regarding a college student's probability of experiencing *any type of sexual assault* using the female sub-sample are presented in Table 6. The split that best differentiated college students who experienced assault (root node) was *marijuana frequency* (Gini improvement =.029; .002). Subsequent splits included *disability status*

(Gini improvement = .008; .004), *relationship status* (Gini improvement= .008), *binge drinking* (Gini improvement= .002).

Table 6:IF-THEN Rules for the Probability of Experiencing Some Type of Sexual Assault in the Prior 12 Months Using Female Subsample

	IF	THEN
Node 1	Never used marijuana	3.9% probability
Node 3	Never used AND No disability	3.2% probability
Node 4	Never used AND Has disability	7.1% probability
Node 7	Never used and Has Disability AND Binge drank 1 or more times in prior 2 weeks	12.3% probability
Node 8	Never used and Has Disability AND No binge drinking in prior 2 weeks	6.0% probability
Node 2	Used marijuana ever	10.0% probability
Node 6	Used marijuana ever AND In a relationship living together	3.4% probability
Node 5	Used marijuana ever AND Not in a relationship, or not living with partner	11.2% probability
Node 10	Used marijuana ever AND Not in a relationship, or not living with partner AND Has disability	16.4% probability
Node 9	Use marijuana ever AND Not in a relationship, or not living with partner AND No disability	9.1% probability
Node 11	Use marijuana ever AND Not in a relationship, or not living with partner AND No disability AND Did not use marijuana in the past 30 days	7.0% probability
Node 12	Use marijuana ever AND Not in a relationship, or not living with partner AND No disability AND Used marijuana 1 or more times in the past 30 days	11.4% probability

Terminal nodes in bold face type.

Categories of female students identified as being disproportionately at risk for experiencing sexual assault are shown in Table 7. Female students whose proportion of sexual assault was double or near double their total proportion of the sample were included.

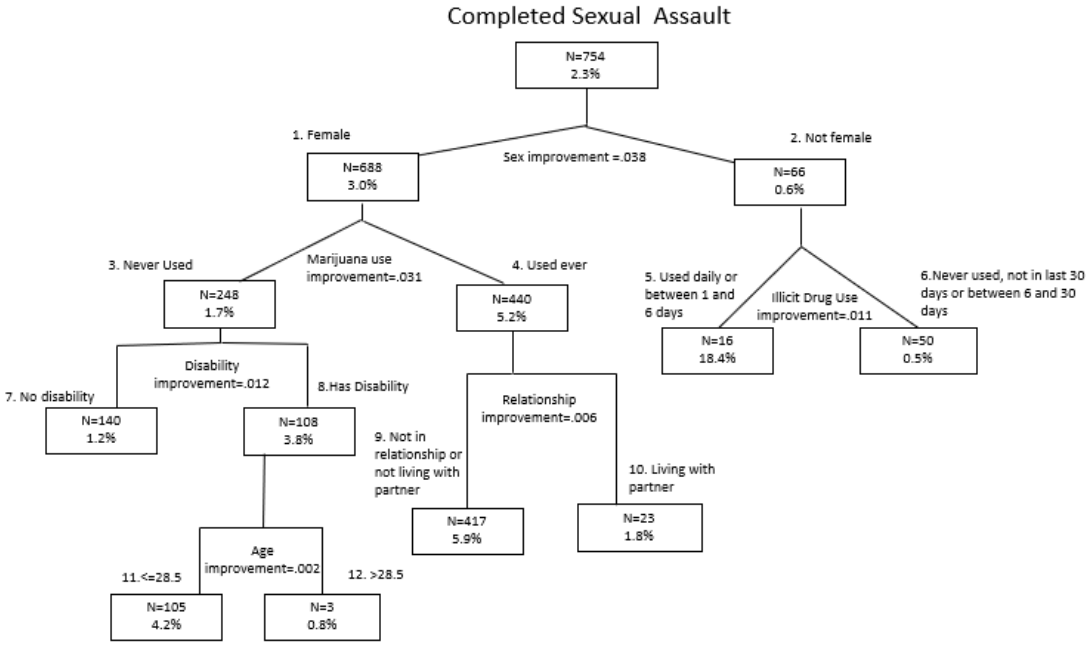
Table 7: Female Students at Disproportionate Risk for All Types of Sexual Assault (SA)

Specific Student Population	% Sample	%SA Victims
Used marijuana ever AND Not in a relationship, or not living with partner AND Has disability	8.9%	23.6%
Never used marijuana AND Has Disability AND Binge drank 1 or more times in the prior 2 weeks	2.1%	4.1%

Completed Sexual Assaults: Entire Sample

Model three, with only *completed sexual assaults* as the dependent variable and using the full sample, identified six predictors that best differentiated students who experienced a completed sexual assault: 1) *sex*, 2) *marijuana frequency*, 3) *illicit drug frequency*, 4) *disability status*, 5) *relationship status*, and 6) *age*. Model three was similar to model one using the entire sample, but *sexual orientation* was no longer important for non-females, and *illicit drug frequency* became important. The model's accuracy in predicting whether a college student outside this sample will be a victim of a completed sexual assault is 72.6% (r=.284; SE=.003). The model correctly classifies 71.2% of all students and has a pseudo R-squared of .743. Seven subgroups of students with varied risk for experiencing a *completed sexual assault* emerged.

Figure 6: Model 3



The IF-THEN rules regarding a college students' probability of experiencing a *completed sexual assault* using the full sample are presented in Table 8. The split that best differentiated college students that experienced assault (root node) was *sex* (Gini improvement =.038). Subsequent splits included *marijuana frequency* (Gini improvement= .031), *illicit drug frequency* (Gini improvement= .011), *disability status* (Gini improvement= .012); *relationship status* (Gini improvement=.006), and *age* (Gini improvement=.002).

Table 8: IF-THEN Rules for the Probability of Experiencing a Completed Assault (CSA) in the Prior 12 Months Using Full Sample

	IF	THEN
Node 2	Not female	0.6% probability
Node 5	Not female and Used illicit drugs between 1-9 days, or daily	18.4% probability
Node 6	Not female and Used illicit drugs Never, used but not in last 30 days, or between 10-29days	0.5% probability
Node 1	Female	3.0% probability
Node 4	Female AND Used marijuana ever	5.2% probability
Node 9	Female AND Used marijuana ever AND Not in a relationship or not living with partner	5.9% probability
Node 10	Female AND Used marijuana ever AND In a relationship living with partner	1.8% probability
Node 3	Female and Never used	1.7% probability
Node 7	Female AND Never used AND No disability	1.2% probability
Node 8	Female AND Never used AND Has disability	3.8% probability
Node 11	Female AND Never used AND Has disability AND <=28.5	4.2% probability
Node 12	Female AND Never used AND Has disability AND >28.5	0.8% probability

Terminal nodes in bold face type.

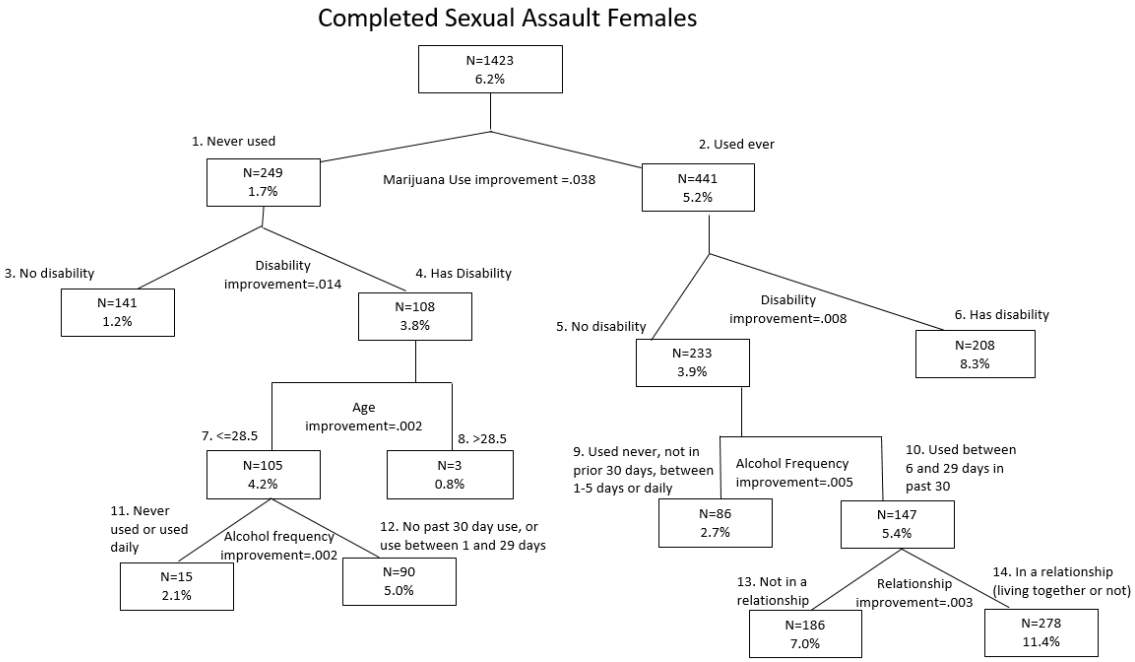
College students identified as being disproportionately at risk for experiencing completed sexual assault are presented in Table 9. Students whose proportion of sexual assault was double or near double that of their total proportion of the sample population were included.

Table 9: Students at Disproportionate Risk for Completed Sexual Assault (CSA)		
Specific Student Population	% Sample	% CSA Victims
Not female and Used illicit drugs between 1-9 days, or daily	0.3%	2.1%
Female and Used marijuana ever	25.3%	58.3%
Female and Used marijuana ever AND Not in a relationship or not living with partner	21.4%	55.3%
Female AND Never used AND Has disability AND <28.5	7.6%	13.9%

Completed Sexual Assault: Female Sub-Sample

Model four, using the subsample of female students with only *completed sexual assaults* as the dependent variable, identified three predictors that best differentiated students who experienced a completed sexual assault: 1) *marijuana frequency*, 2) *disability*, and 3) *alcohol frequency*. Again, the model using the subsample, looked much like the female branch of the model using the full sample; however, *alcohol frequency* becomes important. The model's accuracy in predicting whether a college student outside this sample will be a victim of a completed sexual assault is 68.3% (r=.317; SE=.004). The model correctly classifies 75.5% of all students and has a pseudo R-squared of .704. Eight subgroups of students with varied risk for experiencing a *completed sexual assault* emerged.

Figure 7: Model 4



The IF-THEN rules regarding a female college student's probability of experiencing a completed sexual assault using the full sample are presented in Table 10. The split that best differentiated college students who experienced assault (root node) was *marijuana frequency* (Gini improvement =.038). Subsequent splits included *disability status* (Gini improvement = .014; .008), *age* (Gini improvement= .002), *alcohol frequency* (Gini improvement= .005; .002), and *relationship status* (Gini improvement=.003).

Table 10: IF-THEN Rules for the Probability of Experiencing a Completed Assault (CSA) in the Prior 12 Months Using Female Sub-sample

	IF	THEN
Node 1	Never used marijuana	1.7% probability
Node 3	Never used marijuana AND No disability	1.2% probability

Table 10 (continued)

Node 4	Never used marijuana AND Has disability	3.8% probability
Node 8	Never used marijuana AND Has disability AND >28.5	0.8% probability
Node 7	Never used marijuana AND Has disability AND <=28.5	4.2% probability
Node 11	Never used marijuana AND Has disability AND <=28.5 AND Never used alcohol or used daily4F[5]	2.1% probability
Node 12	Never used marijuana AND Has disability AND <=28.5 AND Used alcohol ever, or between 1 and 29 days in the prior 30 days	5.0% probability
Node 2	Used marijuana ever	5.2% probability
Node 6	Used marijuana ever and Has disability	8.3% probability
Node 5	Used marijuana ever and No disability	3.9% probability
Node 9	Used marijuana ever and No disability AND Used alcohol Never, not in the last 30 days, between 1-5 days or daily in the prior 30 days	2.7% probability
Node 10	Used marijuana ever and No disability AND Used alcohol between 6 and 29 days in the prior 30 days	5.4% probability
Node 13	Used marijuana ever and No disability AND Used alcohol between 6 and 29 days in the prior 30 days AND Not in a relationship	7.2% probability
Node 14	Used marijuana ever and No disability AND Used alcohol between 6 and 29 days in the prior 30 days AND In a relationship (living together or not)	3.3% probability

Terminal nodes in bold face type.

[5] The total number of students that experienced completed assaults, had a disability, were younger than 28.5 years, and drank daily was 6, therefore it could be that drinking daily does increase the risk of completed assault, but there were not enough observations to correctly identify this specific population.

Female college students identified as being disproportionately at risk for experiencing *completed sexual assault* are presented in Table 11. Students whose proportion of sexual assault was double or near double that of their total proportion of the sample population were included.

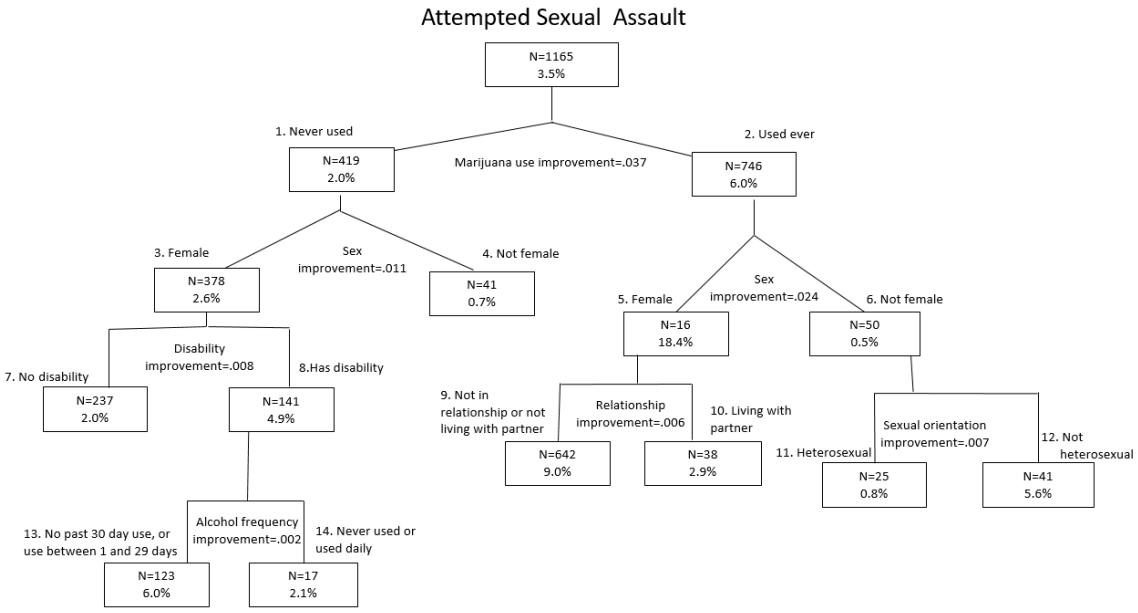
Table 11: Female Students at Disproportionate Risk for Attempted Sexual Assault (CSA)

Specific Student Population	% Sample	% CSA Victims
Have used marijuana ever	36.7%	63.9%
Never used marijuana AND Has disability	10.9%	30.1%
Used marijuana ever and No disability AND Used alcohol between 6 and 29 days in the prior 30 days AND Not in a relationship	6.3%	15.2%

Attempted Assaults: Entire Population

Model five, using the full sample with only *attempted sexual assaults* as the dependent variable, identified six predictors that best differentiated students who experienced attempted sexual assault: 1) *marijuana frequency*, 2) sex, 3) *disability status*, 4) *relationship status*, 5) *sexual orientation*, and 6) *alcohol frequency*. The model's accuracy in predicting whether a college student outside this sample will be a victim of an *attempted sexual assault* is 70.6% (r=.294; SE=.002). The model correctly classifies 71.6% of all students and has a pseudo R-squared of .732. Eight subgroups of students with varied risk for experiencing an *attempted sexual assault* emerged.

Figure 8: Model 5



The IF-THEN rules regarding a college student's probability of experiencing an *attempted sexual assault* using the full sample are presented in Table 12. The split that best differentiated college students who experienced assault (root node) was *marijuana frequency* (Gini improvement =.037). Subsequent splits included *sex* (Gini improvement = .011; .024), *disability status* (Gini improvement= .008), *relationship status* (Gini improvement=.006), *sexual orientation* (Gini improvement=.007), and *alcohol frequency* (Gini improvement .002).

Table 12: IF-THEN Rules for the Probability of Experiencing an Attempted Sexual Assault (ASA) in the Prior 12 Months Using Full Sample

	IF	THEN
Node 1	Never used marijuana	2.0% probability
Node 4	Never used marijuana AND Not female	0.7% probability
Node 3	Never use marijuana AND Female	2.6% probability
Node 7	Never use marijuana AND Female AND No disability	2.0% probability
Node 8	Never use marijuana AND Female AND Has disability	4.9% probability
Node 13	Never use marijuana AND Female AND Has disability AND used alcohol ever, or between 1 and 29 days in the prior 30 days	6.0% probability
Node 14	Never use marijuana AND Female AND Has disability AND Never used alcohol or used daily	2.1% probability
Node 2	Used marijuana ever	6.0% probability
Node 5	Used marijuana ever AND Female	8.1% probability
Node 9	Used marijuana ever and Female AND Not in a relationship or not living with partner	9.0% probability
Node 10	Used marijuana ever and Female AND In a relationship living together	2.9% probability
Node 6	Used marijuana ever AND Not female	1.6% probability
Node 11	Used marijuana ever AND Not female AND heterosexual	0.8%probability
Node 12	Used marijuana ever AND Not female AND Not heterosexual	5.6% probability

Terminal nodes in bold face type.

College students identified as being disproportionately at risk for *experiencing attempted sexual assault* are presented in Table 13. Students whose proportion of sexual assault was double or near double that of their total proportion of the sample population were included.

Table 13: Students at Disproportionate Risk for Attempted Sexual Assault

Specific Student Population	% Sample	% ASA Victims
Used marijuana ever AND Female	25.3%	58.4%
Used marijuana ever AND Female AND Not in a relationship or not living with partner	21.4%	55.1%

Female Students: Attempted Assaults

Model six, using the female subsample with *attempted sexual assaults* as the dependent variable, becomes more complicated. The model identified five predictors that best differentiated students who experienced an *attempted sexual assault*: 1) *marijuana frequency,* 2) *disability status,* 3) *relationship status,* 4) *alcohol frequency,* and 5) *age.* The model's accuracy in predicting whether a college student outside this sample will be a victim of an *attempted sexual assault* is 67.9% (r=.321; SE=.003). The model correctly classifies 72.5% of all female students and has a pseudo R-squared of .712. Ten subgroups of students with varied risk for experiencing an *attempted sexual assault* emerged.

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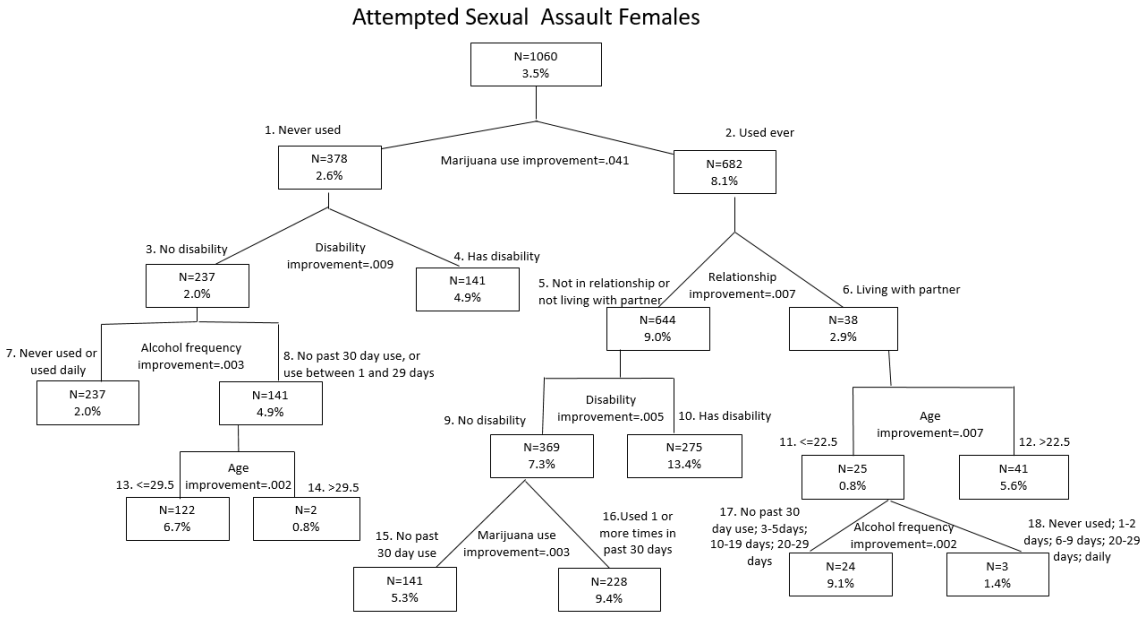
Figure 9: Model 6



The IF-THEN rules regarding a female college student's probability of experiencing an attempted sexual assault using the female sub-sample are presented in Table 14. The split that best differentiated college students who experienced assault (root node) was *marijuana frequency* (Gini improvement =.041). Subsequent splits included *disability status* (Gini improvement= .009; .005), *relationship status* (Gini improvement=.007), *alcohol frequency* (Gini improvement=.003; .002), and *age* (Gini improvement=.007; .002).

Table 14: IF-THEN Rules for the Probability of Experiencing an Attempted Sexual Assault (ASA) in the Prior 12 months Using Female Subsample

	IF	THEN
Node 2	Used marijuana ever	8.1% probability
Node 5	Use marijuana ever AND Not in a relationship or not living with partner	9.0% probability

Table 14 (continued)

Node 10	Use marijuana ever AND Not in a relationship or not living with partner AND Has disability	13.4% probability
Node 9	Use marijuana ever AND Not in a relationship or not living with partner AND No disability	7.3% probability
Node 15	Use marijuana ever AND Not in a relationship or not living with partner AND No disability AND Did not use marijuana in prior 30 days	5.3% probability
Node 16	Use marijuana ever AND Not in a relationship or not living with partner AND No disability AND Used marijuana between 1 day and daily in prior 30 days	9.4% probability
Node 6	Used marijuana ever AND In a relationship living together	2.9% probability
Node 12	Used marijuana ever AND In a relationship living together AND > 22.5 years old	1.3% probability
Node 11	Used marijuana ever AND In a relationship living together AND <= 22.5 years old	5.6% probability
Node 17	Used marijuana ever AND In a relationship living together AND <= 22.5 years old AND Used alcohol between 3-5 days, 10-19 days, or have not used in prior 30 days	9.1% probability
Node 18	Used marijuana ever AND In a relationship living together AND <= 22.5 years old AND Never used alcohol, used between 1-2 days, 6-9 days, 20-29 days, or daily	1.4% probability
Node 1	Never used marijuana	2.6% probability
Node 3	Never used marijuana AND No disability	2.0% probability
Node 4	Never used AND Has disability	4.9% probability
Node 7	Never used and Has disability AND Never used alcohol, or used daily in prior 30 days	2.1% probability

Table 14 (continued)

Node 8	Never used and Has disability AND Used alcohol between 1 and 29 days in prior 30 days	4.1% probability
Node 13	Never used and Has disability AND Used alcohol between 1 and 29 days in prior 30 days AND <=29.5	6.7% probability
Node 14	Never used and Has disability AND Used alcohol between 1 and 29 days in prior 30 days AND >29.5	0.8% probability

Terminal nodes in bold face type.

Female college students identified as being disproportionately at risk for experiencing *attempted sexual assault* are presented in Table 15. Students whose proportion of sexual assault was double or near double that of their total proportion of the sample population were included.

Table 15: Female students at Disproportionate Risk for Attempted Sexual Assault (ASA)

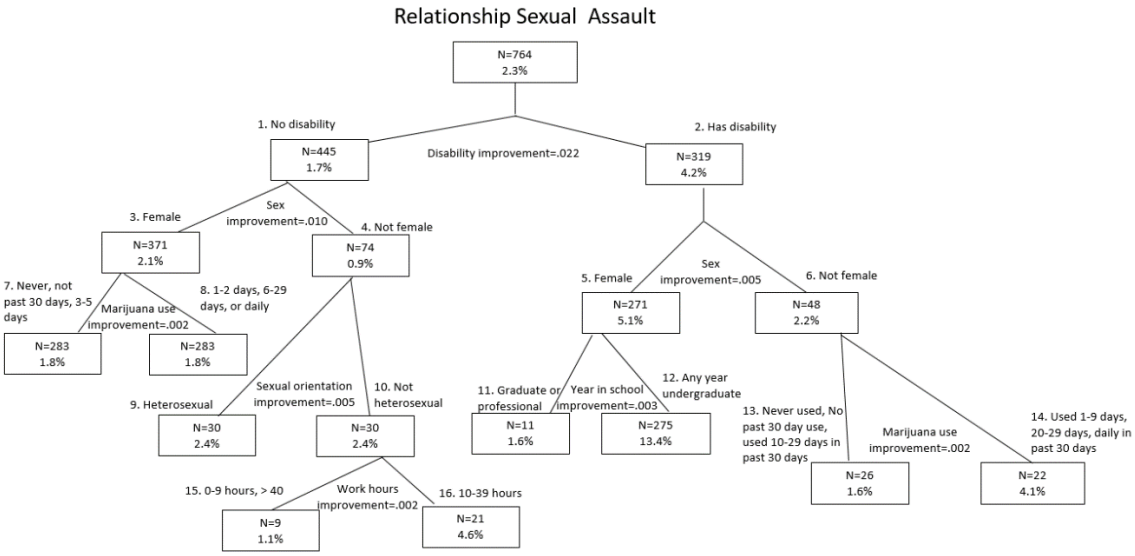
Specific Student Population	% Sample	% ASA Victims
Use marijuana ever AND Not in a relationship or not living with partner	31.0%	60.8%
Use marijuana ever AND Not in a relationship or not living with partner AND Has disability	8.9%	25.9%
Use marijuana ever AND Not in a relationship or not living with partner AND No disability AND Used marijuana between 1 day and daily in prior 30 days	10.6%	21.5%

Relationship Assault: Full Sample

Model seven, using the full sample with only *relationship sexual assault* as the dependent variable, identified six predictors that best differentiated students who experienced a *relationship sexual assault*: 1) *disability status*, 2) *sex*, 3) *marijuana*

frequency, 4) *sexual orientation*, 5) *year in school*, and 6) *hours worked per week*. The model's accuracy in predicting whether a college student outside this sample will be a victim of a relationship sexual assault is 64.9% (r=.351; SE=.002). The model correctly classifies 76.5% of all students and has a pseudo R-squared of .664. Nine subgroups of students with varied risk for experiencing a *relationship sexual assault* emerged.

Figure 10: Model 7



The IF-THEN rules regarding college students' probability of experiencing a *relationship sexual assault* using the entire sample are presented in Table 16. The split that best differentiated college students who experienced assault (root node) was *disability status* (Gini improvement =.022). Subsequent splits included *sex* (Gini improvement= .010; .005), *sexual orientation* (Gini improvement=.005), *marijuana frequency* (Gini improvement=.002; .002), *year in school* (Gini improvement=.003), and approximate *work hours* (Gini improvement= .002).

Table 16: IF-THEN Rules for the Probability of Experiencing a Relationship Sexual Assault (RSA) in the Prior 12 Months Using Full Sample

	IF	THEN
Node 2	Has disability	4.2% probability
Node 5	Has disability AND Female	5.1% probability
Node 11	Has disability AND Female AND Graduate/professional student	1.6% probability
Node 12	Has disability AND Female AND 1st-5th or more years undergraduate student	5.6% probability
Node 6	Has disability and Not female	2.2% probability
Node 13	Has disability and Not female AND Never used marijuana or not in past 30 days, or 10-19 days in prior 30 days	1.6% probability
Node 14	Has disability and Not female AND used between 1 and 9 days or 20-29 days and daily in prior 30 days	4.1% probability
Node 1	No disability	1.7% probability
Node 3	No disability AND Female	2.1% probability
Node 7	No disability AND Female and Used marijuana Never, or not in past 30 days or between 3-5days in prior 30 days	1.8% probability
Node 8	No disability AND Female AND Used marijuana 1-2 days, or between 6 days and daily in prior 30 days	4.0% probability
Node 4	No disability AND Not female	0.9% probability
Node 9	No disability AND Not female AND Heterosexual	0.6% probability

Table 16 (continued)

Node 10	No disability AND Not female AND Not heterosexual	2.4% probability
Node 15	No disability AND Not female AND Not heterosexual AND worked between 0 and 9 hours or 40+ hours per week	1.1% probability
Node 16	No disability AND Not female AND Not heterosexual AND worked between 10-29 hours per week	4.6% probability

Terminal nodes in bold face type.

College students identified as being disproportionately at risk for experiencing *relationship sexual assault* are presented in Table 17. Students whose proportion of sexual assault was double or near double that of their total proportion of the sample population were included.

Table 17: Students at Disproportionate Risk for Relationship Sexual Assault (RSA)

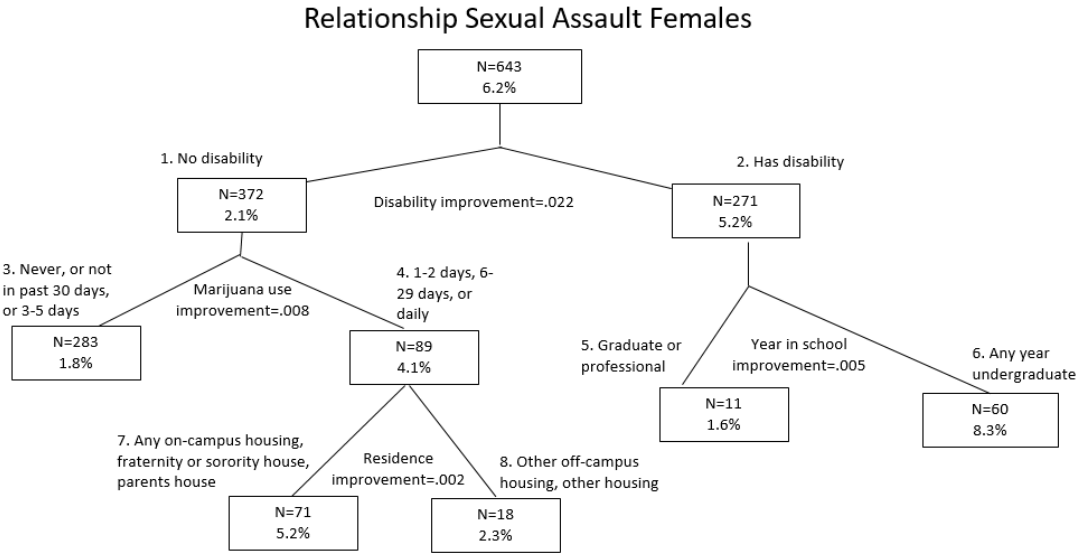
Specific Student Population	% Sample	% RSA Victims
Has disability	22.7%	41.8%
Has disability AND Female	16.1%	35.5%
Has disability AND Female AND 1^{st}-5^{th} year undergraduate	14.0%	34.0%

Female Students: Relationship Assaults

Model eight, using the female subsample with only *relationship sexual assaults* as the dependent variable, identified four predictors that best differentiated students who experienced a relationship sexual assault: 1) *disability*, 2) *marijuana frequency*, 3) *year in school*, and 4) *residence*. The model's accuracy in predicting whether a college student outside this sample will be a victim of a *relationship sexual assault* is 64.0% (r=.360;

SE=.003). The model correctly classifies 73.9% of all students and has a pseudo R-squared of .658. Five subgroups of students with varied risk for experiencing a *relationship sexual assault* emerged.

Figure 11: Model 8



The IF-THEN rules regarding college students' probability of experiencing a relationship sexual assault using the female sub-sample are presented in Table 18. The split that best differentiated college students who experienced assault (root node) was *disability status* (Gini improvement =.022). Subsequent splits included *marijuana frequency* (Gini improvement= .008), *year in school* (Gini improvement .005), and *residence* (Gini improvement .002).

Table 18: IF-THEN Rules for the Probability of Experiencing a Relationship Assault in the Prior 12 Months Using Female Subsample

	IF	THEN
Node 2	Has disability	5.1% probability
Node 5	Has disability AND Graduate/professional student	1.6% probability
Node 6	Has disability and 1st-5th or more year undergraduate student	5.6% probability
Node 1	No disability	2.1% probability
Node 3	No disability AND Never used marijuana or not in past 30 days, or used 3-5 days	1.8% probability
Node 4	No disability AND Used marijuana 1-2 days, or between 6 days and daily	4.1% probability
Node 7	No disability AND Used marijuana 1-2 days, or between 6 days and daily AND Lives on campus at parent or guardian's home, or in a Fraternity/Sorority house	5.2% probability
Node 8	No disability AND Used marijuana 1-2 days, or between 6 days and daily AND Lives off campus or in "other" housing	2.2% probability

Terminal nodes in bold face type.

Female college students identified as being disproportionately at risk for experiencing *relationship sexual assault* are presented in Table 19. Students whose proportion of sexual assault was double or near double that of their total proportion of the sample population were included.

Table 19: Female students at Disproportionate Risk for Relationship Sexual Assault (RSA)

Specific Student Population	% Sample	% RSA Victims
Has disability	23.3%	42.1%
Has disability AND Drank alcohol between 10-29 days, daily, or has used alcohol but not in prior 30 days	7.1%	19.0%
Has disability and 1st-5th or more years undergraduate student	20.3%	40.4%
No disability AND Used marijuana 1-2 days, or between 6 days and daily AND Lives on campus at parent or guardian's home, or in a Fraternity/Sorority house	5.9%	11.0%

DISCUSSION

The results of the present study were mixed in support of the hypotheses. Hypothesis one, that being female would be the most important variable in each tree, in every model that used the entire sample including all genders and sexes, was only partially supported. Sex did emerge as the most important characteristic, for Models one and three, which used any sexual assault, and completed sexual assault as the dependent variable. These models aligned with the literature that suggests being female is the biggest risk factor for college campus sexual assault. Surprisingly though, for attempted assaults, marijuana use emerged as the most important variable, followed by sex. Likewise, for relationship assault, disability status was the most important variable, followed by sex.

Disability status emerging as the most important variable in relationship sexual assault is somewhat less unexpected than marijuana being the most important variable for attempted sexual assaults as the literature does suggest that all types of abuse against

those with disabilities, including sexual abuse, is most commonly perpetrated by a partner (Plummer and Findley 2012). It may be that even though women with disabilities are disproportionately victims of relationship ship sexual assault compared to men, and the results of the present study would suggest, that when sex and disability status are considered simultaneously, that disability is more influential in predicting relationship assaults. This may be due to the qualitatively different context in which relationship and stranger, or acquaintance sexual assault occur. Those that perpetrate relationship sexual assault may be actively seeking out vulnerable victims. While those that perpetrate stranger, or acquaintance rape on college campuses, or against college students may also be seeking out vulnerable victims, that vulnerability may be more context specific. For example, someone seeking to start a relationship and subsequently sexually assault that person may be looking for a more consistent vulnerability such as a permanent disability. Whereas, someone perpetrating a stranger, acquaintance, or party sexual assault, may be looking for situational vulnerability such as impairment due to drugs and alcohol.

Although there have been a handful of studies that cite marijuana use as a risk factor for sexual assault, there has been little discussion as to the reasons for this (see, Krebs et al. 2007; Messman-Moore, Coates, Gaffey, and Johnson 2008; Testa et al. 2003). Obviously, one possible reason is similar to explanations as to why alcohol use and abuse are risk factors for sexual assault; marijuana like alcohol, is a mood altering substance that may diminish one's capacity to consent, or reduce one's ability to recognize risky situations. It is not clear why marijuana is more important than sex for attempted assaults only. But, marijuana shows up as important across all models in both the full sample and the female subsample, suggesting that marijuana use may be a more

prolific risk factor than the literature to date acknowledges. The changing political and moral landscape regarding marijuana use should also be considered. The fact that over half the nation supports federal legalization of marijuana, and that several states allow medical or recreational use, may convey to college students that marijuana use is safe or less risky than alcohol which has been a large focus of college campus sexual assault literature in the past (Swift 2016; Subbaraman and Kerr 2017). Another possibility is that marijuana use is a proxy for risk-taking behavior, and students that use marijuana engage in riskier behavior overall.

Though gaining legitimacy, recreational marijuana use is still illegal in the majority of states, therefore the context in which marijuana use takes place may also increase opportunity for perpetrators to commit sexual assaults. Students may perceive house parties as a better place to use marijuana to avoid legal consequences of using illegal substances. House parties also often include alcohol consumption, and afford potential perpetrators a private space to perpetrate sexual assault, with less formal or informal regulation. As students get older and are of legal age to drink, they can go to public spaces such as bars to consume alcohol, and these public spaces are less conducive to sexual assault as there are typically other patrons, and bar staff or bouncers that regulate behavior. This coincides with data that suggests that as students get further along in their collegiate career, and therefore older, they are less at risk for sexual assault. But, in states where recreational marijuana use is illegal even older students would need a private space such as a house party to engage in marijuana use. This may put older students who would be at lower risk for sexual assault at higher risk than their non-marijuana using counterparts, and could also account for why marijuana is showing up as

more important than alcohol use in the present study. Needless to say, more research is needed to support any speculative theory as to why marijuana use seems to be consistently important in explaining sexual assault victimization.

Again, results from the analyses showed partial support for the second hypothesis, that frequent alcohol use, and binge drinking would be important in all models. Both frequent alcohol use, and binge drinking showed up in some models, but not consistently, and never in the same model. Frequent alcohol consumption showed importance in explaining completed sexual assaults for the female subsample, and for attempted sexual assault in both the full and female subsamples. Binge drinking only emerged as important in model two which used the female subsample and any sexual assault as the dependent variable. These findings are not necessarily in contradiction to previous studies that cite alcohol use, and binge drinking as risk factors (see, for example, Cantor et al 2015; Krebs et al 2007; Krebs et al 2016). Rather, the present study's findings suggest that when alcohol consumption, and binge drinking are considered simultaneously with other variables, the story becomes more complicated. Indeed, the CART models in which frequent alcohol consumption and binge drinking emerge as important identify when, and for which students these variables become important. Binge drinking, was only important in any type of sexual assault in the female subsample, and the model showed that this was only important (at least with the model parameters used in this study) for those female students that had never used marijuana, and who had a disability. Moreover, neither alcohol use or binge drinking were important in explaining relationship sexual assaults in either the full sample or the female subsample. There are no obvious or clear explanations as to why binge drinking shows up as important for only one of the eight

models, and only for females with disabilities that do not use marijuana. However, research suggests that people with disabilities, particularly ADHD, are at higher risk for alcohol and substance abuse (Kaye et al. 2014; Molina & Pelham 2014). It could be that those female students with disabilities that do not use marijuana are more likely to binge drink. However, since marijuana use is the first and most important variable in this model, and had greater Gini improvement, results would still suggest that any marijuana use is a bigger risk factor than binge drinking, and has greater explanatory power.

Frequent alcohol use showed up in three models, female completed assaults, and both models with attempted assaults as the dependent variable. Thus, while alcohol frequency seemed to be more consistently important than binge drinking, in each of these models alcohol frequency only became important in the third or fourth levels of the tree, and had lower Gini improvement scores than marijuana use. Alcohol use, and binge drinking are cited frequently as risk factors for sexual assault with alcohol being used by either the perpetrator, victim or both in over 50% of college campus sexual assaults (Abbey et al. 2004; Krebs et al. 2009; Krebs et al. 2016; Mellins et al. 2017). The present study does not undermine those findings, but does suggest that the riskiness of alcohol use may be overstated in research that does not consider other variables at once. More research is needed to determine whether or not the risk of alcohol use and binge drinking as it pertains to sexual assault is more situational than many studies would indicate.

It is, perhaps, less surprising that frequent alcohol use, and binge drinking do not emerge as important for relationship sexual assault at all. Much of the literature puts forward that alcohol use and binge drinking is used as a tool for incapacitation, such that perpetrators can commit assaults without using physical force or obtaining consent

(Cantor et al. 2015; Krebs et al 2009; Testa 2003). These types of assaults are more commonly discussed in reference to date, acquaintance, incapacitated, or party sexual assaults (Armstrong, Hamilton, and Sweeney 2006; Mellins et al. 2017; Moylan and Javorka 2018). Relationship sexual assaults likely have a somewhat different dynamic, considering the victim is already in a relationship with the perpetrator. Coercion, guilt, or other power and control tactics may be at play in the facilitation of relationship sexual assault. Moreover, as mentioned, this study found that the most explanatory variable in relationship assaults for college students was disability status, asserting that perpetrators may be seeking out a more permanent vulnerability than alcohol use or binge drinking provide.

The hypothesis that Greek affiliation would be important, was not supported at all. Greek affiliation did not emerge as important in any of the models. Although there are several studies that suggest Greek affiliation is a risk factor for sexual assault, much of the literature focuses on fraternity members as perpetrators, with fewer studies examining female membership in sororities (Moylan and Javorka 2018). Nonetheless, the findings from this study were not aligned with previous research. That doesn't necessarily mean that this study refutes Greek affiliation as a risk factor for college campus sexual assault, just that when considered with the effects of all the other variables included in these models, Greek affiliation does not yield a high enough Gini coefficient to appear in the first four levels of regression tree. It could be that if the analyses used five levels as SPSS does by default instead of specifying each model to use four, that Greek life would appear in the model. It could also be that the post-pruning eliminated Greek life affiliation. Additionally, without knowing which fraternities and sororities

participants identified as being a part of, and the data does not provide that information, there is much context left out in terms of what the variable Greek life in the Fall 2016 ACHA-NCHA data is actually measuring.

The final broad hypothesis that institutional level variables would emerge secondarily to demographic and social behavioral variables, if at all, was supported. In fact, no institutional-level variables appeared in any of the models. Like Greek life this could be an artifact of the tree parameters, or the post pruning. But, even if the parameters or post-pruning are responsible for the absence of institutional-level variables, the study would indicate that institutional-level variables are less important in predicting college campus sexual assault than demographic and social-behavioral variables. It may be that there are institutional level-variables that would be important that the data used for the present study did not have available. For instance, there was no information available on what types of services or resources students in the study had access to beyond whether or not they had 'received information on sexual assault'. Thus, we do not know anything specific about the institutions response to sexual violence, or their intervention and prevention programming, which may well be the types of institutional-level variables with the most significance in predicting college campus sexual assault.

POLICY AND PRACTICE IMPLICATIONS

Beyond the hypotheses the aim of the study was to identify particular groups that may be at disproportionate risk for college campus sexual assault, and certainly there were specific groups in each model that emerged as being at increased risk compared to other students in the sample. Many of these groups were not all that surprising considering previous literature, but there were some groups that warrant specific

discussion. For instance, most research focuses on female college students as victims of sexual assault, but the results of the present study found that non-female, non-heterosexual students that had used marijuana in the prior 30 days were disproportionately represented as victims of any sexual assault. This population only accounts for 1.2% of the sample, but accounts for 2.8% of the campus sexual assault population. While 2.8% doesn't sound like a lot, this specific group accounts for 23.8% of all non-female victims of sexual assault. This suggests the trend of marijuana increasing risk for sexual assault goes beyond just female students. Additionally, non-heterosexual males appear to be at increased risk compared to their heterosexual counterparts, and while that may not come as a surprise, it does have implications for policy and prevention programming on college campuses. Partnerships with prevention and intervention offices and LGBTQ advocacy centers on college campuses could aid in developing prevention programming targeted at gay men. Further, these offices could also engage alcohol and drug prevention programs to create educational programming or materials specific to gay men.

In the female subsample, those that have used marijuana ever, are not living with a partner, and have a disability also emerged as at increased risk for sexual assault, accounting for 23.6% of sexual assault victims, but only 8.9% of the sample. Again, research that points to marijuana use, and disability status as risk factors for sexual assault would certainly support this (Findley, Plummer, and McMahon 2016; Krebs et al 2007; Messman-Moore, Coates, Gaffey, and Johnson 2008; Snyder, 2015; Testa et al. 2003). Still, more research needs to be done to find out why marijuana use, over alcohol or other illicit drug use is so important in explaining college campus sexual assault for

women. Further, policy makers, and prevention and intervention practitioners need more context around which particular disabilities are putting students at risk, and what connection those disabilities have to marijuana use. It could certainly be the case that those with disabilities use marijuana to self-medicate, which may even be legal in many cases. But if the marijuana use, combined with the disability status of these young women is putting them at risk there may be ways to enhance targeted prevention tactics. Again, offices that may often operate in silos focused on disability, drug and alcohol prevention education, or sexual assault prevention and intervention could form partnerships to make sure that educational materials and programming, as well as resources for sexual assault victims are reaching this specific group of students.

Along with marijuana use, alcohol use, and disability, relationship status appears frequently for females who are at disproportionate risk for any, completed, and attempted sexual assaults. The present study's findings showed those female students who are in a relationship and not living with their partner, or not in a relationship at all are at increased risk when combined with marijuana use, and disability status. Here again, there is opportunity for offices such as the disabilities services offices, or campus sexual assault prevention and intervention, to add a component of education and strategies for safe dating, or safe hookups, to their programming. Partnerships among sexual assault prevention and intervention, drug and alcohol education, and disabilities services offices may eliminate the need for each office to develop targeted materials of their own, while streamlining these offices ability to provide appropriate referrals or information to students who are at disproportionate risk. Each office does not need to have expertise on another's programming or subject matter, but cooperative development of resources and

educational or prevention programming may help reach students who are multiply marginalized and most at risk for sexual assault victimization. Coalitions, or partnerships among these offices could aid in campuses development of more intersectional and inclusive prevention and intervention, and resource programming that reaches more marginalized groups of students. At the very least, opening those lines of communication should increase knowledge among resources providers to make better referrals for students who use their services.

LIMITATIONS

Of course, there are several limitations to this study. The dataset is not random or representative, and is cross-sectional. Therefore, even though one of the goals of CART is to provide a prediction accuracy score, which gives the researcher an estimate of how likely the model is to be accurate in predicting sexual assault victimization in the population of interest outside the sample (U.S. college students and female U.S. college students), generalizing results from this study broadly may not be the best use of the findings. Rather, a more productive use of the findings may be to inform future research, by using the results to develop new research questions, guide new research projects that add context to the findings, and to inform a more intersectional approach to policy and programming on college campuses.

A second limitation is that despite using weights and priors the overall population correctly classified was between 72.9%-78.1% across models leaving nearly 30% of the sample incorrectly classified in some cases. Although these numbers are aligned with other social science studies that have used CART analyses (Ross and Kearney 2017; Skedgell and Kearny 2018), results should be interpreted with caution. More research is

needed to support the present study's findings. Even so, the study underscores likely specific populations at disproportionate risk for sexual assault which may guide future research projects.

The Gini coefficients, which measure impurity reduction, were quite low across models. This was likely due to the small number of observations (1,616 or 4.8% in the full sample) in the dependent variable's category of interest and that college campus sexual assault victims already occupy a somewhat specific, and more homogenous group. For example, although sex is not the first and most important variable in explaining variance in every model that uses the full sample, the majority of sexual assault victims (87.9%) were female. Gini coefficients represent the reduction in impurity; when a group already has a high level of homogeneity, a smaller reduction in impurity is not surprising. Accordingly, the Gini coefficients were small, but informative, in providing a kind of map as to which variables are most important for which students depending on the type of assault. For example, the findings show that those students with disabilities, that are female, and undergraduates make up only 14% of the sample, but account for 34% of relationship assaults.

Finally, the survey instrument used to collect the data uses a vague definition of sexual assault without providing any examples as to what might constitute assault. Therefore, the data may not be providing the most accurate measure of sexual assault for the population. Related to this, the survey does not touch on alcohol- or drug-facilitated, or incapacitated sexual assault. Thus, a student who experienced assault under the influence, voluntary or otherwise, may not recognize the experience as assault, again leaving room for an inaccurate measure of the true number of assaults in the sample.

FUTURE RESEARCH

In addition to adding to the existing literature on college campus sexual assault, this study unearths several avenues for future research. First, with marijuana showing up as the most important variable in several models, more research is needed to determine students' attitudes about marijuana use, the context in which students use marijuana, and why exactly marijuana use translates to increased risk for college campus sexual assault. One way to do this may be to conduct a series of focus groups comprised of college student marijuana users. Another avenue would be for those conducting large scale college campus climate surveys to ask more detailed questions about attitudes and context of marijuana use to try and get a large scale picture of what these marijuana use variables actually mean in practice. Future research could also use traditional quantitative techniques to determine whether or not college students use of marijuana occurs in conjunction with alcohol use, and partying. Should the federal ban on recreational marijuana use remain, with only some states allowing legal recreational use, it may be prudent to do a comparative analyses of marijuana use at post-secondary institutions where recreational use is legal, and those where it is not. This may help determine whether or not college campus social norms and student attitudes about marijuana coincide with legalization.

More research should also be conducted on college students with disabilities. College campus climate surveys, or national level surveys such as the CSA (Krebs et al. 2007) or AAU (Cantor et al. 2015) designed to measure college campus sexual assault should add more specific questions and definitions around the different types of disabilities. Disability status is a vast category, and different disabilities have an array of

different effects for college students. For instance, someone with a psychiatric disability is going to have different barriers than someone who is blind, and these types of differences may have different implications for risk of sexual assault victimization. Moreover, students with certain types of disabilities may be more or less likely to engage in risky behavior such as binge drinking (for example, see, Kaye et al. 2014; Molina and Pelham 2014) which may multiply risk for college campus sexual assault.

Survey's such as the ACHA-NCHA may do well to adopt best practices of college campus sexual assault researchers in their measurement of campus sexual assault. The ACHA-NCHA survey instrument asks very vague questions, and does not touch on incapacitated, or drug or alcohol facilitated sexual assaults. It also does not provide a detailed account as to what constitutes sexual assault. In order to get the best picture of the ways in which college students are experiencing college campus sexual assault in a large dataset, the ACHA-NCHA instrument should include detailed definitions and examples of sexual assault. Incorporating a variation of the Sexual Experiences Survey (Koss, Gidycz, and Wisniewki 1987) may be a good place to start (see, Fisher, Daigle, and Cullen 2010, or Koss et al. 2007, for examples).

The present study aimed to explore CART as an avenue for engaging in more intersectional quantitative analyses of college campus sexual assault, and in doing so interrogate how previously cited risk factors interact with other social identity characteristics, as well as identify specific groups that may be at disproportionate risk for college campus sexual assault victimization. In using an intersectional framework, noting that each institution is unique, CART may be very effective in evaluating individual institution campus climate surveys so that colleges and universities can tailor prevention

and intervention programming to their specific populations. Likewise, future research should also perform CART analyses on national or multi-institutional campus climate datasets aimed specifically at measuring college campus sexual assault and violence.

Using intersectionality as a theoretical framework in quantitative analysis may require using a data-driven approach to analysis in order to identify marginalized subgroups that are overlooked in other traditional quantitative techniques such as regression. The present study, while not without limitations or completely intersectional, may give social science researchers studying violence against women a tool that provides information on a quantitative level without disregarding marginalized populations' experiences altogether. Further, the present study identified understudied areas of college campus sexual assault victimization such as marijuana use that have been largely ignored by the literature to date. While many of the findings were supported by previous literature, with the use of CART this study was able to glean the relative importance of individual, social-behavioral, and institutional-level variables when considered simultaneously, and specify specific social locations that put students disproportionately at risk for college campus sexual assault. These findings led to feminist policy implications that include coalition building across campus resources offices, and direction for future research that moves beyond what campus sexual assault research has uncovered over the past three decades.

This paper explores risk factors for college campus sexual assault victimization in more detail, looking to uncover more specific social locations that are at disproportionate risk for college campus sexual assault. However, little has been done to explore protective factors for campus sexual assault. Paper three draws on the plethora of

evidence connecting alcohol use to college campus sexual assault, exploring protective behavioral strategies as possible tools for campuses to use in their prevention and intervention programming.

CHAPTER 4. DRINKING PROTECTIVE BEHAVIORAL STRATEGIES AND COLLEGE CAMPUS SEXUAL ASSAULT

College campus sexual assault is a pervasive problem, with college females being disproportionately affected compared to their male counterparts (Fisher, Daigle, and Cullen 2010). While research prevalence estimates over the last 30 years vary due to differences in measurement and definition of sexual assault more recent studies show approximately 1 in 5 women experiencing sexual assault during college (Cantor et al. 2015; Krebs et al. 2007). In addition, the investigation of factors associated with campus sexual assault has identified alcohol consumption to be a well-established risk-factor for both perpetration and victimization of sexual assault on college campuses, with 50% or more of sexual assaults involving alcohol use by either the perpetrator or victim or both (Abbey et al. 2004; Krebs et al. 2009; Krebs et al. 2016; Mellins et al. 2017). Despite the overwhelming empirical evidence underscoring the problem of sexual assault on college campuses, prevention strategies across campuses are far from uniform, and very few have programs with a specific focus on the relationship between sexual assault and alcohol. The Centers for Disease Control provides guidance for programs to prevent sexual violence through STOP SV: A technical Package to Prevent Sexual Violence, but the only programs highlighted specific to college campus populations are bystander intervention programs (Dills, Fowler, and Payne 2016). While bystander intervention programs have shown promise in reducing violence in the form of stalking and sexual harassment, evaluation of bystander programs have not shown a significant reduction in alcohol-related sexual assault (Coker et al. 2015).

Given the consistently high association of alcohol consumption and college campus sexual assault victimization, the lack of empirically validated sexual assault

prevention programming at the collegiate level specifically addressing alcohol consumption and campus sexual assault is somewhat surprising. Regardless of the lack of CDC-endorsed programming, national advocacy organizations continue to warn the public about the relationship between alcohol and sexual assault. For instance, the Rape, Abuse & Incest National Network (RAINN) has a page dedicated to sexual assault prevention via alcohol safety strategies. Researchers by and large are not blaming women for being assaulted because of their alcohol consumption. Rather, they are pointing out that alcohol decreases judgement, thereby decreasing one's ability to identify risky situations, and can lead to incapacitation, both of which elevate risk for sexual assault (Fisher, Cullen and Turner 2000; Fisher, et al. 2010; Krebs et al. 2009). Despite the consistent findings that alcohol consumption and college campus sexual assault are related, there have been relatively few studies exploring drinking protective behavioral strategies (drinking PBS), which are tactics students (or others) can engage in to make drinking safer. Motivated by the frequently cited relationship between alcohol consumption and college campus sexual assault, and the fairly thin foundation of research examining drinking PBS and college campus sexual assault, the present study explored the efficacy of drinking PBS in lowering odds for sexual assault victimization on college campuses[6].

COLLEGE CAMPUS ALCOHOL CONSUMPTION AND SEXUAL ASSAULT

College campuses are known to be a space where excessive alcohol consumption is common, including frequent use of alcohol and binge drinking. In fact, studies estimate

[6] Sexual assault takes place on and off college campus, throughout this study the use of the language, "college campus sexual assault," refers to sexual assault taking while attending college, not necessarily assaults on college campuses.

more than 60% of college students have consumed alcohol in the prior month with roughly 65% of those college students having engaged in binge drinking (NIAAA 2015; SAMHSA 2014). Adverse outcomes related to excessive alcohol consumption on campus or in campus-related settings have been well-established. For instance, Hingson and colleagues (2009) estimated almost 600,000 college students between ages 18 and 24 are accidentally injured during or after having consumed alcohol. Another study by Presley and Pimentel (2006) showed that nationally, 8.5 percent of college students got into trouble with the police, including arrests because of alcohol consumption. About 20 percent of college students per year are considered to have an alcohol use disorder (Blanco et al. 2008). The list of these adverse alcohol-related outcomes continues, but notably nearly 100,000 students between ages 18 and 24 years are victims of alcohol-related sexual assault in a given year (Hingson et al. 2009). Reasons for excessive and increased alcohol use on college campuses are myriad, but include individual and environmental factors. Individual factors that may be associated with more alcohol use and abuse for college students include inflated perceptions of other students drinking, positive beliefs about drinking alcohol such as the belief that drinking alcohol will break the ice , or make people sexier, students having psychological distress, and demographic characteristics with students who are white and male being more likely to use and abuse alcohol (McBride et al. 2014; Wechsler and Nelson 2001; Wechsler and Kuo 2003; White and Hingson 2013; Yusko et al. 2008).

Environmental factors that may be associated with more college campus alcohol consumption include campuses with a pervasive Greek system, colleges with Greek housing, and NCAA sports campuses (Mallett et al. 2013; Wechsler and Kuo 2003;

White and Hingson 2013; Scott-Sheldon et al. 2012; Yusko et al 2008). These environmental factors have been cited as integral in creating a culture that promotes the uniting of rape culture and party culture on college campuses. Male peer support theory explains that membership in all-male social groups aids in a narrow conception of masculinity that supports male dominance over women; encourages alcohol consumption, which is often used to aid in sexual assault as well as excuse sexual assault and promote victim blaming; and provides group secrecy or a "wall of silence" that protects perpetrators of violence against women (DeKeseredy and Schwartz 2013). Male peer support theory suggests that when access to attaining hegemonic masculinity is blocked, men may turn to these all-male social networks, which may provide role models who support violence against women as a means of maintaining or asserting masculinity (DeKeseredy and Schwartz 2013). DeKeseredy and Schwartz (2013) also point out that this scenario may be particularly common on large NCAA athletics campuses, as well as colleges and universities with highly active and prestigious Greek systems that have been associated with male social bonding and party culture.

These associations between alcohol, male peer support, rape culture, party culture and sexual assault on college campuses are not new findings. In fact, more than three decades of research has gone into uncovering prevalence rates and risk factors for sexual assault (see, for example: Fedina, Holmes, and Backes 2018; Fisher et al. 2010). Despite this research, prevalence rates have remained high, and organizations where rape myths, and party culture thrive such as fraternities and athletics networks continue to dominate many college campuses (Armstrong and Hamilton 2013; Cantor et al 2015; Fisher, et al. 2010; Krebs et al. 2015). Thus, it seems unlikely that any prevention effort aimed only at

deterring students from drinking alcohol, deconstructing rape myths, or dismantling Greek or athletics organizations will be swiftly successful (Fisher et al. 2010; Mellins et al. 2017). Therefore, in conjunction with efforts to dismantle rape culture, increase gender equity, and reduce male peer support and party culture, college campuses may do well to focus on minimizing the harm that stems from some of the risk factors associated with college campus sexual assault, including alcohol consumption. Incorporating drinking PBS into campus prevention programming and education may be one way to do just that.

DRINKING PBS

Drinking PBS are a set of actions, behaviors, or strategies a college student (or anyone) can make in relation to their alcohol consumption aimed at decreasing the amount of alcohol consumed in one episode, and reducing alcohol consumption-related harm (Benton et al. 2004; Martens et al. 2005; Pearson 2013). Drinking PBS are not designed to make students into total abstainers, but rather to make alcohol consumption safer. Moreover, drinking PBS are not a specific program in and of themselves, but rather, may be incorporated into alcohol prevention and intervention, or college campus orientation programming and education in an effort to keep students safer while drinking.

There have been several different scales designed to measure drinking PBS[7], Martens and colleagues (2004) initially examined a set of eight strategies from the 2001 American College Health Association's National College Health survey. These eight strategies included: alternating non-alcoholic with alcoholic beverages; determining a set

[7] For a more comprehensive list of studies that have examined drinking protective behavioral strategies efficacy in minimizing negative alcohol related outcomes see Pearson (2013) whose article summarizes the many different scales, and different study results.

number of drinks not to exceed in advance; using a designated driver; eating before or during drinking; having a friend let you know when you've had enough; keeping track of how many drinks you were having; pacing drinks to 1 or fewer per hour; and avoiding drinking games (Martens et al. 2004). Benton and colleagues (2004) used a 10-item scale that included students' responses of how often they used the following PBS strategies: stopping drinking at least 1-2 hours before going home; alternating with nonalcoholic beverages, having a designated driver, limiting the number of drinks, making one's own drinks, limiting money spent on alcohol, only drinking in safe environments, hanging out with trusted friends, counting drinks, and pacing number of drinks per hour. Both Benton et al. (2004), and Martens et al. (2004) found that drinking PBS strategies were associated with experiencing fewer negative alcohol-related consequences such as performing poorly on an exam, or being in a fight. Martens and colleagues (2005) built on this research, moving on to develop and test the 15 item (drinking) Protective Behavioral Strategies Survey (PBSS) which appears to be the most commonly used measurement of protective behavioral strategies (Pearson 2013). They found that the use of the PBSS reduced negative alcohol related consequences as defined by the Rutgers Alcohol Problem Index (RAPI) developed by White and Labouvie (1989). The scale includes 23 items that measure consequences such as, having a fight with a friend or family member, missing school or work, and neglecting responsibilities because of alcohol consumption in the prior year. Martens and colleagues then conducted a factor analysis that resulted in three different PBSS categories: stopping or limiting drinking, manner of drinking, and serious harm reduction (Martens et al. 2005).

Although drinking PBS have been associated with fewer negative alcohol-related consequences, relatively little has been done specifically to explore the relationship between drinking PBS and sexual assault victimization risk. In fact, the RAPI does not include any items measuring sexual assault victimization, or perpetration. Studies that have looked at this specific connection have been relatively small and vary with regard to the associations being explored. Palmer and colleagues (2010) surveyed 370 college students and using an ANCOVA to test for differences in use of drinking PBS, found that students with a history of past-year sexual assault or unwanted sexual contact were less likely to use drinking PBS (M=28.74, SE=1.19) than those without (M=32.90, SE=.84). Using a sample of 860 undergraduate women and hierarchical regression models, Gilmore and colleagues (2015) looked at the relationship between use of drinking PBS, child sexual abuse (CSA), and adult sexual abuse (ASA). They found that women experiencing ASA involving incapacitation were less likely to use drinking PBS (β=-0.13, p<.01). Neilson and colleagues (2018) used a maximum likelihood estimation path model, and sample of 620 college students recruited through a university psychology department to examine sexual assault revictimization and use of both drinking PBS and sexual assault PBS, finding that drinking PBS was used less by women who had histories of sexual assault (β=-.079, p=.057).

This relative dearth of literature focusing on drinking PBS as a potential protective factor for college campus sexual assault is a somewhat surprising oversight considering the majority of campus assaults involving alcohol consumption on the part of the victim, perpetrator, or both. The overwhelming evidence connecting alcohol consumption and college campus sexual assault (see, for example, Cantor et al. 2015;

Krebs et al. 2016; Mellins et al. 2017), combined with the lack of literature exploring protective factors for college campus sexual assault involving alcohol, serve as the impetus for the present study. Exploring the possibility of drinking PBS as tools in risk-reduction for campus sexual assault may help prevention and intervention programs develop concrete programmatic education that students can use to make drinking alcohol safer in relation to sexual assault. The present study, then, explores the efficacy of using drinking PBS as a protective factor for college campus sexual assault in the most often affected population, college females who drink alcohol.

THE PRESENT STUDY

Research Questions and Hypotheses

1) Is more frequent use of drinking PBS associated with lower risk for sexual assault?
2) Does more frequent use of drinking PBS moderate the association between binge drinking and higher odds for college campus sexual assault in female students who drink alcohol?
3) Does more frequent use of drinking PBS moderate the association between frequent use of alcohol and higher odds for college campus sexual assault in female students who drink alcohol?

I hypothesized that the frequent use of drinking PBS may not have a direct effect on risk reduction for college campus sexual assault among female college drinkers, but that the frequent use of drinking PBS would moderate the effects of binge drinking and frequent alcohol use, ultimately reducing risk for sexual assault for female student drinkers. Given the somewhat exploratory nature of this study, I did not have specific

hypotheses related to individual drinking protective behavioral strategies. However, aligned with my above hypotheses, I surmised that individual strategies that were significant would be significant as moderators as well.

Data

Given that drinking PBS seems to be broadly defined as strategies used to lessen the amount of alcohol consumed and make alcohol consumption safer, and many scales have been used to measure drinking PBS, data was chosen based on the availability of specific variables measuring both sexual assaults on college campuses and drinking protective behavioral strategies. As such the data being used to address the research questions come from the American College Health Association's National College Health Assessment (ACHA-NCHA) of Fall 2016, a national research survey designed to assist schools that choose to participate in collecting data about student health, behaviors, and perceptions. The original Fall 2016 data had an N=33,512 and include responses from students at 51 colleges and universities around the U.S. However, because college campus sexual assault disproportionately affects women, and the present study is aimed at evaluating the efficacy of drinking PBS in reducing risk for sexual assault, this analysis only looks at female college students who drink alcohol. All male students were dropped, and all students who indicated they did not ever drink alcohol were also dropped, resulting in an N=15,628[8].

[8] After an examination of all missing observations, finding no discernible pattern, missing observations were dropped from the analysis using listwise deletion.

Variables and Measures

Dependent variables

The first dependent variable used in this study was *any sexual assault* victimization, derived by combining responses from three survey items designed to measure sexual assault victimization within the past 12 months. These items included the following questions: 1) Was sexual penetration attempted (vaginal, anal, oral) without your consent? 2) Were you sexually penetrated (vaginal, anal, oral) without your consent? 3) Have you been in an intimate (coupled/partnered) relationship that was sexually abusive (e.g., forced to have sex when you didn't want it, forced to perform or have an unwanted sexual act performed on you). The three items were coded 1 if the participant answered "yes" to any of the three survey items, and 0 if participants responded "no" to all three items. In addition to these three items forming a composite dependent variable, they were also used individually to form three more dependent variables designated as *completed sexual assault*, *attempted sexual assault,* and *relationship sexual assault,* where each type of assault was structured as a dummy variable (1 = the student had experienced that specific type of assault in the last 12 months, and 0 = the student had not).

Independent variables

The drinking PBS scale in the ACHA-NCHA data includes 11 items. The Fall of 2016 ACHA-NCHA survey instrument includes items adapted from an earlier ACHA-NCHA drinking PBS scale, and also includes items used at in several other drinking PBS studies (Benton et al. 2005; Martens et al. 2004; Martens et al. 2005). The 11 included items are intended to constitute an overall scale of drinking PBS. As such Cronbach's

alpha was obtained (α=.80) and found to be satisfactory. All participants who responded "N/A,don't drink" to any of the drinking PBS independent variables were dropped as the present study was focused on only female students that drink.

Drinking PBS items were first evaluated for overall mean use, with a variable measuring mean use of *all drinking PBS* strategies that was created and included based on responses to the following 11 items. "During the last 12 months, when you 'partied'/socialized, how often did you:

- Alternate non-alcoholic with alcoholic beverages
- Choose not to drink alcohol
- Determine in advance a set number of drinks
- Eat before and/or during drinking
- Have a friend let you know when you had enough
- Keep track of how may drinks you were having
- Pace your drinks to 1 or fewer per hour.
- Avoid drinking games
- Stick with only one kind of alcohol when drinking
- Use a designated driver
- Stay with the same group of friends the entire time you were drinking

Individual variables for each of the 11 items were also created for subsequent analyses to examine specific drinking PBS strategies. Responses for both the mean use variable measuring *all drinking PBS* use, and the individual independent variables were coded 0=Never; 1=Rarely; 2=Sometimes; 3=Most of the time; 4=Always individually.

Socio-behavioral variables related to substance use/abuse

Several social-behavioral variables were included as independent variables of interest. Of course, variables measuring *alcohol frequency*, and *binge drinking* were included to determine whether or not these variables were significant in increasing risk for sexual assault, and accordingly, whether or not drinking PBS moderated the increased risk of these variables when applicable. Additionally, *marijuana frequency* and *illicit drug frequency* were both included to help gauge whether or not substance use beyond alcohol was associated with higher risk for college campus sexual assault victimization, as these results may also lead to policy and programming implications for college campus offices and administrators.

- *Binge drinking* was included as a continuous variable measured through a survey item asking: "Over the last two weeks, how many times have you had five or more drinks of alcohol at a sitting?" The ACHA-NCHA Fall 2016 survey provided students with a definition of one drink of alcohol before they answer questions related to drinking alcohol: "One drink of alcohol is defined as a 12 oz. can or bottle of beer or wine cooler, a 4 oz glass of wine, or a shot of liquor straight or in a mixed drink." Response categories range from 0-11 with 0=N/A, don't drink, 1=none, 2=1 time, 3=2 times, 4=3 times, 5=4 times, 6=5 times, 7=6 times, 8=7 times, 9=8 times, 10= 9 times, 11=10 or more times.
- *Alcohol frequency* was included as an ordinal variable measured through a survey item that asked: "Within the last 30 days, on how many days did you use alcohol (beer, wine, liquor)?" Response categories are 0=Never, 1=Have used, but not in last 30 days, 2=1-2 days, 3=3-5 days, 4=6-9 days, 5=10-19 days, 6=20-29 days, 7=Used daily.

- *Illicit drug frequency* was included and combined responses from the survey items that asked: "Within the last 30 days, on how many days did you use: Cocaine (crack, rock, freebase), Methamphetamine (crystal meth, ice, crank), Other amphetamines (diet pills, bennies), Sedatives (downers, ludes), Hallucinogens (LSD, PCP), Opiates (heroin, smack), Inhalants (glue, solvents, gas), MDMA (Ecstasy), Other club drugs (GHB, Ketamine, Rohypnol), Other illegal drugs. Response categories are 0=Never, 1=Have used, but not in last 30 days, 2=1-2 days, 3=3-5 days, 4=6-9 days, 5=10-19 days, 6=20-29 days, 7=Used daily.
- *Marijuana frequency* though federally illegal, is legal in many states and therefore was included as a standalone variable separate from illicit drug use. Response categories are 0=Never, 1=Have used, but not in last 30 days, 2=1-2 days, 3=3-5 days, 4=6-9 days, 5=10-19 days, 6=20-29 days, 7=Used daily.

Control variables

- *Race* was included as a dummy variable, coded 1 for non-white and 0 for white;
- *Year in school* was included as an ordinal variable coded 1=1st year undergraduate, 2= 2nd year undergraduate, 3= 3rd year undergraduate, 4=4th year undergraduate, 5= 5th year undergraduate, and 6=Graduate/Professional.
- *International status* was included as a dummy variable, coded 1=International and 0=Domestic.
- *Greek life* was included as a dummy variable, coded 1 for students involved in fraternities or sororities and 0 for those who were not.

- *Veteran status* was included as a dummy variable, coded 1 for those respondents who were veterans, and 0 for those who were not.
- *Disability status* was included as a dummy variable, coded 1 for those respondents who were disabled, 0 for those who were not.
- *Campus residence* was included as a dummy variable, coded 1 for those respondents who lived on campus, and 0 for those who did not.
- *Sexual orientation* was included as a dummy variable, coded 1 for heterosexual, and 0 for not heterosexual.

Analytic Plan

The present study used logistic regression techniques to examine whether the more frequent mean use of *all drinking PBS* items was associated with a lower likelihood of sexual assault for college females who drink alcohol. Then, the individual PBS items were included in subsequent models as separate variables to explore which specific, if any, drinking PBS items were associated with a lower risk of each dependent sexual assault variable. Next, analyses were conducted that included interaction terms to explore whether or not drinking PBS items individually, or overall mean use of drinking PBS moderated the effects of *alcohol frequency* or *binge drinking*. Interaction terms were only included in subsequent analyses for models where *alcohol frequency* or *binge drinking* were positively associated with higher risk of sexual assault. Tables are included to show the direct effects of drinking PBS on risk for sexual assault victimization in female student drinkers, and predicted probability figures are included to demonstrate the moderating effects of drinking PBS (when applicable) on *binge drinking* and *alcohol frequency*.

To address the first research question, whether or not more frequent use of *all drinking PBS* reduces the risk for college campus sexual assault of female student drinkers, a series of logistic regression models were run. The first four models use the different types of sexual assault--*any sexual assault, completed sexual assault, attempted sexual assault,* and *relationship sexual assault*--as the respective dependent variables, with the main independent variable of interest being mean use of *all drinking PBS*. Other independent variables of interest included social-behavioral variables centered around substance use and were *binge drinking*, *alcohol frequency*, *marijuana frequency*, and *illicit drug frequency*. Variables that have been cited as risk factors for sexual assault victimization in previous literature were included as control variables: *disability status, Greek status, year in school, sexual orientation,* and *campus residence.* Finally, based on demographic information available on the ACHA-NCHA survey, the following demographic variables were included as control variables as well, *international status, veteran status*, and *race*. The next four models use the same dependent variables and the same control variables, but instead of including the mean use of *all drinking PBS* scale, independent variables of interest were the individual scale items to discern whether or not a certain actions or types of drinking PBS may be more or less protective for the different types of college campus sexual assault. Descriptive statistics for all variables used in the analyses are shown in Table 20.

Table 20: Descriptive Statistics for Variables Used in Analyses (N=15,635)

Variable	Percent	Mean (SD)
Any sexual assault	7.43	--
Completed sexual assault	3.67	--

Table 20 (continued)

Attempted sexual assault	5.71	--
Relationship sexual assault	3.11	--
Disability status (any)	24.49	--
Binge drinking		
None	59.52	--
1 time	29.40	--
2 times	9.89	--

Table 20 (continued)

3 times	4.49	--
4 times	2.89	--
5 times	1.09	--
6 times	.68	--
7 times	.31	--
8 times	.16	--
9 times	.06	--
10 or more times	.19	--
Alcohol use past 30 days		
Not in last 30 days	11.99	--
1-2 days	25.05	--
3-5 days	24.29	--
6-9 days	19.49	--
10-19 days	14.67	--
20-29 days	3.36	--
Used daily	0.78	--
Marijuana use past 30 days		
Never used	51.54	--
Not in last 30 days	24.81	--
1-2 days	9.32	--
3-5 days	4.28	--
6-9 days	2.72	--
10-19 days	3.01	--
20-29 days	1.54	--
Used daily	2.37	--
Illicit drug use		
Never used	96.32	--
Not in last 30 days	2.92	--
1-2 days	0.29	--

Table 20 (continued)

3-5 days	0.13	--
6-9 days	0.04	--
10-19 days	0.04	--
20-29 days	0.03	--
Used daily	0.03	--
Greek affiliation	13.70	--
Year in school		
1st year	18.82	--
2nd year	17.68	--
3rd year	19.58	--
4th year	20.38	--
5th or more undergraduate	6.22	--
Graduate or professional	15.59	--
International student	4.17	--
Veteran	1.06	--
Non-white	24.07	--
Heterosexual	79.76	--
Live on campus	41.02	--
All drinking PBS	--	3.71 (.01)
Alternating alcoholic and non alcoholic beverages	--	3.05 (.01)
Choose not to drink	--	2.75 (.01)
Set # of drinks in advance	--	3.17 (.01)
Eat before or during drinking	--	4.22 (.01)
Have friend tell you when you've had enough	--	3.19 (.01)
Keep track of the # of drinks	--	3.98 (.01)
Consume <1 drink per hour	--	3.07 (.01)
Uses designated driver	--	4.57 (.01)
Stick w/same group of friends	--	4.44 (.01)
Avoid drinking games	--	3.02 (.01)
Stick w/one kind of alcohol	--	3.57 (.01)

Descriptive statistics for females who report drinking alcohol in ACHA-NCHA Fall 2016 survey.

After initial models were run, subsequent models that included interaction terms to test for moderating effects of the mean use of *all drinking PBS,* and individual times were run. Interaction terms were included in subsequent models based on initial models in which *binge drinking* or *alcohol frequency* were significantly associated with higher risk of sexual assault. The logic being that drinking PBS can only moderate the effects of *binge drinking* and *alcohol frequency* if those variables are significantly positively associated with higher risk for college campus sexual assault. A discussion of the results and predicted probabilities figures is included for all significant interactions. All models were tested for multicollinearity and influential cases.

RESULTS

In the first set of regressions, mean use of *all drinking PBS* was significant in lowering odds for three of the four sexual assault victimization variables. For each unit increase in mean use of *all drinking PBS*, odds of *any sexual assault* were reduced by 31% (OR=.69; $p<.001$). Use of *all drinking PBS* also reduced odds of *completed sexual assaults* by 41% (OR=.59; $p<.001$), and *attempted sexual assaults* by 34% (OR=.66; $p<.001$) with each unit increase in mean use. However, the use of *all drinking PBS* was not significant in the model with *relationship sexual assault* as the dependent variable.

Other significant variables included *disability status, binge drinking*, and *marijuana use,* with each associated with higher the odds for each type of sexual assault in female drinkers. Being *heterosexual vs. non-heterosexual* was associated with lowered odds for sexual assault victimization for all types. *Year in school* had a significant negative relationship with all types of sexual assault victimization for female drinkers, with risk for assaults associated with lower odds for each subsequent year in school.

Greek affiliation was associated with higher odds only in *any sexual assault* and *completed sexual assaults*, but approached significance with *attempted sexual assaults*. Similarly, *alcohol frequency* was not significant for *relationship assaults*, but was significant for the dependent variables measuring *any, completed,* and *attempted sexual assault* victimization. See Table 21 for detailed results.

Table 21: Sexual Assault (SA) and Female Drinker's Use of Drinking PBS Overall

	Any SA		Completed SA		Attempted SA		Relationship SA	
	b (se)	OR	b (se)	OR	b (se)	OR	b (se)	OR
Disability	.62*** (.13)	1.85	.72*** (.19)	2.05	.63*** (.14)	1.88	.74*** (.21)	2.10
Binge drinking	.08*** (.02)	1.08	.06* (.03)	1.06	.08** (.03)	1.08	.10** (.04)	1.10
Alcohol frequency	.12*** (.03)	1.12	.13*** (.04)	1.15	.13*** (.04)	1.14	.01 (.04)	1.01
Marijuana frequency	.09*** (.02)	1.10	.07*** (.03)	1.07	.11*** (.02)	1.12	.07** (.03)	1.07
Illicit drug frequency	.12 (.09)	1.13	.14 (.12)	1.15	.09 (.1-)	1.09	.07 (.13)	1.07
Greek affiliation	.19* (.10)	1.21	.32** (.16)	1.37	.18+ (.11)	1.20	-.02 (.14)	0.99
Year in school	-.18*** (.02)	0.85	-.16*** (.03)	0.85	-.18*** (.02)	0.84	-.23*** (.03)	0.80
International	.17 (.21)	1.19	.03 (.27)	1.03	.01 (.22)	1.01	.23 (.33)	1.26
Veteran	-.65 (.24)	0.52	-.84 (.31)	0.43	-.56 (.29)	0.57	-.75 (.34)	0.47

Table 21 (continued)

Non-white	.04	1.04	-.17	0.84	.00	1.00	.02	1.02
	(.08)		(.10)		(.09)		(.12)	
Heterosexual (vs. Non)	-.37***	0.69	-.45***	0.64	-.27***	0.76	-.53***	0.59
	(.05)		(.06)		(.06)		(.06)	
Lives on Campus	.09	1.10	.04	1.04	.09	1.10	.01	1.01
	(.08)		(.11)		(.09)		(.11)	
All drinking PBS	-.37***	0.69	-.52***	0.59	-0.411***	0.66	-.13	0.88
	(.04)		(.04)		(.04)		(.07)	
% Correctly Classified		92.44%		96.25%		94.13%		96.83%
Log-likelihood		-3597.73		-2135.88		-2978.59		-2091.13
Pseudo R-squared		.07		.07		.07		.05
N		14395.00		14395.00		14395.00		14395.00

***p<.001; **p<.001; *p<.05

The next set of regressions models include the same dependent and control variables, but the different drinking PBS items were included as separate variables to see if there are certain drinking PBS that may be better protective factors for campus sexual assault. See Table 22 below for detailed results.

Table 22: Sexual Assault (SA) and Female Drinker's Use of Drinking PBS by Type

	Any SA		Completed SA		Attempted SA		Relationship SA	
	b (se)	OR	b (se)	OR	b (se)	OR	b (se)	OR
Disability	.61*** (.13)	1.83	.71*** (.19)	2.03	.62*** (.14)	1.86	.73*** (.21)	2.08
Binge drinking	.08*** (.02)	1.08	.06* (.03)	1.07	.08** (.03)	1.08	.10** (.04)	1.11
Alcohol frequency	.13*** (.03)	1.14	.15*** (.04)	1.16	.14*** (.04)	1.15	.02 (.04)	1.02
Marijuana Frequency	.09*** (.02)	1.10	.07*** (.03)	1.07	.11*** (.02)	1.11	.08** (.03)	1.08
Illicit drug frequency	.11 (.09)	1.12	.15 (.12)	1.13	.09 (.10)	1.09	.05 (.13)	1.05
Greek affiliation	.18* (.10)	1.20	.30** (.15)	1.35	.17† (.11)	1.19	-.02 (.14)	0.98
Year in school	-.17*** (.02)	0.84	-.15*** (.03)	0.86	-.17*** (.02)	0.85	-.21*** (.03)	0.81
International	.17 (.21)	1.18	.03 (.27)	1.03	.02 (.22)	1.02	.21 (.32)	1.24

Table 22 (continued)

Veteran	-.66 (.24)	0.52	-.83 (.31)	0.43	-.55 (.30)	0.58	-.74 (.34)	0.48
Non-white	.02 (.08)	1.02	-.19 (.10)	0.83	.01 (.09)	0.99	.01 (.12)	1.00
Heterosexual (vs. non)	-.36*** (.05)	0.70	-.45*** (.06)	0.64	-.27** (.07)	0.77	-.51*** (.06)	0.60
Lives on campus	.08 (.08)	1.09	.03 (.11)	1.04	.08 (.09)	1.08	.01 (.11)	1.01
Alternating alcoholic and nonalcoholic beverages	.05 (.03)	1.05 +	-.00 (.04)	1.00	.05 (.04)	1.05	-.02 (.04)	0.98
Choose not to drink	.08 (.05)	0.06 +	.13* (.07)	1.14	.07 (.05)	1.08	.10 (.07)	1.10
Set # of drinks in advance	-.00 (.03)	1.00	.00 (.04)	1.00	.01 (.04)	1.01	-.04 (.04)	0.96
Eat before or during drinking	-.12** (.04)	0.88	-.12* (.05)	0.89	-.22* (.04)	0.90	-.14* (.05)	0.87
Have friend tell you when you've had enough	.02 (.03)	1.02	.03 (.04)	1.03	.02 (.03)	1.02	.06† (.04)	1.07
Keep track of the # of drinks	-.02 (.03)	0.98	-.02 (.05)	0.98	.01 (.04)	1.01	.00 (.05)	1.00
Consume <1 drink per hour	-.14*** (.03)	0.87	-.12** (.04)	0.88	-.16*** (.03)	0.85	-.08 (.05)	0.92

Table 22 (continued)

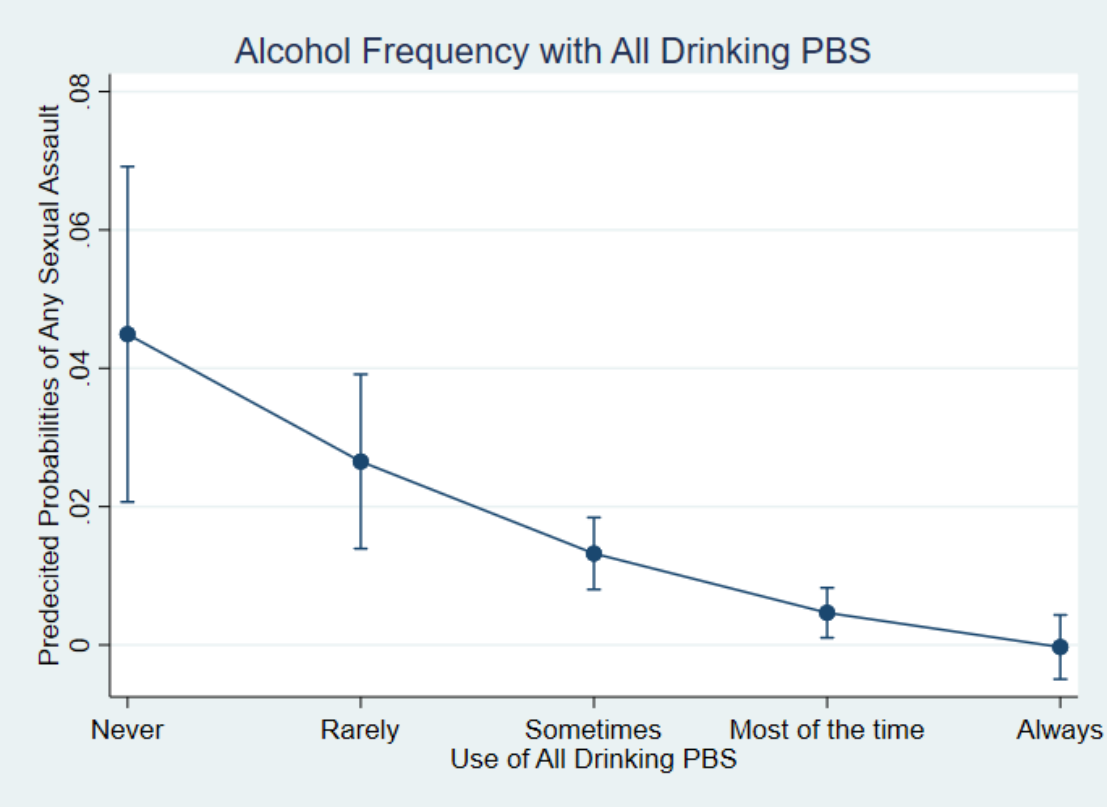
Use designated driver	-.06† (.03)	.95	-.08† (.04)	0.92	-.07 (.03)	0.93	-.03 (.05)	0.97
Stick with same group of friends	-.06 (.04)	0.94	-.10† (.05)	0.90	-.08 (.04)	0.93	.02 (.07)	1.02
Avoid drinking games	-.02 (.03)	0.98	-.07† (.04)	0.93	-.06† (.03)	0.94	.05 (.04)	1.05
Stick with 1 kind of alcohol	-0.08 (.03)	0.92 *	-.12** (.05)	0.88	-.10* (.04)	0.90	-.07 (.05)	0.94
% Correctly Classified	92.44%							
Log-likelihood	-3581.97		-		-		-	
Pseudo R-squared	.07							
N	14395.00							

***p<.001; **p<.01; *p<.05; †p<.10

A series of logistic regression models incorporating interaction terms to explore whether or not the overall use of drinking PBS moderates the effects of *binge drinking* and *alcohol frequency* on sexual assault. Although *binge drinking* appears to be associated with higher risk of all types of sexual assault, none of the PBS variables moderated the effects of *binge drinking*. *Alcohol frequency* was not significantly associated with *relationship sexual assault*, subsequently interaction terms examining the moderating effects of drinking PBS variables on *alcohol frequency* were only run on models using the dependent variables of *any sexual assault, completed sexual assaults*, and *attempted sexual assaults*. There were only four significant interactions with drinking PBS variables and *alcohol frequency*. None of these interactions were significant for *completed sexual assaults*. For *any type of assault*, mean use of *all drinking PBS, using a designated driver*, and *avoiding drinking games* all moderated the effects of alcohol frequency. For *attempted sexual assaults*, only *using a designated driver* moderated the effects of *alcohol frequency*. There were no significant interactions for *completed sexual assaults.* Predicted probabilities for significant interactions are included below to demonstrate the effects of each of these moderating variables, holding all other variables constant.

Figure 12 demonstrates the moderating effects of mean use of *all drinking PBS* had on the association of *alcohol frequency* and risk for *any sexual assault*. As is shown, the effects of *alcohol frequency* in terms of risk for *any sexual assault* were reduced as the students used *all drinking PBS* more frequently.

Figure 12: Alcohol Frequency with All Drinking PBS



Two individual drinking PBS strategies also demonstrated efficacy in reducing the effects of *alcohol frequency* on *any sexual assaults* in female college drinkers. Figure 13 shows that as female college drinkers *used a designated driver* more frequently the association between any type of college campus sexual assault and *alcohol frequency* use was lowered. Likewise, Figure 14 demonstrates that *avoiding drinking games* more often also lowered the positive association between alcohol frequency use and any college campus sexual assault in female drinkers.

Figure 13: Alcohol Frequency with Using a Designated Driver

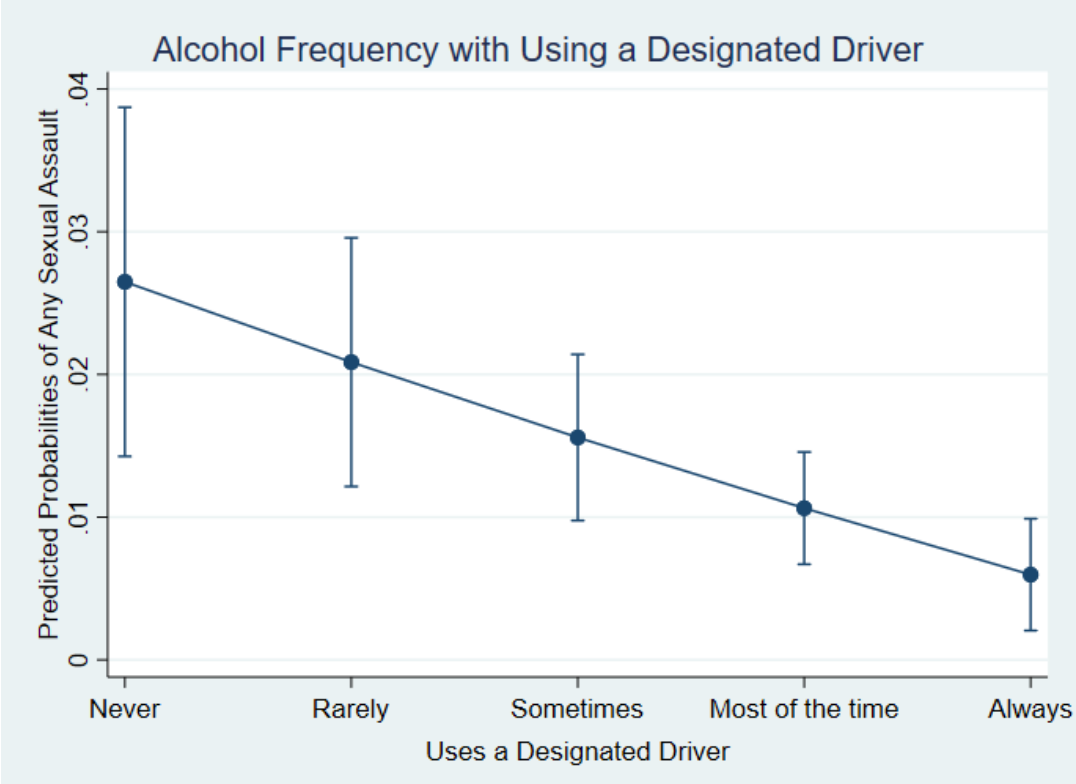
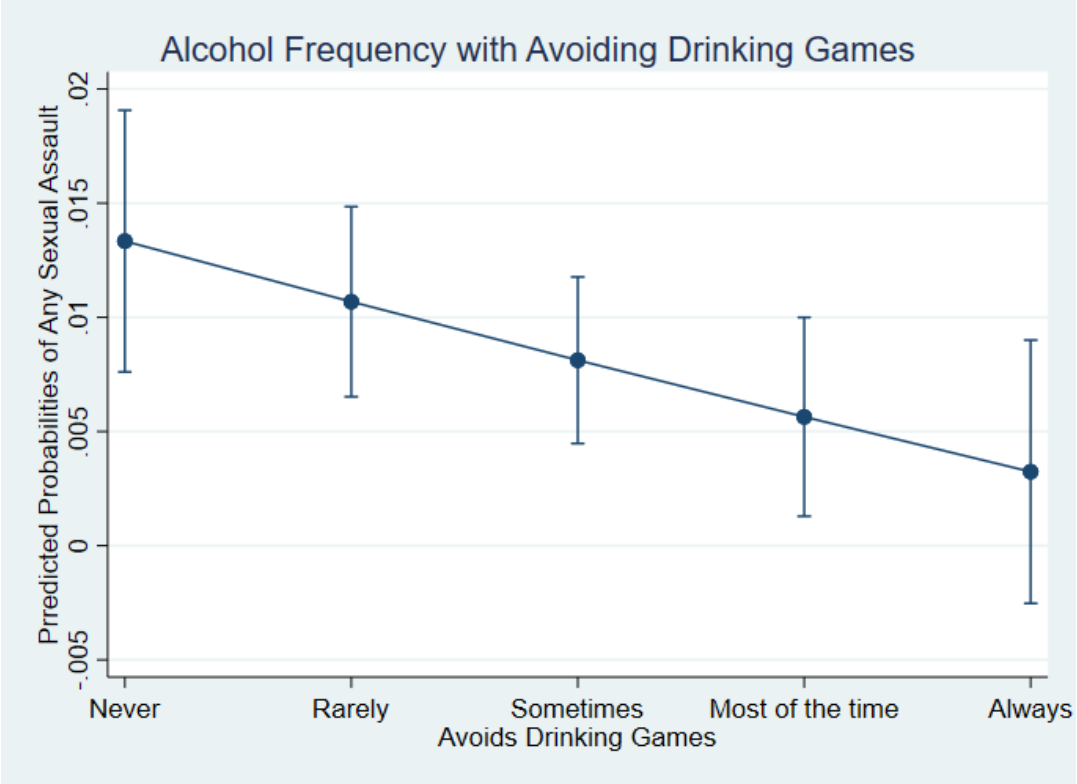
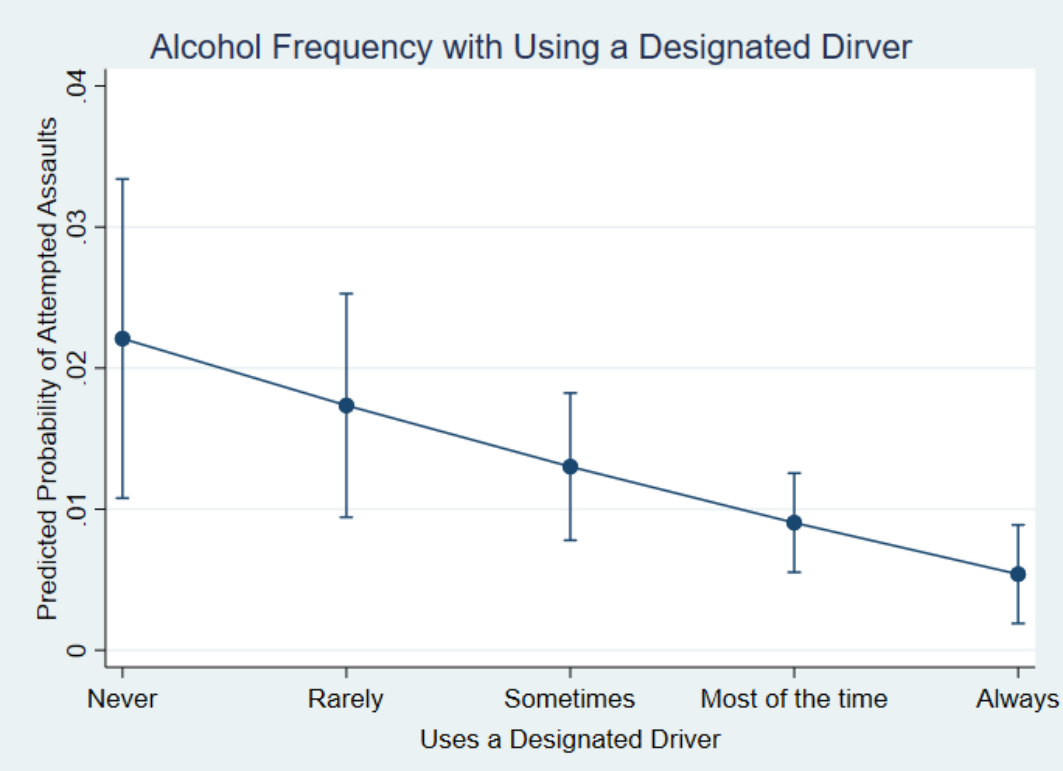


Figure 14: Alcohol Frequency with Avoiding Drinking Games



The only other significant interaction was that between *using a designated driver* and *alcohol frequency*. Figure 15 illustrates that, more frequent *use of a designated driver* moderated the effects of *alcohol frequency* for *attempted sexual assaults* for female college drinkers.

Figure 15: Alcohol Frequency with Using a Designated Driver for Attempted Assaults



The general hypothesis that drinking PBS may not have main effects, but would moderate the effects of alcohol variables was not supported overall. The results seem to indicate somewhat of an opposite outcome. Use of *all drinking PBS* and four of the individual drinking PBS variables had significant *main effects* in reducing college campus sexual assault victimization for female students who drink. However, only one variable, *eating before or during drinking*, was significant for all types of assault. *Eating before or during drinking* was associated with between a 10-13% reduction in odds of sexual assault victimization depending on the type of assault. More frequent mean use of *all drinking PBS*, *consuming less than one drink per hour*, and *sticking with one kind of alcohol* were all significantly associated with reduced risk for *any*, *completed*, and *attempted sexual assaults* in female college drinkers. Likewise, *using a designated driver* approached significance ($p<.10$) for all types of sexual assaults except *relationship sexual*

assault. *Choosing not to drink* more often, was associated with lowered odds for *completed sexual assault.* Thus, there were a greater number of significant main effects, with more consistency across types of assault as compared to interaction terms that moderated the effects of *alcohol frequency*. Moreover, none of the variables moderated the effects of *binge drinking*.

DISCUSSION

The primary aim of the present study was to explore the efficacy of drinking PBS in reducing risk for sexual assault victimization in female college students who report using alcohol. There is relatively little research on protective factors when it comes to college campus sexual assault, and a mountain of scholarship documenting the prevalence rates and the risk factors (see, for example, Fisher, et al. 2010; Mellins 2017). This analysis suggests that the use of drinking PBS *may* show some efficacy as a protective factor for female college students who drink alcohol. More frequent mean use of drinking PBS lowered odds for all types of sexual assault except relationship assault. However, it is hard to know whether or not these associations are causal, or may be a proxy for some other underlying variables. For instance, more frequent use of drinking PBS may be a proxy for risk-taking behavior overall. That is, those that engage in drinking PBS more frequently may be less likely to engage in other risky behavior that may increase odds for sexual assault. A closer discussion of the individual drinking PBS strategies that were significantly associated with lowered odds for sexual assault may provide more context.

First, eating during or before drinking was the only individual drinking PBS that was associated with less risk for all categories of sexual assault. It may be that those who

eat when they drink are doing so out of a dietary preference, such as having a beer or glass of wine with dinner. Therefore, they may be less likely to become inebriated because the goal of alcohol consumption for those who drink alcohol while eating is likely different than the goals of those who consume alcohol in a party or bar setting. Obviously, eating while drinking, and drinking to excess are not mutually exclusive. There is also evidence to support that female college students who binge drink are significantly more likely to also have eating disorders (Rush, Curry, and Looney 2015; Zhang et al. 2015). Therefore, it may not be that eating prevents binge drinking, or reduces alcohol consumption, but rather that those who have eating disorders, such as anorexia, also binge drink, putting them at higher risk for all types of sexual assault.

Next, using a designated driver approached significance for all types of sexual assault except relationship sexual assault. Female students that have a plan for a safe ride home at the end of a drinking episode, may also be less likely to engage in risky sexual behaviors, such as frequent sex, multiple sexual partners or unprotected sex, that have been linked to increased risk for sexual assault in college women (Combs-Lane, and Smith 2002). Additionally, it is not surprising that using a designated driver did not lower risk for relationship sexual assault. Most likely, relationship sexual assault does not occur in the context of being out at a party or bar drinking, but at a place of residence where a ride home is not needed. Using a designated driver also moderated the effects of frequent alcohol use on any, and attempted sexual assault variables. Using a designated driver may help college women who drink alcohol avoid situations where sexual assault would be attempted in the first place. If college women have a safe and sober ride home, they may be able to leave quickly if they feel the situation is becoming unsafe. The moderating

effects using a designated driver had on the association between frequent alcohol consumption and attempted assault may also be accounting for the effects in the variables that is measuring any type of sexual assault.

Both drinking PBS, consuming less than 1 drink per hour, and sticking with one kind of alcohol were significantly associated with reduced risk for any, completed, and attempted sexual assaults, but not for relationship assaults. Drinking one or less drinks per hour, by definition, would help female college drinkers avoid binge drinking altogether. This may in turn reduce sexual assault as these women may avoid becoming inebriated to the point of not being able to a) recognize risky situations, or b) be able to provide affirmative consent. That is, women who do not binge drink may not be targeted by perpetrators as they are less vulnerable than women who are very intoxicated. The same logic applies to sticking to one kind of alcohol. If female college students drink one kind of alcohol, they may be better able to pace themselves appropriately and anticipate how the alcohol will affect them. On the other hand, switching between many different kinds of alcohol, such as beer, wine, shots of liquor, or mixed drinks, may make it hard for women to gauge how much alcohol they've actually consumed and lead to unintentional inebriation. Again, perpetrators may seek out potential victims based on vulnerability, and if a woman is incoherent or inebriated from alcohol consumption, perpetrators may target her.

Choosing not to drink alcohol was significantly associated with lower odds of experiencing completed sexual assault. It is interesting that choosing not to drink alcohol is included as a drinking PBS, since drinking PBS are aimed at making alcohol consumption safer. Some scholars have left it out of their analyses (see, for example,

Martens et al. 2004) because they are only interested in strategies that take place during alcohol consumption. However, the present analyses included it since many female students may drink alcohol, but rarely. Therefore, if drinking alcohol increases risk for sexual assault, it does seem that choosing not to drink more frequently than choosing to drink would be a protective factor. It may be that choosing not to drink alcohol was significant in reducing completed assaults, but not attempted assaults because female students who are sober may be able to recognize a potential or attempted sexual assault more quickly and therefore avoid a completed assault.

Without more context, all of these explanations are speculative. Nonetheless, the results do suggest that increased use of all drinking PBS reduces risk for sexual assault, along with a handful of the individual drinking PBS strategies, but these results should be interpreted with caution. The analysis also suggests that drinking PBS does not necessarily make drinking, particularly binge drinking safer in terms of risk for sexual assault. None of the drinking PBS moderated the effects of binge drinking, suggesting that binge drinking is a risk factor female college drinkers regardless of the use of drinking PBS. Furthermore, only 4 of 36 models examining interactions between drinking PBS and frequent alcohol consumption had significant moderating effects. The use of drinking PBS may be an indication of female drinkers' risk-taking behaviors overall. In other words, those female drinkers who use drinking PBS may be less likely to binge drink, use drugs, or engage in other risky behavior that may increase odds of sexual assault. Without more research, it would not be advisable to draw any firm conclusions. Nonetheless, results do cautiously indicate that drinking PBS overall, may be worth looking into for prevention programs on college campuses.

IMPLICATIONS FOR COLLEGE CAMPUSES

Many colleges require incoming freshmen to complete courses on alcohol education; whether online or in person, these courses could incorporate drinking PBS. Partnerships between alcohol prevention and sexual assault prevention offices or personnel could be developed to educate students on the relationship between alcohol and sexual assault in a trauma-informed and victim-centered manner. This means simultaneously giving students tools, including drinking PBS, that may reduce the risk of negative outcomes associated with alcohol consumption, but also underscoring that a sexual assault is never the victim's fault and that alcohol doesn't cause sexual assault, only perpetrators cause sexual assault. This would also be an opportunity to provide students with resource materials, if they or someone they know has been sexually assaulted, outlining where a student can find confidential advocacy or counseling services, medical help such as SANE exams, and accommodations through the Title IX office.

While some scholars and advocates may argue that focusing on prevention at the individual level can blame victims, if there are tools available to keep young women who drink alcohol on college campuses safer and make it less likely that they will experience sexual assault, it is irresponsible not to provide students with this information. As noted, this can be done in a way that continually emphasizes that correlation is not causation, and that victims who are assaulted while drinking, whether they are using drinking PBS or not, are *never* at fault. Additionally, prevention efforts should be multi-faceted, focusing on dismantling rape culture through awareness events, providing students with

social activity opportunities outside of partying, and implementing bystander intervention programs, particularly in high-risk organizations such as fraternities.

Bystander intervention programs have been labeled a promising practice by the CDC (Frieden, Houry, and Mercy 2016). However, as Coker and colleagues (2015) point out, research on bystander intervention has not indicated that these programs significantly reduce alcohol-related sexual assaults. A potentially powerful combination might be encouraged by the idea that bystander prevention programs could augment their materials to include education about drinking PBS as well. Bystander programs focus on teaching students how to recognize risky situations, situations that are likely to become violent, or situations that have already become violent, and then trains them to intervene in the safest way possible (Frieden et al. 2016). Drinking PBS are not antithetical to this goal. For instance, one strategy listed under Martens et al. (2005) drinking PBS scale is, "Make sure you go home with a friend." Bystander intervention advocates for community and social accountability, thus, incorporating these tools into bystander intervention by emphasizing to students that they should look out for their friends when drinking or attending parties, and have a plan to stick together or go home with one another, seems well aligned with bystander intervention objectives.

LIMITATIONS

This study is one of only a handful that have begun to examine the efficacy of drinking PBS in sexual assault prevention and it certainly has limitations that should be discussed. First, there are several different measures of drinking PBS, the most commonly used is the PBSS developed by Martens and colleagues (2005), which includes fifteen items broken down into three sub-scales, limiting or stopping drinking,

serious harm reduction, and manner of drinking. The ACHA-NCHA drinking PBS measures include some of the same items, but only two items from the manner of drinking, and serious harm reduction subscales. This prevented the present study from using those narrower genres of drinking PBS in the analyses, as the Cronbach's alpha reliability scores for those two-item scales were far below the acceptable range. It is difficult to design policy changes around analyses that are as broad and varied as mean use of all the different ACHA-NCHA drinking PBS items together, but focusing only on individual items such as using a designated driver, may also be missing a larger strategy that a category of drinking PBS such as serious harm reduction may be able to capture.

The ACHA-NCHA Fall 2016 data are cross-sectional and non-random, so they are not generalizable to female college drinkers throughout the U.S. Therefore, results should be interpreted with caution and used as one piece of a larger effort for continued research into possible protective factors for college campus sexual assault. Additionally, the survey instrument was not designed specifically with sexual assault in mind; thus, the survey items used to measure sexual assault are less than ideal. The instrument does not provide specific definitions of what does or does not constitute a sexual assault. The instrument uses the term "force," but does not discuss a definition of force, or mention sexual assaults facilitated by drugs or alcohol (voluntary or involuntary consumption). Many students may have experienced a sexual assault but not recognize it as such based on the vague and unspecific definitions the survey provides in the questions measuring sexual assault.

Related to measurement, sexual assault categories (e.g., completed, attempted, and relationship) are measured at the individual level as opposed to incident level and,

therefore, are not mutually exclusive. This makes it impossible to determine whether or not students who've indicated they were assaulted in more than one category are referring to the same or different incidents. Of course, this has the potential to artificially inflate prevalence rates. However, inflated prevalence rates for one type of sexual assault or another are less of an issue for the present study as the aim is to identify protective factors, not prevalence. Other variables are also somewhat vague, disability status measures a variety of disabilities that may have different significant associations with college campus sexual assault.

FUTURE RESEARCH

More research is needed on the individual scale items included in the ACHA-NCHA survey as they relate to college campus sexual assault. Future research may also include a factor analysis to determine whether or not there are distinct types of drinking PBS within the 11 item scale used in the ACHA-NCHA survey instrument. Additionally, research that uses Martens and colleagues (2005) 15-item PBSS scale, and subscales of limiting or stopping drinking, serious harm reduction, and manner of drinking scales to explore their efficacy as protective strategies against college campus sexual assault may shed more light on the usefulness or lack thereof of using drinking PBS for sexual assault prevention on college campuses. This may be particularly important regarding students' binge drinking behavior, as our results suggest that none of the drinking PBS included in the ACHA-NCHA Fall 2016 survey make binge drinking safer in terms of risk for sexual assault. Martens and colleagues' (2005) scale includes some specific items not included in the ACHA-NCHA survey that could be tested as protective factors for binge drinking and sexual assault including: 1) Drinking shots of liquor 2) Drinking slowly, rather than

gulping or chugging; 3) Avoiding trying to keep up with others; and 4) Make sure that you go home with a friend. These items, in particular, may reduce binge drinking or lessen the likelihood of incapacitation, and may keep those who do binge drink safer by ensuring students are not left alone in an incapacitated state.

Colleges that administer campus climate surveys should incorporate survey items measuring their students' knowledge and use of drinking PBS, as well as sexual assault victimization, and other alcohol-related adverse outcomes to develop prevention programs that target their specific student population. These surveys can be tailored to evaluate any existing prevention programming and determine if drinking PBS are something that need to be incorporated into alcohol and sexual assault prevention programming on campus. Campus climate surveys can give college administrators an idea of how informed students are about available campus resources for sexual assault victimization, but also for help with alcohol and substance abuse, or other adverse outcomes stemming from alcohol use such as depression.

The focus of this study was to glean whether or not drinking PBS may lower risk for college campus sexual assault in the population of female students who drink, but models also showed three other risk factors throughout analyses: 1) marijuana use, 2) disability, and 3) sexual orientation. Given that marijuana is legal in several states and decriminalized in several others, future research should examine what if any protective behavioral strategies might be salient for students who use marijuana. Researchers should also scrutinize which college students are being studied, specifically focusing on marginalized populations such as students with disabilities and LQBTQ students, who appear to be at disproportionately higher risk for sexual assault, and explore protective

factors specific to these populations (Black et al. 2011; Cantor et al 2015; Eisenberg, Lust, Mathiason, and Porta 2017; Findley, Plummer, and McMahon 2016; Ford and Soto-Marquez 2016; Snyder 2015).

While the current study clearly has limitations, the significant associations between drinking PBS and college campus sexual assault derived from the analyses do demonstrate the need for continued research into the efficacy of drinking PBS as protective factors for college campus sexual assault. Moreover, the results do suggest that drinking PBS are worth exploring for prevention and intervention on college campuses, and provides suggestions for ways to include drinking PBS into pre-existing prevention programming, such as bystander intervention, as well as alcohol education programming through collaboration across campus offices. The study adds to the sparse literature available on both protective factors for college campus sexual assault more generally, as well as for drinking PBS as a specific protective factor for campus sexual assault. The study results underscore the need for future research into understudied marginalized campus populations such as LGBTQ students or students with disabilities, and for further analysis of drinking PBS as protective factors.

CHAPTER 5. CONCLUSION

Each paper in this dissertation addressed a separate but related substantive area in campus sexual assault research. Recognizing the value in quantitative research when it comes to policy and practice implications, while also acknowledging that intersectionality is a cornerstone in feminist scholarship, these papers demonstrate that quantitative analysis and intersectionality are not mutually exclusive. Rather, in combination, an intersectional framework and quantitative analysis can uncover areas in campus sexual assault research that have been largely overlooked.

Paper one, takes the principle of intersectionality and uses it to ask the question, "Which women are being studied in college campus sexual assault research?" The analysis in paper one suggests that female students with disabilities are at disproportionate risk for campus sexual assault. Further, it indicates that disability status is associated with higher odds for campus sexual assault in female students more so than commonly cited risk factors such as alcohol consumption, or Greek life. Thus, in applying an intersectional framework and interrogating which students are being studied, the disproportionate risk for college campus sexual assault victimization that female students with disabilities face is highlighted. This paper has been accepted for publication and is forthcoming in the *Journal of Interpersonal Violence*.

Acknowledging that focusing on just one group of marginalized students at disproportionate risk certainly does not mean intersectionality in campus sexual assault research has been achieved, but instead that an intersectional framework should continue to be applied both theoretically and methodologically. Paper two uses an intersectional theoretical framework and applies it to quantitative methods, using CART analysis to

explore what individual, social-behavioral, and institutional variables are most important, and for which students, in assessing risk for campus sexual assault. CART is relatively new to the social sciences, and in that regard paper two was an exercise in exploring quantitative methodology that lends itself to an intersectional framework. But, beyond the exploratory value paper two provided, the analyses identified and discussed unique social locations disproportionately at risk for three different types of campus assault, completed, attempted, and relationship. Paper two is longer than a standard journal length article, and bridges the substantive area of college campus sexual assault, and intersectional methodology. As such, this paper will be edited and separated into two papers for publication, one that focuses on CART as a tool for intersectional methodology in violence against women research, and one that focuses on the analysis results in relation to the extant literature on college campus sexual assault. The paper focused on methodology will be prepared for submission to *Feminist Criminology*. The second paper focused on the results of the CART analysis will be prepared for submission to *Gender and Society* or *Violence Against Women*.

In response to the overwhelming amount of empirical evidence linking alcohol and college campus sexual assault, paper three explores the efficacy of drinking PBS in college campus sexual assault prevention or risk reduction. The analysis used logistic regression to examine the main and moderating effects drinking PBS on campus sexual assault, and alcohol consumption (frequent alcohol use and binge drinking), respectively. The results were mixed in terms of whether or not individual drinking PBS strategies were effective, but overall, increased mean use of all drinking PBS was associated lower risk for sexual assault. The possible practice implications and paths for future research on

the topic were outlined. This paper may be appropriate for journals focused on violence and victimization, or for journals focused on alcohol studies. As such, this manuscript will be prepared for *Journal of Interpersonal Violence*, *Violence Against Women*, or *Journal for Studies on Alcohol and Drugs*.

There were some notable themes that emerged through all three papers. First, marijuana use showed up as a significant risk factor in each study. Although the reason for marijuana use being a risk factor is not clear, these results have implications for future research. In order to better understand the correlation between marijuana use and college campus sexual assault, it is necessary to explore the context in which students use marijuana as well as their reasons for using marijuana. Understanding the context may help researchers delineate whether or not marijuana use is a proxy for other risk taking behavior, or if the effects of marijuana use are amplified by other alcohol and substance use leading to increased risk for sexual assault, or if marijuana use in and of itself increases risk for sexual assault on college campuses. Moreover, getting a better picture of why students use marijuana may also help explicate the link to sexual assault. For instance, while many students may be using marijuana in the context of college party culture, others may be using marijuana as a coping or self-medicating mechanism in response to trauma or stress, mental or physical health disorders. Knowing the reasons behind marijuana use, the context, and students' attitudes regarding marijuana should shed light on the relationship between marijuana use and sexual assault, as well as help guide response and prevention to sexual assault on college campuses.

Next, while the first paper focuses on students with disabilities specifically, disability status continued to be an important risk factor through all three papers. More

information is needed to flesh out the relationship between disability status and college campus sexual assault in detail. Having a disability may make students more vulnerable to sexual assault perpetrators. Understanding more about students with disabilities social networks, social-behavioral norms such as drinking and drug use, mental health, as well as barriers they face on college campuses may help delineate why these students are more vulnerable and inform prevention and intervention programming accordingly. Additionally, the we need better and more specific information regarding what specific types of disabilities put students at risk. Future researcher should endeavor to shed light on these issues.

Another variable that emerged as a risk factor was LGBTQ status, with students who identified as LGBTQ being at increased risk for experiencing sexual assault victimization. Future research should focus specifically on LGBTQ students and their experiences of sexual violence. Further, this research should avoid lumping experiences of LGBTQ students into a singular category. The experiences of lesbian, gay, bisexual, trans, and queer students are likely unique to their individual identities. Thus, calling for research LGBTQ students experiences of sexual assault on college campuses is a start, but too often these students are being treated as one group with the same identity. Unilaterally lumping students whose sexual orientation or gender identity is not aligned with heteronormative identities may result in over or understating risk and protective factors for these students.

Although college campus sexual assault is not a new or groundbreaking topic of research, there is still much that needs to be done to more fully understand the experiences and risk factors for victimization. This dissertation highlighted ways to

engage in more intersectional quantitative research such that marginalized populations do not continue to be overlooked. By no means is this dissertation an exhaustive intersectional study, and that was not the aim. The aim was offer new ways to think about quantitative research intersectionally with regard to violence against women research, to highlight marginalized and disproportionately victimized student experiences, and to uncover further research avenues that may expand the intersectional and feminist scope of quantitative research.

APPENDIX

Appendix

Descriptive Statistics For Paper One

Variable	Full Sample (N= 33,512)	Female Sub-Sample (N= 23,120)
	Percent	Percent
Any Sexual Assault	4.8	6.1
Completed Sexual Assault	2.3	3.0
Attempted Sexual Assault	3.5	4.6
Relationship Sexual Assault	2.3	2.8
Disability (any)	22.6	23.2
Race		
White	62.7	63.3
Black	5.9	6.3
Hispanic/Latino(a)	10.7	11.0
Asian	11.6	10.3
American Indian	1.8	1.8
Bi/Multiracial	3.6	3.9
Other race	2.6	2.2
Age (mean)	22.1 (SD=6.00)	22.0 (SD=5.98)
Heterosexual	80.0	78.8
Gender Non-conforming	1.5	1.5
Transgender	1.4	1.6
Fulltime enrollment	90.5	90.3
Veteran	2.0	1.0
International		
Year in school		

Appendix (continued)

1st year undergraduate	24.8	24.9
2nd year undergraduate	17.9	18.5
3rd year undergraduate	18.4	18.6
4th year undergraduate	16.5	16.8
5th or more undergraduate	5.4	5.3
Graduate/Professional student	15.2	13.8
Housing		
Campus residence hall	38.7	38.9
Fraternity or sorority house	1.2	1.1
Other campus housing	3.4	3.4
Parent or guardian's home	16.1	16.5
Other off-campus housing	34.7	33.7
Other housing	5.1	5.3
Relationship status		
Not in a relationship	51.7	49.1
In a relationship, not living together	33.1	35.3
In a relationship, living together	14.3	15.0
Marital status		
Single	87.6	87.5
Married/Partnered	8.9	8.6
Separated	.2	0.3
Divorced	1.0	1.1
Other	1.4	1.3

Appendix (continued)

Varsity athletics	7.4	6.8
Club athletics	10.3	8.6
Intramural athletics	16.7	12.7
Greek affiliation	10.5	11.2
Work hours per week		
0 hours	40.4	38.5
1-9 hours	15.9	16.7
10-19 hours	18.1	18.8
20-29 hours	12.7	13.0
30-39 hours	4.1	4.5
40 hours	4.3	4.3
More than 40 hours	3.2	2.8
Volunteer hours per week		
0 hours	61.4	59.3
1-9 hours	32.6	34.5
10-19 hours	3.1	3.1
20-29 hours	0.8	0.8
30-39 hours	0.2	0.2
40 hours	0.2	0.1
More than 40 hours	0.2	0.1
GPA		
A	42.6	43.7
B	43.8	44.3
C	8.6	8.2
D/F	.5	0.4
N/A	3.5	3.4

Appendix (continued)

Binge drinking prior 2 weeks (any)	31.8	28.7
Alcohol consumption prior 30 days		
Never used	21.3	20.4
Used, not in last 30 days	14.3	14.8
1-2 days	18.0	19.4
3-5 days	17.1	17.4
6-9 days	14.3	14.0
10-19 days	10.8	10.4
20-29 days	2.9	2.5
Daily	.9	0.6
Marijuana use prior 30 days		
Never used	62.3	63.0
Used, not in last 30 days	19.0	19.3
1-2 days	6.7	6.8
3-5 days	3.2	3.1
6-9 days	2.2	2.0
10-19 days	2.4	2.2
20-29 days	1.4	1.2
Daily	2.3	1.9
Illicit drug use prior 30 days		
Never used	96.3	97.1
Used, not in last 30 days	2.8	2.3
1-2 days	.3	0.0
3-5 days	.1	0.1
6-9 days	.1	0.0
10-19 days	.0	0.0

Appendix (continued)

20-29 days	.0	0.0
Daily	.1	0.0
Campus type		
Two-year	5.0	4.8
Four or more years	95.0	95.2
Campus size		
Less than 2500	9.1	9.9
2500-4999	11.7	11.6
5000-9999	27.7	27.1
10,000-19,9999	18.0	17.2
20,000 or more	33.5	34.1
Public or Private		
Public	59.9	59.5
Private	40.1	40.5
Carnegie Classification		
Associates colleges	5.0	4.8
Baccalaureate colleges	14.9	13.5
Master's Colleges and Universities	18.3	19.1
Doctoral Universities	59.2	59.7
Baccalaureate Associates Colleges	2.5	3.0
Religious institution	18.0	19.5
Campus locale population size		
>=500,000	18.1	17.9
250,000-499,999	19.2	18.9

Appendix (continued)

50,000-249,999	25.5	26.5
10,000-49,999	25.3	26.5
2,500-9,999	9.0	7.4
<2,500	2.8	2.8
Region of Campus		
Northeast	23.5	22.6
Midwest	27.0	27.0
South	32.5	32.9
West	17.0	17.5
Feel safe on campus-Daytime		
Not safe at all	.3	.2
Somewhat unsafe	1.1	1.1
Somewhat safe	13.0	14.0
Very safe	85.1	84.0
Feel safe on campus-Nighttime		
Not safe at all	2.9	3.4
Somewhat unsafe	14.2	17.2
Somewhat safe	45.8	51.0
Very safe	36.3	27.7
Feel safe in community surrounding school- daytime		
Not safe at all	1.3	1.2
Somewhat unsafe	7.1	7.6
Somewhat safe	39.4	42.1
Very safe	51.5	48.3

Appendix (continued)

Feel safe in community surrounding school-nighttime		
Not safe at all	11.3	12.6
Somewhat unsafe	29.5	33.4
Somewhat safe	39.1	39.6
Very safe	19.5	13.6

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VITA

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EDUCATION

2019 (expected)	**Ph.D.,** Sociology, University of Kentucky Dissertation title: Students on the Margins: Intersectionality and College Campus Sexual Assault *Committee: Dr. Claire Renzetti (Chair), Dr. Diane Follingstad, Dr. Carrie Oser. Dr. Joe Ferrare*
2010	**M.A.,** Criminology, University of Minnesota *Thesis Chair: Dr. Emily Gaarder*
2008	**B.A.,** Criminology, University of Minnesota Duluth

PROFESSIONAL POSITIONS HELD

2017	**Project Director** *Department of Sociology/Center for Research on Violence Against Women* Office on Violence Against Women Grant to Evaluate Greenhouse 17 (local domestic violence shelter) Therapeutic Horticulture Program
2016-Present	**Graduate Research Assistant** *Center for Research on Violence Against Women* Campus Attitudes Toward Safety Survey Project
2014-15	**Project Director** *Crook County Domestic Violence Intervention Team* Victim Experience with Community Coordinated Response in Crook County Interview Project
2009	**Graduate Research Assistant** *University of Minnesota Department of Sociology/Criminology* International Migration in Healthcare

PUBLICATIONS

Campe, Margaret I. "College Campus Sexual Assault and Students with Disabilities." *Journal of Interpersonal Violence.* (Forthcoming)

Campe, Margaret I. and Claire Renzetti. "Feminist Debates on Interpersonal and Structural Violence." In *Companion to Gender Studies*, edited by N.A. Naples. New Jersey: Wiley Blackwell. (forthcoming, Spring 2019)

Harp, Kathi L.H., Margaret I. Campe, and Carrie B. Oser. "Substance Use and Family Violence: Introduction and Overview." In *Substance Use and Family Violence*, edited by K. Harp, C.B. Oser, and M.I. Campe. San Diego, CA: Cognella. (under contract for January 2021 publication)

Harp, Kathi L.H., Margaret I. Campe, and Carrie B. Oser eds. *Substance Use and Family Violence.* San Diego, CA: Cognella. (under contract for January 2021 publication)

HONORS

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