

SPECIFIC SEXUAL RISK BEHAVIORS OF COLLEGE STUDENTS AND THE ROLE  
OF ALCOHOL INTOXICATION IN THE INTENTION TO PARTICIPATE

By

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To my husband – without his support, this accomplishment  
would not have been possible  
To the Gator Nation

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Abstract of Dissertation Presented to the Graduate School  
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This study explores specific sexual behaviors of college students and the role alcohol intoxication may play in the intention to participate in the behaviors and is presented as three individual manuscripts. A modified version of N. Krause's instrument development process was applied to create a behavior-specific instrument assessing oral, vaginal, and anal sex behaviors. The process included a review by expert scholars in relevant fields, cognitive interviews with the target population, piloting to assess measurement scales, and a formal investigation. Fifty preliminary measures were developed and assessed during the process, which resulted in 49 final questions. The piloted instrument resulted in a 17.75% response rate. Psychometric testing was conducted and the instrument was edited once more. The formal investigation resulted in a 20.8% response rate. The 3% increase in response rate was attributed to the addition of four \$50 gift card incentives.

The Theory of Planned Behavior was applied via a path analysis to determine the causal links between the constructs. Three models were developed, one for each sexual behavior: oral, vaginal, and anal. Overall results of all three models indicated Attitude Towards Behavior had the greatest impact on intention. Subjective Norm was

also significant, while Perceived Behavioral Control did not significantly impact Intention or Behavior in terms of direct paths.

A cluster analytic technique revealed three distinct risk groups. Low-risk members were in an exclusive relationship, reported less condom/barrier or contraceptive usage, and were least likely to be a victim of coercion/abuse. Though the medium-risk group had higher frequencies of sexual activity, it was characterized by more protective behaviors, such as higher proportion of condom/barrier usage. The high-risk group was primarily composed of those casually dating, reporting more sexual partners and less condom/barrier usage.

These results indicate an individual's effort to protect themselves from sexual-risk consequences is attributed to the duration and stability of the relationship. Results have medical screening and policy implications for drinking offenses and sexual assault. They provide a clearer understanding of the relationship between alcohol use and sexual activity and aid in the development of effective public health interventions.

## CHAPTER 1 INTRODUCTION AND LITERATURE REVIEW

### **Introduction**

One of the overarching goals of Health People 2020 is the improvement of reproductive health through promotion of healthy sexual behaviors. Among these ongoing public health challenges are Sexually Transmitted Infections (STIs) which include more than 25 infectious organisms that are transmitted through various sexual behaviors.<sup>1</sup> Though some STIs are treatable, they all cause long-term health risks, including increased risk for cancer, and HIV/AIDS.<sup>2</sup> Annually, in the U.S., untreated infections contribute to infertility in approximately 24,000 women.<sup>1</sup> The annual cost of these infections to the U.S. health care system estimated at \$15.9 billion.<sup>3</sup>

The Centers for Disease Control and Prevention (CDC) estimated approximately 19 million new STI cases each year.<sup>4</sup> Unfortunately this number can only be an estimate due to the lack of proper STI diagnosis and reporting. Only cases of Chlamydia, gonorrhea, and syphilis are reported to the CDC. Some infections are asymptomatic or are never discussed with a physician and thus are undiagnosed. Common viral infections such as Human Papillomavirus (HPV) and genital herpes are not reported as they can be complicated to diagnose due to multiple strains and they have no cure; making it difficult to track the spread of infection. Thus public health professionals are left with a fraction of the true scope of the STI problem.

Sexually transmitted infections result from sexual activity. An individual's overall probability of acquiring an STI increases with number of sex partners. According to the National College Health Assessment (NCHA) 70% of college students have had at least one sexual partner within the past school year.<sup>5</sup> Though total abstinence is the only way

to completely eliminate one's risk of STI transmission, individuals who are sexually active are unlikely to return to abstinence as a disease protection measure.<sup>6</sup> Of those NCHA students who reported being sexually active, only 18% stated they practiced safe sex by always using a condom and 4% reported not using any form of pregnancy protection.<sup>5</sup> These risky sexual behaviors led to approximately 9 million new STI infections among 15 to 24 year olds as well as increased numbers of unwanted pregnancies.<sup>7, 8</sup> Approximately, 1 out of 10 women reported an unintended pregnancy with rates highest among women aged 18–24.<sup>9</sup> In addition, a significant percentage of the NCHA college students reported participating in anal sex which, if unprotected, is the most efficient route for HIV transmission.<sup>10-12</sup> Young adults aged 15 to 24 account for approximately 12% of newly diagnosed cases of HIV in the United States.<sup>4</sup>

Alcohol consumption has been linked to risky sexual behavior on college campuses, particularly heavy alcohol consumption.<sup>13-15</sup> Heavy episodic or binge drinking is defined in the literature as the consumption of at least five or more drinks in a row for men (four or more for women) at least once within the past two weeks.<sup>16</sup> Depending on the type of school and its location, approximately 20% to 50% of students are likely to be heavy drinkers.<sup>17</sup> According to the 4th edition of the Diagnostic and Statistical Manual of Mental Disorders nearly one-third of college students meet the criteria for the formal diagnosis of alcohol abuse and one in 17 can be classified as alcohol dependent.<sup>16</sup>

In addition to alcohol abuse and alcohol dependency, heavy alcohol consumption contributes to a variety of other problems. Heavy episodic drinking is consistently associated with serious personal, social, and community consequences which include,

but are not limited to violence, physical injury, property damage, sexually transmitted infections, unintended pregnancy, sexual assault, poor academic performance, and even death.<sup>16, 18</sup> The National Institute on Alcohol Abuse and Alcoholism (NIAAA) estimates that annually over 1,700 student deaths, 599,000 student injuries, and 696,000 assaults occur and are associated with high-risk drinking.<sup>19</sup> Heavy alcohol use also impacts academics. In their study, Wechsler, Lee, Kuo, and Lee found more than one third of frequent heavy drinkers were behind in schoolwork, and over half reported doing something they regretted as a result of their alcohol abuse.<sup>15</sup>

Forty two percent of college students who drink heavily also engaged in unplanned sex.<sup>15</sup> Among college students high-risk drinking and sexual risk-taking routinely occur simultaneously.<sup>7</sup> Inconsistent condom use is also highly correlated with high-risk drinking.<sup>20, 21</sup> Research indicates that women have a one in five chance of being sexually assaulted while enrolled in college.<sup>22</sup> The social environment of school with high rates of heavy episodic drinking (5 or more drinks) places students at an increased risk of sexual assault.<sup>23</sup> While rates of sexual assault vary widely due to varying definitions, policies, under-reported incidents, and differing data collection methods. One study estimates alcohol involvement in at least 50% of all sexual assaults involving college women.<sup>24</sup> Alcohol use is also associated with an increased likelihood of sexual coercion and sexual assault, along with a greater severity of the latter due to intensified sexual expectations and increased feelings of alcohol-induced sexual prowess and aggression among males.<sup>25 26</sup> Additionally, some students cite alcohol use as validation for participation in sexual activity and high-risk behaviors.<sup>24</sup>

## Research Problem

Campuses provide an important context in which to study risky sexual behaviors because students' behaviors demonstrate a developmental progression. The percentage of students ever having had sex rises steadily during the college years, peaking at about 86% by the senior year.<sup>27</sup> While in high school, students who plan to attend college have lower rates of heavy drinking than their non-college bound peers. However, after high school graduation both groups increase their rates of heavy drinking, with rates of college students' alcohol consumption increasing dramatically and ultimately surpassing their nonstudent peers.<sup>28</sup> The difference in level of risk-taking is also present within the college student population. Since 2002, data show that young adults enrolled in full-time four year institutions generally participate in more high-risk drinking than those not enrolled full time.<sup>29</sup> Additionally, Naimi and fellow researchers report consumption of 5 or more drinks to be most prevalent during the late teens and early to mid-twenties.<sup>18</sup>

Additional indicators of problem drinking behaviors and sexual consequences among college students are well documented. In 2006, undergraduate students from 134 colleges across the nation (N=71,189) completed the Core Alcohol and Drug Survey (a standardized instrument specifically aimed at college students). Over 10% of participants reported being taken advantage of sexually and 3.2% reported taking sexual advantage of another person. Additionally, 18.6% of respondents believed alcohol causes women to feel sexier and 18.4% stated the same belief for men. Over half (53.7%) of participants responded in the affirmative when asked if alcohol facilitates sexual opportunities.<sup>30</sup> Within the year preceding the study a small percentage of students reported experiencing forced sexual touching (4.9%) and unwanted sexual

intercourse (3.0%), most of these violent acts (69.1% and 82.3%, respectively) occurred along with the use of drugs or alcohol. The dangerous interactions between alcohol use and high-risk sexual activities suggest public health prevention efforts attempting to explain the relationship between these two risk factors are needed if effective intervention programs are to be developed.

Excessive alcohol use results in deleterious sexual health and reproductive consequences for college students. As previously discussed, these risk behaviors are related to one another in complex ways. However, there is a lack of consensus on the best methodologies for collecting valid and reliable data on self-reported sexual behaviors and alcohol use.<sup>31</sup> In addition, while a number of instruments exist to measure sexual behavior few measure the entire spectrum of behaviors; including digital and oral sex. The lack of measurement consistency between studies is problematic making comparisons and generalizations difficult to assess, and possibly resulting in incomplete or incorrect public health implications.<sup>32</sup> Studies conducted with inappropriate measures or measures lacking sensitivity for certain behaviors, may reach inappropriate conclusions. Future studies attempting to understand individual differences in alcohol use and sexual behaviors are necessary for development of effective interventions.<sup>7, 33</sup> Along with increased sensitivity and precision of sexual behavior measurements, assessment of the interaction between alcohol use and participation in sexual activities is warranted. Cooper suggests the application of multivariate models embedding alcohol use in the network of these risk behaviors.<sup>7</sup>

### **Significance**

Sexual behaviors, especially in combination with alcohol use, can cause physical, emotional, and financial burdens. Oftentimes these behaviors result in STIs, a long-time

public health problem of significance, though largely unrecognized by the public, policymakers, and health care professionals.<sup>1</sup>

Despite the large amount of research into sexual behavior and alcohol use, a lack of agreement exists as to the best way to measure and validate self-reports of sexual behavior and alcohol use.<sup>7, 31</sup> In addition, many existing instruments measure sexual behavior but few measure specific sexual behaviors.<sup>7</sup> Studies conducted with inappropriate measures or measures lacking sensitivity to specific sexual behaviors, can easily reach inappropriate conclusions regarding the risk behavior. Noar, Cole, & Carlyle provide examples of this discrepancy as it related to condom use.<sup>34</sup> They cite surveillance studies assessing the percentage (proportional measure) of condom usage, but failing to take into account the frequency of sexual intercourse. This failure results in a lowered risk due to less frequent intercourse, but the proportional measure of condom usage is not accurately represented. Accurate behavior measurement is critical for positive impacts on public health and policy.

### **Theory of Planned Behavior**

Planning effective health behavior interventions requires use of a theoretical framework to guide “empirically adequate descriptions, explanations, or predictions” of the behavior.<sup>35</sup> One of the most widely and effectively used behavioral theories in sexual risk research is the Theory of Planned Behavior (TPB).<sup>35-37</sup> The TPB is an extension of the Theory of Reasoned Action (TRA), which posits attitude and perceived acceptance of a behavior as influencing a person’s intention. Behavioral intention then influences a person’s decision to perform or refrain from performing a behavior.<sup>36</sup> Ajzen and colleagues expanded the theory by incorporating perceived control over behavior achievement as an additional aggregate of intention.<sup>38</sup> The change allowed researchers

to take into account factors such as resources and opportunities.<sup>39</sup> Refer to Figure 1-1 for the Theory of Planned Behavior.

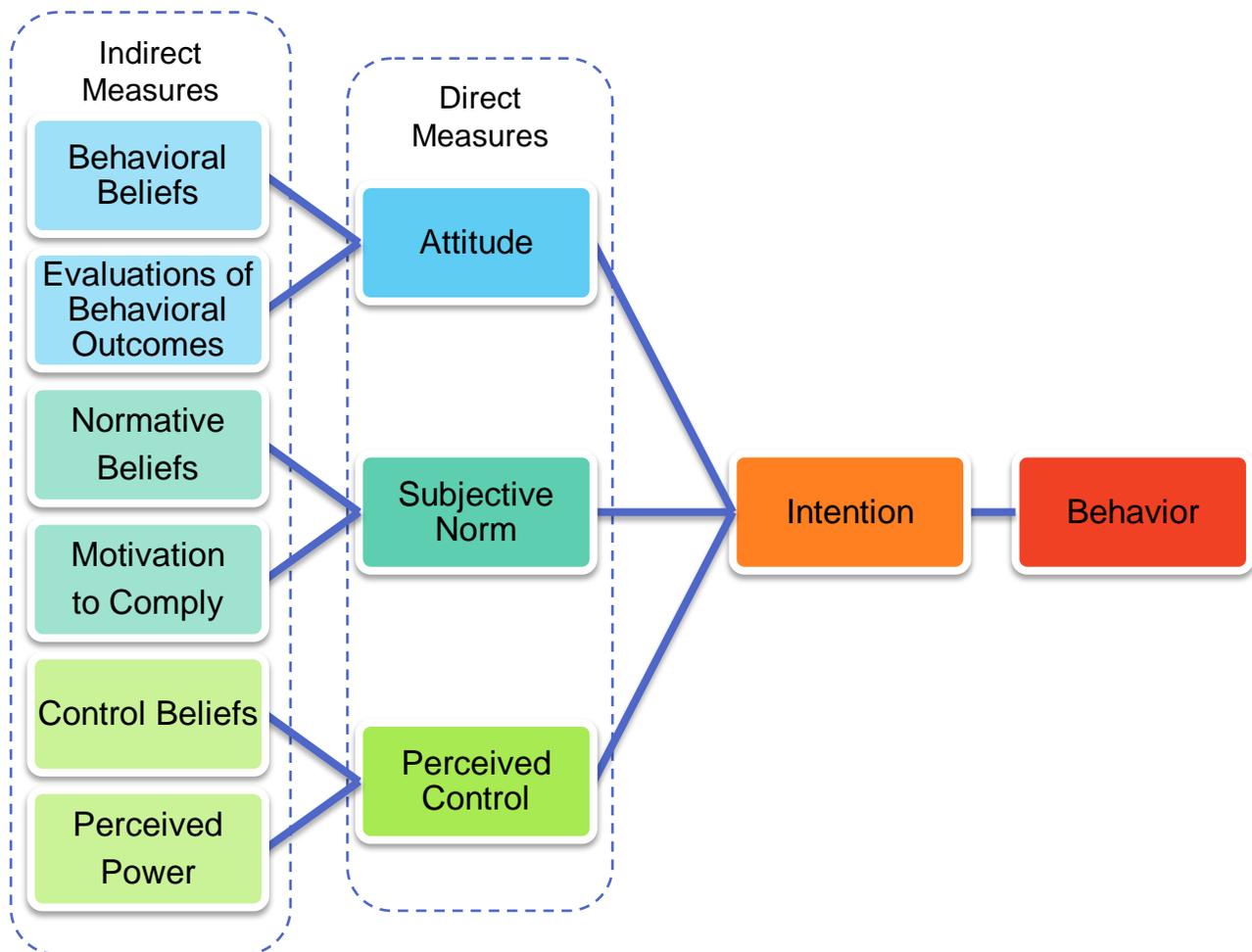


Figure 1-1. Theory of Planned Behavior

The constructs of the TPB, with the exception of behavior, are psychological and may be measured directly, e.g. asking respondents about their overall attitude towards a behavior, or indirectly, e.g. asking respondents about their beliefs and outcome evaluations concerning the same behavior. Direct and indirect measurement approaches make different assumptions about the underlying cognitive structures and neither approach is perfect.<sup>39</sup> Direct measures are usually more strongly associated with intentions and behaviors than are indirect measures. The association between direct

measures and intention indicates the relative importance of attitude, subjective norm, and perceived behavioral control in explaining or predicting a behavior. It is critical to demonstrate these associations before analyzing indirect measures. Thus, indirect measures should be strongly associated with direct measures in order to be certain that appropriate beliefs are included in the indirect measures and that composite beliefs (attitude, norms, and control) are adequate measures of their respective TPB constructs. Once this is demonstrated, indirect measures are most applicable for intervention and policy development. Thus, experts recommend the inclusion of both measurements in TPB instruments.<sup>40</sup>

The predictor variable of Attitude is directly measured by asking respondents about their overall attitude toward a behavior. For example, those who report participation in anal sex while intoxicated is fun and enjoyable are more likely to have favorable attitudes in general toward drinking and participating in risky sexual behaviors. Consequently, people who believe participating in anal sex while intoxicated is risky and potentially unhealthy are more likely to have unfavorable attitudes toward participating in sexual behaviors while intoxicated. Attitude can also be measured indirectly by inquiring about specific behavioral beliefs and outcome evaluations. Behavioral beliefs consist of an individual's attitude towards performing a behavior. Evaluation of behavioral outcomes is the relative value an individual places on possible behavioral outcomes or elements.

Subjective norm represents an individual's beliefs about whether influential people in their lives (i.e. family, close peers, significant others) will approve or disapprove of their behavior and how strongly motivated they are to comply with the expectations of

these influential people. Indirect measures include normative beliefs and motivation to comply. Normative beliefs describe the individual's subjective assessment of whether influential people in their life will approve or disapprove of a particular behavior. Motivation to comply is influenced by whether or not the individual cares what these influential others think.

Perceived Behavioral Control (PBC) is the individual's overall assessment of their power or control to perform or discontinue a behavior. Indirect measures include the constructs of control belief, which is an individual's assessment of perceived benefits and barriers to performing the behavior, along with perceived power, which is the evaluation of each condition which makes achieving the behavior more or less difficult.

Cooper and Orcutt conclude that because of the complex relationship between the variables alcohol use and sexual behaviors, they are best understood, not in isolation, but in the context of a larger system of interconnected variables.<sup>33</sup> Thus, selection of the Theory of Planned Behavior (both direct and indirect measures) to assess these behaviors in relation to college student risk-taking seem most advantageous.

### **Instrument Development Process**

The literature contains many articles describing instrument development processes, few of the existing methodologies use both qualitative and quantitative methods, and even fewer provide specific methodological details.<sup>41-44</sup> Krause effectively described a multi-modal technique for developing close-ended survey questions that effectively bridge the qualitative/quantitative methodological approaches.<sup>42</sup> While a full understanding is lacking in regards to the ways multiple risk behaviors interact, sexual activity and related risk behaviors have been widely studied.<sup>7, 45-48</sup> Thus, Krause's development process was slightly adjusted to reflect the current published information

concerning these behaviors (i.e. focus groups, interviews, etc.). Figure 1-2 describes the eight-step instrument development process. An in-depth discussion of each step follows the figure.

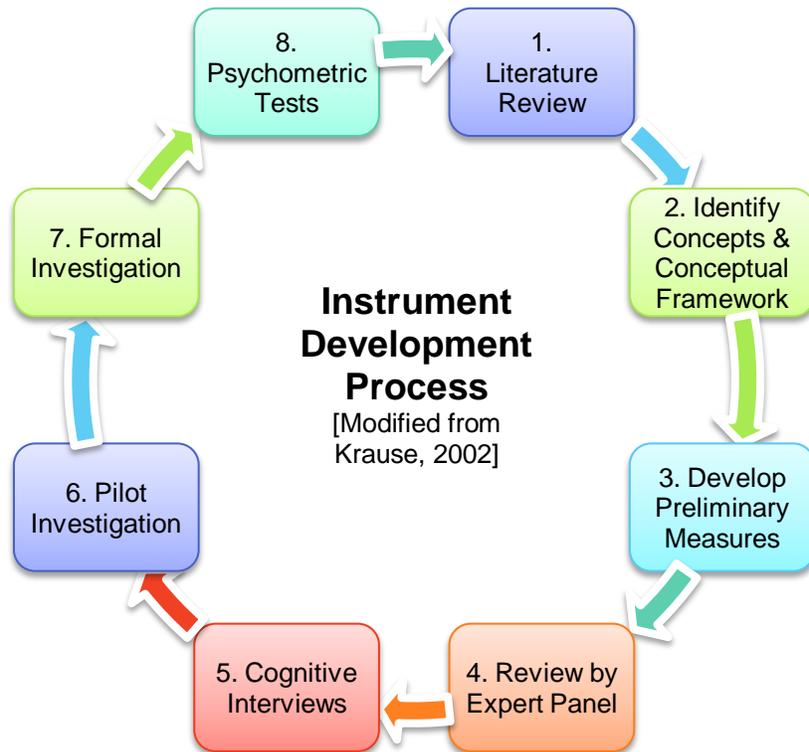


Figure 1-2. Instrument development process

Step 1. The instrument development process requires a thorough review of the literature. When little or no information is known about the behavior of interest, focus groups and in-depth interviews are important for filling the void in the literature. This study was aided by the plethora of published information concerning alcohol and sexual risk behaviors among college students. Therefore, a review of the current literature was completed to determine applicable themes, variables and behavioral measures.

Step 2. Addressing the proposed research questions required an instrument using combined measurements consisting of established and validated items, newly

developed items, and items specifically revised for the purpose of this study. Step 2 involved identifying the appropriate concepts and theoretical frameworks, and culminated in the formal selection of a theoretical or conceptual framework. For this study, the Classical Test Theory was used to guide the development and assessment of all proposed measurements.<sup>42, 49</sup> Of equal importance is acknowledgment of the Classical Test Theory's limitations. First, the psychometric properties of this theory are instrument and sample dependent. Also, due to the cross-sectional study design the measurement is static.<sup>49</sup> A similar theory with increasing use demonstrated in the current literature is the Item Response Theory (IRT). However, use of the IRT in this study was precluded by the inability to meet common assumptions of the theory. The present study focuses on behaviors that most likely occur simultaneously and, as the Theory of Planned Behavior posits, influence behavior through intention. Thus, the instrument is neither unidimensional nor provides local independence, common IRT assumptions. In addition, present study methodology required online delivery of the instrument which enabled respondents to complete it in a private setting. The need for respondent anonymity and use of an uncontrolled environment for participant response made it impossible for the researcher to meet the IRT environmental requirement of a non-rushed format where the respondents did not have personal schedule or time restrictions.<sup>49</sup>

Step 3. Preliminary measures were created by the application of results of the previous steps. For this existing measurements were adapted for use specifically to increase instrument validity. Items were retrieved from existing instruments including several surveillance and behavioral questions used in the American College Health

Association's National College Health Assessment II (ACHA-NCHA II).<sup>5</sup> Additionally, perceived effects were evaluated using items from the Core Alcohol and Drug Survey. The Core survey is a nationally validated instrument specifically aimed at evaluating behaviors in college student populations.<sup>30</sup> The measurements from the aforementioned instruments were used in their entirety. The third existing instrument was the Worry about Sexual Outcomes (WASO) Scale. This scale evaluates a participant's perceived concern over sexual risk-taking outcomes. The 10-item measurement contains two subscales of worry, namely STI. The WASO was demonstrated to have internal consistency and satisfactory construct validity in a sample of 522 African-American female adolescents.<sup>44</sup> For this study the pregnancy items were omitted since they exclude male respondents. Instead, gender neutral pregnancy items were developed.

The fourth step involved assembling an expert panel to review the proposed instrument. A total of 6 scholars knowledgeable in the areas of alcohol use, sexual behaviors, instrument development and statistical analysis were selected to assess the proposed measures and instrument as a whole. Each expert received for review all student notifications, consent forms and the complete questionnaire. They were asked to evaluate the quality of the content, instrument structure, and the ability of the measures to address both the theoretical constructs and the proposed statistical analysis.

Following edits based on panelists' comments, cognitive interviews were conducted with the population of interest. The purpose of the interviews was to assess correct interpretation of the items by participants. Close attention was given to issues arising due to cultural and societal differences between the researchers and the

participants. Eleven interviews were conducted with college students aged 18-24 years. Both genders were sampled and interviews were conducted in a private, confidential environment. Students were asked to think-a-loud and hypothetically answer each question. The researcher focused on assessing four components: comprehension, information retrieval, judgment, and reporting. Refer to Table 1-1 for a complete list of guiding probes. Careful attention was made to ensure that the context of the recall did not impede the completion of the measurement or the respondent's capability to recall an event. Attention was also given to both the evaluation and presentation of the instrument.

Step 6. Upon completion of the previous step, a pilot study was conducted on the edited instrument. The primary purpose of the pilot investigation was to conduct a quality check among the target population. A total of 4,000 students, aged 18-24 were randomly selected by the registrar to participate in the pilot study. The selected sample consisted of 2,000 students enrolled full-time during the Summer A semester and an additional 2,000 participants enrolled full-time during the Summer B/C term. This approach allowed the sampling to be reflective of the university population, as opposed to over sampling students who were first semester freshman in the Summer B term. In addition, no one under the age of 18 was allowed to participate in the study.

Seven hundred ten students completed the pilot test resulting in a 17.75% response rate. The pilot study assessed the length of the survey, frequency of distributions to ensure sufficient variance among the behavioral indicators, and performance of exploratory factor analyses to examine the newly developed scales' structure and psychometric properties.

Once the pilot instrument was edited, the final two steps involved formal investigation and psychometric tests. The final instrument was administered to a random sample of 4,000 full-time students, aged 18-24 years and enrolled during Spring semester. The final iteration resulted in 832 respondents for a 20.8% response rate and successful collection data necessary to conduct the required statistical analyses. Of particular interest is the TPB's constructs' predictability of sexual risk. Additional psychometric analyses were conducted to continue assessment of the validity and reliability of the final instrument.

### **Analytic Techniques**

In order to understand the influence of alcohol use and specific sexual behaviors, the following statistical analyses were conducted. First, descriptive statistics describe the sample population. Psychometric properties of the instrument were also assessed. Structural equation modeling was conducted via a path analysis to assess the constructs of the Theory of Planned Behavior on intention to participate in specific sexual behaviors (oral, vaginal, anal) while intoxicated. Finally, a cluster analytic technique was used to aid in risk identification and assessment. This included a typological grouping of respondent's sexual risk level using a cluster algorithm, followed by a discriminant analysis to differentiate between the groups. Figure 1-3 provides both the cluster and discriminating variable. More information concerning each analysis is included in their respective chapters.

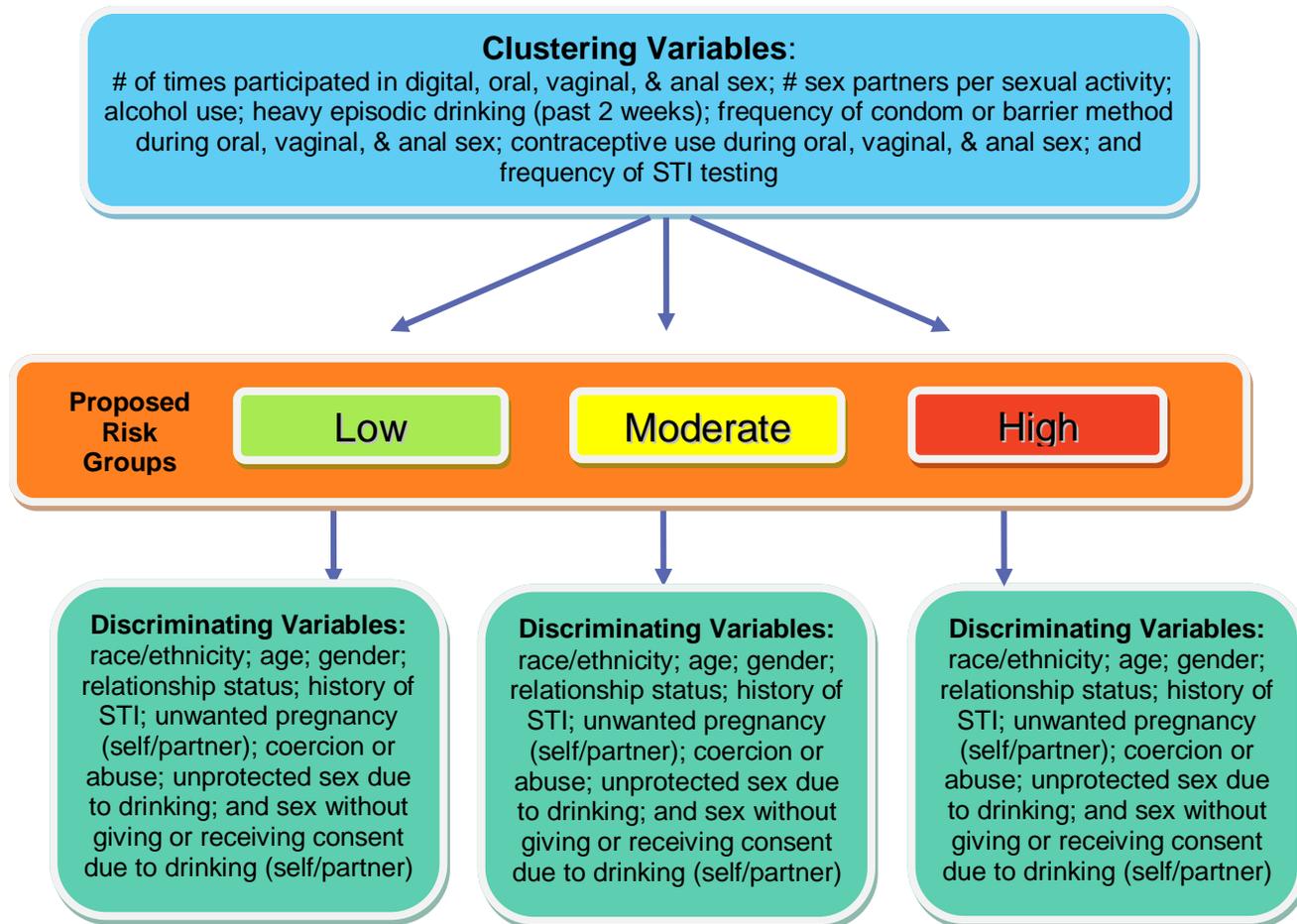


Figure 1-3. Cluster analytic variables

### Research Questions

The research questions for the proposed investigations include the following:

**RQ1:** How can current sexual risk behavior survey instruments be improved?

**RQ2:** Can an instrument be developed to collect and assess the specific sexual behaviors of college students?

**RQ3:** What is the reliability and validity of the Specific Sexual Behavior instrument?

**RQ4:** What is the prevalence of specific sexual behaviors among college students at a large southeastern university?

**RQ5:** How much of the sexual behavior while intoxicated variance is accounted for by the Theory of Planned Behavior?

**RQ6:** Which construct(s) within the Theory of Planned Behavior (Subjective Norm, Attitude Toward the Behavior, Perceived Behavioral Control, and Behavioral Intention) account for the largest proportion of variance when predicting specific sexual behaviors among college students while intoxicated?

**RQ7:** Using constructs from the Theory of Planned Behavior, what are the causal effects in predicting participation in specific sexual behaviors while intoxicated?

**RQ8:** What is the sexual behavior typology of sexually active college students enrolled full-time at a large southeastern university?

**RQ 9:** What are the sexual risk-taking differences between the observed typology clusters?

**RQ10:** Among the observed clusters, are sexual coercion and abuse, unplanned pregnancy, and sexually transmitted disease more or less prevalent?

### **Organization of the Studies**

The aim of this study is the examination of specific sexual behaviors and the role of alcohol use in one's intention to participate in these behaviors. The specific purposes were to: 1) develop a survey tool using both qualitative and quantitative methods; 2) apply the Theory of Planned Behavior to assess the perceptions, attitudes, prevalence and intentions of sexual-risk taking behaviors among college students; 3) identify the typology of sexual risk-taking among college students using a cluster analytic technique.

Chapter 2 presents the first manuscript which involves the development and evaluation of the proposed sexual-risk taking survey. Due to the sensitive nature of the subject matter the instrument was administered online. Among the college student population, web-based surveys are more cost effective and convenient than other modes of survey research.<sup>50</sup> Four thousand full-time undergraduate students 18-24 were randomly recruited for this investigation. All participants were notified via e-mail to complete the online survey.

The survey instrument was developed for this study. Instrument development included: 1) an extensive review of the literature; 2) identifying the concepts and conceptual frameworks commonly associated with alcohol use and sexual behaviors; 3) development of preliminary measures;<sup>40</sup> 4) content review by experts in the areas of alcohol use and sexual behaviors, instrument development, research, and statistical analysis; 5) cognitive interviews with the target audience of college students; 6) a pilot testing of the proposed instrument; 7) a formal investigation and 8) continued psychometric testing. Refer to Figure 1-2 for the instrument development framework.

Chapters 3 and 4 describe the formal assessment of the instrument. Chapter 3 presents the second manuscript, describing application of the Theory of Planned Behavior to assess sexual risk-taking attitudes, perceptions, and prevalence among college students. This theory was chosen based upon the stated research questions for this study. Chapter 3 describes individual motivation factors as behavioral predictors through the relationship between beliefs, norms, attitudes, intentions, and behaviors<sup>39</sup> as they relate to specific sexual activities engaged in while an individual is intoxicated.

Chapter 4 presents the cluster analysis was serving as the focus of the third manuscript. In this portion of the study, participants were grouped based on the following sexual risk-taking variables: number of times respondents participated in digital sex, oral sex, vaginal sex, and anal sex; number of sex partners in the past 30 days; alcohol use in the past 30 days; heavy episodic drinking in the past 2 weeks; frequency of condom or barrier method use during oral, vaginal, and anal sex in the past 30 days; and frequency of STI testing and contraceptive use. The following consequences were used to discriminate between the cluster groupings: race; age;

gender; relationship status; history of sexually transmitted infections; unplanned pregnancy (self or partner); experience with coercion or abuse; experience with unprotected sex due to drinking alcohol; and sex without giving or receiving consent due to intoxication (self or partner).

Chapter 5 provides an overall summary of the three papers and a discussion of the results, limitations, implications for public health education specialists, and recommendations for future research and practice.

### **Delimitations**

The following delimitations should be considered when interpreting the results of this proposed study:

- Participants in this study include college students, aged 18 to 24, and enrolled full-time at the University of Florida. Only students in the specific age range were selected.
- A random list of survey participants was provided by the UF Registrar. All the members of the list were sent an email requesting their participation.
- Respondents in this study agreed to voluntarily participate and may therefore be different from those who chose not to participate.

### **Limitations**

The following limitations should be considered when interpreting the results of this investigation:

- Data collected from this cross-sectional study reflects responses from participants at a specific point in time. It will not follow respondents longitudinally to view personally normative behaviors and thus direct causation cannot be established.
- This study focuses on traditional-aged college students who attend a 4 year institution with a robust social environment. Findings from the proposed study cannot be generalized to campuses without a similar environment and social scene.

- Demographic variations of the student respondents may influence the results of the study.
- The self-report nature of the data collection limits the ability of the researcher to determine the extent of respondents over- and under-reporting behaviors

### **Assumptions**

For the purposes of this investigation, the following assumptions were made:

- Every participant had access to the internet. The university provides internet access to currently enrolled students through various locations on campus.
- The registrar provided current and accurate student e-mail addresses. Students are assigned a university e-mail address but they may no longer be enrolled, may have changed their e-mail address, or their inbox maybe full. Thus, the response rate may be influenced by non-receipt of survey materials.
- The students who participate in the study are representative of the overall student population unless otherwise noted. The registrar provided a completely random list of students to participate in the study.
- Students who agreed to participate in the study answered survey questions honestly. The consent, instrument, and reminder notifications assured participants of their anonymity and encouraged them to answer truthfully.

### **Definition of Terms**

Anal Sex	A sexual position in which the penis is inserted through the partner's anus into the rectum. <sup>51</sup>
Attitude	Overall evaluation of a behavior determined by individual's beliefs concerning the outcomes or attributes of performing the behavior. <sup>39</sup>
Behavioral Belief	An indirect measure of attitude where individuals assess whether their actions or potential actions are associated with certain attributes or outcomes. <sup>39</sup>
Behavioral Intention	Perceived likelihood of performing the behavior of interest. <sup>39</sup>
College Student	Random selection of individuals aged 18-24 who are registered to attend the University of Florida full-time.
Control Beliefs	An indirect measure of Perceived Behavioral Control, where individuals assess the presence or absence of facilitators and

	barriers to behavioral performance. <sup>39</sup>
Digital Sex	Sexual penetration involving one's hands and fingers, or digits; also referred to as mutual masturbation or manual sex. <sup>52</sup>
Drink	A standard drink is equal to a 12 oz can or bottle of beer or wine cooler, a 4 oz. glass of wine, or a shot (1 ½ oz.) of liquor straight or in a mixed drink. <sup>16, 53</sup>
Drunk	Consumption of alcohol to the point of impairment of mental and physical abilities. In the state of Florida legal intoxication or being drunk is defined as blood alcohol level equal to or exceeding 0.08 mg/dl.
Evaluation of Behavioral Outcomes	An indirect measure of attitude, where individuals assess the value attached to a belief or associated with an activity or attribute. <sup>39</sup>
Heavy Episodic Drinking	This is defined in the literature as five or more drinks for males in one sitting within the past two weeks. The definition for females is four or more drinks in the same time frame. <sup>16</sup>
Heterogeneity	A statistical measure of diversity that is used as a stopping rule in cluster analysis. A large increase in heterogeneity when two clusters combine indicates a more natural structure exists when the clusters are separate. <sup>54</sup>
High-risk sexual behavior	Any sexual behavior that increases the probability of negative consequences such as sexually transmitted infections, number of sexual partner and unplanned pregnancy. The most common form of this behavior is vaginal sex without a condom. <sup>55</sup>
Hooking-up	A spectrum of spontaneous sexual behaviors that may include anything from a simple kissing to various forms of intercourse (vaginal, anal, oral) usually lasting only one evening. <sup>14</sup>
Motivation to Comply	An indirect measure of the Subjective Norm where individuals assess their intrinsic drive to act in accordance with what they perceive their key referents deem appropriate concerning the behavior of interest. <sup>39</sup>
Normative Belief	An indirect measure of the Subjective Norm where individuals assess the extent to which each referent approves or disapproves of the behavior of interest. <sup>39</sup>
Oral sex	Refers to the sexual activity involving oral (mouth) stimulation of one's partner's sex organs (includes both fellatio and

	cunnilingus). <sup>51</sup>
Perceived Behavioral Control	The degree to which individuals believe they have control over their actions. <sup>39</sup>
Perceived Power	An indirect measure of Perceived Behavioral Control, where individuals assess the impact of each factor in facilitating or inhabiting the behavior of interest. <sup>39</sup>
Referent	Salient or influential person in the individual's life. <sup>39</sup>
Sexual partner	Refers to a person with whom one engages in sexual behavior. This term is not indicative of relationship status. <sup>51</sup>
Sexually Transmitted Infection (STI)	Also known as Sexually Transmitted Disease; diseases that can be transmitted via sexual interaction. <sup>51</sup>
Subjective Norm	Belief about whether most people approve or disapprove of the behavior. <sup>39</sup>
Vaginal sex	Refers to penis-vagina intercourse. Also known as coitus. <sup>51</sup>

### **Summary**

The purpose of this study was to assess specific sexual behaviors (digital, oral, vaginal, anal) of college students and the role alcohol intoxication may play in the intention to participate in these behaviors. This chapter describes the overall focus of this research and includes a description of the research problem, purpose of the study, significance, applicable theories, research questions, statistical analyses, delimitations, limitations, assumptions, and definition of terms. Risky sexual behaviors among college students have serious public health consequences. The present study provided a comprehensive description of sexually specific behaviors of college students and aids in addressing gaps in the current knowledge base. The results help to provide a clearer understanding of the relationship between alcohol use and specific sexual activity and will aid in the development of effective public health interventions and policies.

Table 1-1. Cognitive interview probes

Component	Guiding Probes
<p>Definition of Terms – Ensure the terminology is appropriately defined and equally understood by the respondents</p>	<ol style="list-style-type: none"> <li>1. Define the following in your own words               <ol style="list-style-type: none"> <li>a. One drink of alcohol</li> <li>b. Drunk</li> <li>c. Sexually Transmitted Infection</li> <li>d. Digital sex</li> <li>e. Oral sex</li> <li>f. Vaginal ex</li> <li>g. Anal sex</li> </ol> </li> </ol>
<p>Comprehensions – Ascertain what the question is asking and attaching a meaning to the question</p>	<ol style="list-style-type: none"> <li>1. What do you think the question is asking you?</li> <li>2. How do you think other students would understand the question?</li> </ol>
<p>Information Retrieval – Recalling relevant information or experience from memory</p>	<ol style="list-style-type: none"> <li>1. Is it difficult to recall the time frame?</li> <li>2. Does the context of the question help recall the information?</li> <li>3. Is the question difficult to distinguish from similar events or information?</li> </ol>
<p>Judgment – Judging sampled experience versus a reference (or an expectation) and formulating answers to a survey question.</p>	<ol style="list-style-type: none"> <li>1. Does the question ask information you already have?</li> <li>2. How detailed/complete do you think this information need to be?</li> <li>3. How accurate do you think this information need to be?</li> </ol>
<p>Reporting – Mapping the judgment onto a response category.</p>	<ol style="list-style-type: none"> <li>1. Does the design of the response alternatives affect the way you decide to answer?</li> <li>2. Do you feel the need to edit your answer to satisfy personal and societal pressures?</li> </ol>

## CHAPTER 2 ASSESSING SPECIFIC SEXUAL BEHAVIOR: INSTRUMENT DEVELOPMENT AND VALIDATION TECHNIQUES

### **Background**

One of the overarching goals of Healthy People 2020 is the improvement of reproductive health through promotion of healthy sexual behaviors. Among these ongoing public health challenges are sexually transmitted infections (STIs) which include more than 25 infectious organisms that are transmitted through various sexual behaviors.<sup>1</sup> Each year, sexual behaviors lead to approximately 9 million new STIs among 15 to 24 year olds as well as increased rates of unwanted pregnancies.<sup>7, 8</sup> Approximately 1 out of 10 women report an unintended pregnancy with rates highest among women aged 18–19 and 20–24.<sup>9</sup> In 2007, young adults aged 15 to 24 accounted for approximately 12% of newly diagnosed cases of HIV in the United States.<sup>4</sup>

A large focus of HIV/AIDS, STI, and teen pregnancy prevention literature has been on comprehending and promoting safer sexual behavior.<sup>12, 27, 34, 56, 57</sup> Though total abstinence is the only way to completely eliminate individual risk for HIV and STI transmission, it is not plausible to expect sexually active individuals to use sexual abstinence as a preventive measure for acquiring an STI.<sup>6</sup> According to the 2010 National College Health Assessment 70% of students have had at least one sexual partner within the past school year. The study goes on to report that of this percentage, 18% practice safe sex by always using a condom, while 4% of students reported no use of pregnancy protection.<sup>5</sup>

Alcohol, readily available in the college environment, compounds these issues. Alcohol use has been associated with risky sexual behavior on college campuses.<sup>13-15,</sup>  
<sup>58</sup> Forty two percent of college students who drink heavily also engage in unplanned

sex.<sup>15</sup> Casual sex behaviors of college students combined with high-risk drinking influence the simultaneous occurrence of sexual risk-taking, including inconsistent condom use.<sup>7,20, 21</sup> Alcohol use is also associated with the increased likelihood of sexual coercion and increased severity of sexual assault.<sup>25</sup>

Despite the large amount of research into these risky behaviors, there has been a lack of consensus as to the best way to measure and validate self-reports of sexual behavior and alcohol use.<sup>31, 59</sup> In addition, many instruments have been created to measure sexual behavior but none measure the entire spectrum of behaviors, including digital sex, oral sex, and anal sex.

The lack of measurement consistency between studies is problematic because comparisons and generalizations are difficult to assess, thus leading to serious public health implications.<sup>32</sup> Studies conducted with inappropriate measures or measures that are not sensitive to certain sexual behaviors, may reach inappropriate conclusions regarding the risk behaviors. Noar, Cole, & Carlyle provide examples of this discrepancy as it relates to condom use.<sup>34</sup> They cite a surveillance study conducted using the percentage (proportional measure) of condom usage as not taking into account the frequency of sexual intercourse. Should the community under surveillance reduce frequency of intercourse, overall risk would be lowered but the outcome would not be portrayed by the proportional measure. Thus accurate behavior measurement is critical for an accurate description of behaviors and their impacts on public health and policy.

The aim of this study was the assessment of specific sexual behaviors of college students and the role alcohol intoxication plays in one's intention to participate in these behaviors. Specifically, the purpose of this study was to develop a survey instrument

and assess measurement properties of the instrument using multi-modal methods. The following research questions guide the present study:

**RQ1:** How can current sexual risk behavior survey instruments be improved?

**RQ2:** Can an instrument be developed to collect and assess the specific sexual behaviors of college students?

**RQ3:** What is the reliability and validity of the Specific Sexual Behavior instrument?

## **Conceptual Framework**

### **Classical Test Theory**

The Classical Test Theory (CTT) guided the development and assessment of the measurements. It is important to note limitations associated with the use of this theory.<sup>49</sup> The psychometric properties are instrument and sample dependent and cannot be extended to other populations or age groups. Also, the measurement is static, not dynamic as it is a cross-sectional study design. In order to address the research questions, the instrument was composed of a combination of measures including established and validated items, newly developed items, and items specifically revised for the purpose of this study.

### **Theory of Planned Behavior**

The Theory of Planned Behavior (TPB) is a commonly used theory in sexual risk research since it incorporates perceived control over achievement of behavior as an additional aggregate of intention.<sup>35-37</sup> The theory focuses on individual motivation factors as behavioral predictors by assessing the relationship between beliefs, norms, attitudes, intentions, and behaviors.<sup>39</sup> Cooper and Orcutt conclude that the complex relationship between alcohol use and sexual behaviors requires the variables to be studied, not in

isolation, but in the context of a larger system of interconnected variables.<sup>33</sup> Thus, the TPB emerged as the best theoretical framework to assess these behaviors as they relate to college student risk-taking.

The TPB is an extension of the Theory of Reasoned Action (TRA); and incorporates perceived control over behavior achievement as an additional aggregate of intention.<sup>36</sup> The TPB focuses on factors of individual motivation as predictors of behavior by assessing the relationship between beliefs, norms, attitudes, intentions, and behaviors.<sup>39</sup> Refer to Figure 1-1 for a graphic representation of the theory.

The TPB centers on the following constructs:

- Behavioral Intention is the perceived likelihood of performing a behavior and is viewed as the most important determinant of behavior.
- Attitude is the personal evaluation of the behavior and impacts behavioral intention. It is shaped by behavioral beliefs and the evaluation of behavioral outcomes.
- Subjective Norm is the personal beliefs of peer approval or disapproval of the behavior. The construct focuses on behavioral intention as influenced by the motivation to gain peer approval and assesses normative beliefs and motivation to comply.
- Perceived Behavioral Control is the construct that was added to the TRA by Azjen and Drive to account for situations in which behavioral intention is influenced by factors perceived to be beyond personal control. It is shaped by control beliefs and perceived power.

The TPB assumes all other cultural and environmental factors operate through the models' constructs and do not independently predict behavior.<sup>39</sup> The TPB is often applied to survey research because it can be used to predict and explain a health behavior in a limited set of constructs.<sup>36, 40</sup>

## **Measurements**

### **Established Measurements**

In order to increase instrument validity when possible, existing measurements were used. When existing measures were not available items were adapted or developed for the purposes of this study. Existing surveillance and behavioral questions come from the American College Health Association's National College Health Assessment II (ACHA-NCHA II).<sup>5</sup> Additionally, perceived effects were evaluated using items from the Core Alcohol and Drug Survey. This survey is a nationally validated instrument specifically aimed at evaluating college student behaviors.<sup>30</sup> The items from the above named instruments were kept in their entirety.

Items from the Worry About Sexual Outcomes (WASO) scale were also used. The WASO scale evaluates participants' perceived concerns associated with sexual risk-taking outcomes. The 10-item measure contains two subscales of STI/HIV worry and pregnancy worry and demonstrates internal consistency and satisfactory construct validity.<sup>44</sup> Since this study includes male participants, the WASO pregnancy items were omitted and gender-neutral pregnancy items were developed for use in this study.

### **Relationship Status**

Previous research points to relationship status as strongly affecting sexual risk taking in general.<sup>33, 60-62</sup> Surra et al. describe current research focusing on the college population as weak because specific features of relationship status are missing.<sup>63</sup> Further research in sexual risk-taking needs to include a more thorough assessment specific of perceived relationship status. Numerous studies have included measurements of relationship status and other aspects of sexual risk-taking, but none

have analyzed the specific effect of perceived relationship status on alcohol use and sexual activity intention.<sup>64-67</sup>

### **Specific sexual behaviors**

Digital sex behaviors are largely not included in the current literature. Though, penetration of the vagina, anus, or oral cavity can occur with the penis, foreign objects, or fingers, distinction between these behaviors is rarely made.<sup>68</sup> Even the term sexual assault includes both sexual contact (fondling) and sexual penetration (rape). However, when forced digital penetration is the only complaint, a medical-legal examination cannot be performed.<sup>69, 70</sup> This is based on decades-old research identifying rape victims by pregnancy, syphilis or gonorrhea diagnosis, ignoring other physical or psychological trauma. Reports of digital-genital contact during sexual assault range from 26% to 55%.<sup>71-74</sup> Rossman and colleagues conducted a retrospective study documenting the frequency and type of genital injuries in women who solely reported forced digital penetration.<sup>72</sup> During the 3-year span, 941 sexual assault case files were reviewed. Fifty-three cases solely experienced forced digital penetration or manipulation. Of this group, 81% presented genital injuries with a mean of 2.4 injuries per patient. Further research is needed to understand digital behaviors so as to best dictate policy. Little is known about the behavioral norm, such as if it is more likely to occur with other risk behaviors. Even less is known about digital behaviors among college students.

Another behavior of interest is oral sex, which refers to sexual activity involving oral (mouth) stimulation of one's partner's sex organs and includes both fellatio and cunnilingus.<sup>51</sup> For several reasons, oral sex can be a preferred form of sexual expression for adolescents and young adults. The behavior cannot produce an

unwanted pregnancy, which is often the central focus of their concerns about sexual risks.<sup>75</sup> In some situations, oral sex may be preferred because it is perceived to involve less intimacy than intercourse.<sup>64</sup> In addition, some studies have found that oral sex is not judged to be a form of sexual activity at all, thus allowing participants to view themselves as not being sexually active.<sup>75, 76</sup>

Anal sex is another behavior of interest to this study. It is a behavior that is not often assessed in sexual-risk surveys even though it is the most efficient route for HIV transmission.<sup>10</sup> Between 20-25% of college-aged adults have participated in anal sex behaviors.<sup>10-12, 77</sup> Research also suggests those who participate in anal sex are more likely to participate in other risk behaviors.<sup>10</sup> Thus further investigation of these specific behaviors is warranted.

### **Instrument Development Process**

Krause described a multi-modal technique for the development of close-ended survey questions that effectively bridges both qualitative and quantitative methodological approaches.<sup>42</sup> Sexual behaviors have been thoroughly researched, thus Krause's development process was slightly adjusted to reflect the information already published concerning these behaviors (i.e. focus groups, interviews, etc.). Refer to Figure 1-2 for a graphic of the instrument development process.

Instrument measures were formatted using Dr. Ajzen's guidelines for constructing TPB instruments.<sup>40</sup> Attitude, subjective norm, perceived behavioral control, and intention are usually assessed directly by means of standard scaling procedures. When developing the scales, the measurements must be directly compatible with the behavior in terms of action, target, context, and time elements. Participants may have trouble understanding questions with negative phrasing, statements containing both subjects

and verbs relating to the behavior, or item responses depending on further information, not specified in the question.<sup>78</sup> Thus, it is critical for the spectrum of sexual behaviors to be clarified in the measurements and for each item to be clear, concise, and completely exhaustive.

Due to the sensitive nature of the subject matter the instrument was designed in the present study to be administered online. Among college students, web-based surveys are more cost effective and convenient than other modes of survey research. A meta-analysis comparing web and mail surveys among college respondents reported the web survey response rate to be 3% higher.<sup>50</sup> The benefits of utilizing web-based surveys include reduced implementation costs, faster data collection, improved formatting, elimination of data entry, and reduced processing costs.<sup>79, 80</sup> Also, by emphasizing a study's brevity and application of additional reminders a higher response rate is more likely to be achieved.<sup>81</sup> Thus, the present study was administered online, notifying participants via multiple reminders to respond to the one-time survey. Participants were told they had the option of discontinuing the survey at any point. In addition, no e-mail or IP addresses were collected in order to ensure the anonymity of the subjects.

### **Development of Preliminary Variables**

Preliminary measures were developed using Ajzen's guidelines for constructing a TPB questionnaire.<sup>40</sup> Likert type scales provide precise information on respondents' degree of attitudes and provide high reliability.<sup>82</sup> This format was used for many of the present survey items. Special attention was given to avoid the use of vague words, technical terms, and double-negative wording. The instrument defined the specific sexual behaviors so all respondents' would be using the same definition for their item

responses. In addition, the instrument's Flesch-Kincaid Readability Score was 8.6, ensuring the material was suitable for college-aged students.

### **Review by Expert Panel**

The expert panel consisted of 6 scholars knowledgeable in the area of alcohol use, sexual behaviors, instrument development and statistical analysis. Each panel member received all student notifications, consent forms and the complete preliminary questionnaire. The panel was asked to evaluate the content quality, instrument structure, and ability of the measures to produce data appropriate to answer the stated research questions. In addition, the panel received all participant contact emails, consent process, and cognitive interview probes. Problems with each measure were identified, discussed, and potential solutions were proposed. The panel judged important construct and domain themes of the TPB. In addition to reviewing questions and response formats, the panel was also determined the order of the questions and content of the email notifications and informed consent.

Based upon input from the panel, changes were made to the survey instrument, including removal of erotic touch behaviors. These behaviors are defined as physical acts without penetration, such as massage, groping, and self-masturbation. Erotic touch was initially included as the researcher sought to assess the entire spectrum of behaviors. However, the panel did not define these behaviors as risk-related, as rape, STIs, and pregnancy were generally not associated with erotic touch. Instead, further information was added clarifying digital sex behaviors and additional questions were suggested concerning the consequences of digital sex (attempted assault, etc.).

Further edits included the clarification of the definition of oral sex to include both giving and receiving the sexual act and the clarification of items using the term "sexual

activity” by expanding them to include specific sexual behaviors. Double-barreled items were reworded, skip patterns were applied for conditional questions and the instrument was edited to begin with the least sensitive or personal queries. Participant notifications were amended to emphasize the topic, clarify the plea for help, include support for school spirit and further discuss the potential impact of the results on the student population. In addition, a graphic was created and used across all materials (participant notifications, consent and instrument) to highlight and remind participants of the anonymous nature of the instrument. During the course of the editing process, the researcher turned to the literature to support recommended changes as they applied to previous qualitative and quantitative studies of sexual behaviors among college students.

### **Cognitive Interviews**

Following edits based on the experts’ comments, cognitive interviews with members of the target audience were conducted. The purpose of the interviews was to assess item interpretability by the participants. Participants may have trouble understanding questions with negative phrasing, clauses to the behavior, or answers depending on further information, not specified in the question.<sup>78</sup> Sometimes issues may arise due to cultural and societal differences between the researchers and the participants. Thus, it is critical for the spectrum of sexual behaviors to be clarified in the measurements and for each item to be clear, concise, and completely exhaustive.

Interviewees were recruited via word-of-mouth and asked to think-a-loud while completing the instrument. The cognitive interview focused on assessing four components: comprehension, information retrieval, judgment, and reporting via guiding probes. Refer to Appendix B for the complete cognitive interview probes. The interviews

assessed cognitive interpretation of the information required for participants need to answer each question. The participant's voice and screen movement were captured with Camtasia Studio 6, a screen capture program which is often used in distance education development and applied as a tool in the observational analysis of internet use.<sup>83, 84</sup>

Similarly to the Krause study, the instrument was introduced to participants in a manner intended to increase motivation and commitment during the lengthy interview.<sup>42</sup> Students were provided with an explanation of the time and effort required for instrument development and the importance of their opinions of the current instrument. Cognitive interviews were conducted with 11 students (6 female). The majority of respondents were Caucasian (18% Latino) and the median age was 19. The sample demographics were representative of the overall university. All cognitive interview participants reported their sexuality as heterosexual and 73% reported sexually activity within the past 30 days. About a third of the respondents were in a monogamous relationship, another third were dating, but not in an exclusive relationship, and the final third were neither in a relationship or dating.

The cognitive interviews were analyzed via researcher notes, respondent voice recordings and captured screen movement. Findings were used to further edit the instrument. The definition of sexually transmitted infections was clarified, anchors reworded to match the stem, "not applicable" was added to certain response options and the query into sexual partners was expanded to include all sexual behaviors of interest. In addition, greater emphasis was placed on formatting the web survey to include bolded categories, increased spacing, and larger font size.

## **Pilot Test**

After editing the instrument based on the cognitive interviews, a pilot study was conducted. The pilot study served as a quality check among the target population. A total of 4,000 students, aged 18-24 were randomly selected by the registrar to participate in the pilot study. Invited participants received one initial contact followed by three additional reminders over the course of two weeks. To ensure anonymity participants' IP addresses, names and e-mails were not collected. Respondents were notified of their right to discontinue the questionnaire at any point without retribution. Upon completion of the survey, respondents were directed to an exit page with local alcohol, sexual health, and mental health resources.

Zoomerang, a commercial internet survey software program, was used to collect and store the electronic study data. Data was entered in SAS statistical software package version 9.2. Each question on the survey was coded numerically to facilitate data analysis. Response patterns were assessed by age, gender, sexual preference, and relationship status. The distribution and missing responses were analyzed. Due to the sensitive nature of the survey content extra attention was placed on ceiling and floor effects. Data analysis indicated measurements suffering from polar weight lacked adequate discriminate capability of high versus low levels of health behavior; these measures were eliminated.

A total of 710 students completed the instrument, resulting in a 17.75% response rate. As shown in Table 2-1, comparability of the pilot sample to the entire University population. Survey length, frequency of distributions for sufficient variance, and an exploratory factor analysis was preformed to examine the structure and psychometric properties of the newly developed scales. Particular attention was given to establishing

the reliability and validity of the new instrument. Demographic and prevalence characteristics of the participants were calculated through descriptive statistics which included analysis of respondent and nonrespondents characteristics. Since bias may arise from respondent's perceived social norms, participant demographics were matched to the overall university population (Table 2-1).

Content validity was primarily assessed during the qualitative portion of the protocol. The expert panel and cognitive interviews were used to judge important construct and domain themes. Content validity was also assessed through the clarity, comprehensiveness, and redundancy of items and domains. Since the instrument includes both new and edited measures exploratory factor analysis was conducted to identify if the derived constructs are the same as those hypothesized. Items were discarded if they demonstrated a weak relationship (low factor loading) with the underlying variable. Varimax rotation was used to examine the factor loadings. Items were retained on factors if they had high loadings (i.e., saturated or loadings with an absolute value greater than .40) and were not complex. Cronbach's alpha determined the internal consistency of the scales and provided evidence for items that might be suppressors. Items found to be too difficult, too easy, and/or have near-zero or negative discrimination were replaced with more suitable items.

Minor revisions were made to the instrument including revisions of response items, elimination of questions with low factor loadings and the revision of the STI testing measure to include both 6 month and 12 month time spans. A total of 49 questions, with multiple sub-queries, were retained for the final edition of the instrument.

## **Formal Investigation**

The registrar's office randomly selected another 4,000 students for the formal investigation. The previously piloted methodology was applied in the formal investigation, with one exception. In order to increase the instrument's response rate, an incentive was offered to the first two and last two participants. On the exit page participants had the option to exit the survey and continue to the incentive form, which required submitting their contact information to be considered for a \$50 gift card.

The formal data collection (with incentive) led to a 20.8% response rate (832 respondents), a 3% increase from the pilot administration. Table 2-1 presents a comparison of the final sample with the university population. Respondent behavioral measures were compared to a national sample (Table 4-1) and were found to be somewhat comparable.

The final student notifications, consent information, and survey can be found in appendices C, D, and E, respectively. The continued development process of the behavior-specific sexual risk survey will be presented in a series of substantive papers exploring the applicability of the Theory of Planned Behavior to predict intention to participate in specific sexual behaviors while intoxicated and the applicability of a risk-level typology.

## **Results**

Application of the Krause instrument development process led to 50 preliminary measures assessing specific sexual behaviors and the role of alcohol intoxication in the intention to participate. The initial measures included a spectrum of sexual behaviors: erotic touch, digital, oral, vaginal, and anal sex. The expert panel suggested the removal of erotic touch behaviors as they are not risk-related, resulting in the deletion of sub-

questions from behavior-specific items. Three additional questions were created to address the consequences of specific sexual behaviors. Definitions were clarified, items reworded, and skip patterns were added. Participant notifications were edited to emphasize the topic and the anonymous nature of the study design.

Fifty three questions were presented in the student cognitive interviews. Participant comments and screen movements were recorded during the think-a-loud process. This allowed accurate analysis of verbal comments and inferences, as well as specific movement over response options and instrument structure. This information led to changes in response options, readability, the creation of 3 screening questions and 4 sub-questions relating to specific-sexual behavior. Screen-capture software has previously been used as a methodology assessing internet usage.<sup>83, 84</sup> Results of the present study prove it to be a cost effective, rich data collection technique for instrument development.

The piloted instrument contained 56 questions assessing digital, oral, vaginal, and anal sexual behaviors and the role of alcohol intoxication in these behaviors. The factor analysis resulted in the removal of two measures across 3 sexual behaviors (total of six items) due to poor loadings. The removed items included: “when it comes to (oral, vaginal, anal) sex behaviors, how motivated are you to meet the expectations of your parents” and “I am confident I can resist (oral, vaginal, anal) sex advances” respectively from the constructs Motivation to Comply and Perceived Behavioral Control. Another item was removed from further analyses as it loaded on the wrong factor. “Availability of free alcoholic drinks influences my decision to participate in digital sex” was theorized as part of Perceived Power but loaded on Control Beliefs. Exploratory factor loadings

ranged from .56 to .84. Internal consistency was demonstrated for the instrument overall ( $\alpha = 0.83$ ) and for each factor except Perceived Behavioral Control (oral sex  $\alpha = -0.17$ , vaginal sex  $\alpha = 0.46$ , anal sex  $\alpha = 0.31$ ). Factor loadings and estimates of internal consistency are shown in Table 3-4. In addition to the elimination of questions with low factor loadings, the item assessing STI testing was revised to include both 6 month and 12 month sub-items.

During the pilot study, the total numbers of items were reduced from 56 to 49. The formal investigation of the 49 items was conducted with an additional sample 4000 students. Survey methodology remained the same except for one notable difference; the use of an incentive. By offering participants the opportunity to receive one of four \$50 gift cards, the response rate increased 3%. Additional psychometric testing of the instrument is presented in a series of substantive papers (Chapters 3 and 4).

### **Discussion**

Although the establishment of an instrument is an ongoing task requiring replication across a series of studies, the present study results provides structured guidelines and encouraging results. To date, concurrent alcohol use and sexual activity has been difficult to assess. This study contributes to exploratory efforts in this field via development of measures specific to alcohol use and sexual behavior risk. The present instrument development process aids in addressing measurement and validation of self-report sexual behavior; which currently lacks consensus in the literature.<sup>31, 59</sup> In addition, this instrument is the first to assess a spectrum of specific sexual health behavior, including digital, oral, vaginal, and anal sex behaviors and how they relate to alcohol intoxication.

The applied eight-step instrument development process provided explicit guidelines for mix-modal analysis development. By reviewing the literature to identify relevant concepts of sexual behavior and alcohol use, preliminary measures were cultivated. These measures were then reviewed by a panel of experts, edited and tested among the target population with cognitive interviews. The application of Camtasia Studio in the cognitive interviews, proved to be a cost effective method to capture not just the vocal response, but also the participant's screen interaction with the web survey. This aspect of the analysis proved fruitful because the researcher was able to analyze how the participant interacted with the survey design, response options, length, and overall construction. The web-based design of the instrument also proved to be modestly cost-effective with a small incentive and provided increased anonymity for participants.

Caution must be applied in generalizing the results of this study to a broader college student sample. The results may not be transferred to campuses without a comparable environment and social scene. In addition data collection occurred during a specific time interval and thus does not follow respondents longitudinally to view personally normative behaviors. It is also important to note the mixed-methodology of the instrument development process can be costly and labor-intensive. However, the present study provides a comprehensive description of the sexual behaviors of college students and aids in addressing the gap in our knowledge base.

Further research should focus on continued development of the measures and specific properties of the 49-item instrument. Further testing with other college-student populations is necessary to establish required psychometric measures. In addition,

inclusion of additional risk behaviors or measures to better describe these public health perils should be considered. Continued review of the applied instrument development process is warranted as newer technologies and techniques are developed and assessed.

### **Conclusions For Consideration**

The lack of measurement consistency between studies evaluating alcohol use and sexual activity is problematic because comparisons and generalizations are difficult to assess.<sup>32</sup> The aim of this study was to develop an instrument to assess specific sexual behaviors among college students and the role alcohol intoxication plays in one's intention to participate in these behaviors. The Classical Test Theory provided the framework for development and assessment of the measurements. In addition, the Theory of Planned Behavior was used to both predict and explain the health behaviors, as well as to guide formatting and structure of individual items. The instrument development process included review by an expert panel, cognitive interviews with sample participants, and pilot investigation. Edits and revisions were finalized following pilot testing and the survey readied for final administration. The applied instrument development process employed screen capture software and web-based surveying in a cost-effective format suitable for mixed-method measurement development. The development and application of the instrument provides a clearer understanding of the relationship between alcohol use and sexual activity and aids in the development of effective public health interventions and policies.

Table 2-1. Study sample comparison to total university population

	Demographic	University Population	Current Study	
			Pilot Study	Formal Investigation
Gender	Male	45.0%	39.0%	33.0%
	Female	55.0%	61.0%	67.0%
Race	White/Caucasian	60.4%	67.2%	64.6%
	Black/African American	10.2%	12.5%	7.5%
	Asian	8.7%	6.4%	5.8%
Ethnicity	Hispanic	15.4%	18.3%	17.5%
Age	18	18.3%	19.9%	14.7%
	19	20.2%	20.1%	25.7%
	20	21.7%	25.2%	24.0%
	21	20.3%	23.1%	22.1%
	22	8.9%	7.8%	9.7%
	23	3.0%	2.8%	2.4%
	24	1.4%	1.0%	1.4%

## CHAPTER 3 SEXUAL RISK-TAKING ATTITUDES, PERCEPTIONS, AND PREVALENCE AMONG COLLEGE STUDENTS

### **Background**

Campuses provide an important context in which to study risky behaviors because of the developmental progression students' experience. While in high school, students planning to attend college have lower rates of heavy drinking than their non-college bound peers. After high school graduation both groups increase their rates of heavy drinking, but college students' rates increase dramatically and surpass their nonstudent peers.<sup>28</sup> The difference in level of risk-taking is also present in the college student population. Since 2002, data have shown that young adults enrolled in full-time 4 year institutions generally participate in more high-risk drinking than those not enrolled full time.<sup>29</sup> Current literature offers numerous studies describing the developmental progression of students' sexual experiences.<sup>45, 85-87</sup> The percentage of students who have ever had sex rises steadily during the college years, reaching about 86% by the senior year.<sup>27</sup>

Among college students high-risk drinking and sexual risk-taking routinely occur simultaneously.<sup>7</sup> The social environment of school with high rates of heavy episodic drinking (5 or more drinks) places students at an increased risk of sexual assault.<sup>23</sup> Research indicates that women have a one in five chance of being sexually assaulted while enrolled in college.<sup>22</sup> Rates of sexual assault vary widely due to varying definitions, policies, under-reported incidents, and differing data collection methods. One study estimates alcohol involvement in at least 50% of all sexual assaults involving college women.<sup>24</sup> Sexual assault may be greater in severity due to intensified sexual expectations and increased feelings of alcohol-induced sexual prowess and aggression

among males.<sup>25 26</sup> Additionally, some students cite alcohol use as validation for participation in sexual activity and high-risk behaviors.<sup>24</sup>

The term sexual assault includes both sexual contact (fondling) and sexual penetration (rape). However, when forced digital penetration is the only complaint, a medical-legal examination cannot be performed.<sup>69, 70</sup> This is based on decades-old research identifying rape victims by pregnancy, syphilis or gonorrhea diagnosis, ignoring other physical or psychological trauma. Reports of digital-genital contact during sexual assault ranged from 26% to 55%.<sup>71-74</sup> Rossman and colleagues conducted a retrospective study documenting the frequency and type of genital injuries in women who solely reported forced digital penetration.<sup>72</sup> During the 3-year span, 941 sexual assault case files were reviewed. Fifty-three cases solely experienced forced digital penetration or manipulation. Of this group, 81% presented genital injuries with a mean of 2.4 injuries per patient. Further research is needed to understand digital sexual behaviors among college students. Little is known about the behavioral norm, such as if it is more likely to occur with other risk behaviors.

Other sexual behaviors such as oral, vaginal, and anal sex, when combined with alcohol, can result in physical, emotional, and financial burdens. Oral sex refers to sexual activity involving oral (mouth) stimulation of one's partner's sex organs and includes both fellatio and cunnilingus.<sup>51</sup> For several reasons, oral sex can be a preferred form of sexual expression for adolescents and young adults. The behavior cannot produce an unwanted pregnancy, which is often the central focus of their concerns about sexual risks.<sup>75</sup> In some situations, oral sex may be preferred because it is perceived to involve less intimacy than intercourse.<sup>64</sup> In addition, some studies have

found that oral sex is not considered by some to be a form of sexual activity, thus allowing participants to view themselves as not sexually active.<sup>75, 76</sup>

Anal sex is another behavior of interest to this study, but one not often assessed in sexual-risk surveys. Anal sex is the most efficient route for HIV transmission, therefore it is of evident importance.<sup>10</sup> Studies indicate that between 20-25% of college-aged adults have participated in anal sex behaviors.<sup>10-12, 77</sup> Research also suggests those who participate in anal sex are more likely to participate in other risk behaviors.<sup>10</sup> Thus further investigation of these specific behaviors is warranted.

Interventions grounded in theory are considered successful in addressing multiple determinants of risky sexual behaviors.<sup>88</sup> To maximize the effectiveness of an intervention it must be tailored to the specific behaviors and culture of the target audience.<sup>89</sup>

Effective health behavior interventions also apply a theoretical framework so as to provide “empirically adequate descriptions, explanations, or predictions” of the behavior.<sup>35</sup> Multiple studies have applied the Theory of Planned Behavior to college student sexual behaviors and alcohol use.<sup>88, 90-93</sup> However, most of these studies are specific to condom usage, and commonly only evaluate vaginal and/or anal sex.<sup>7</sup> Of necessity to increased understanding in the field of research is development of instruments with increased sensitivity and precision, along with inclusion of items assessing the interaction between alcohol use and participation in sexual activities. Cooper suggests application of multivariate models in which alcohol use is embedded within a network of these risk behaviors.<sup>7</sup> Cooper and Orcutt conclude that the complex relationship between alcohol use and sexual behaviors is best understood in the context

of a larger system of interconnected variables.<sup>33</sup> Application of the Theory of Planned Behavior to a spectrum of specific sexual behaviors can increase understanding of alcohol's role in one's intention to participate in these behaviors.

This study 1) assesses the perceptions, attitudes, and prevalence of specific self-reported sexual behaviors among college students and 2) examines the efficiency of the TPB in explaining intention of engaging in sexual activity while intoxicated.

**RQ1:** What is the prevalence of specific sexual behaviors among college students at a large southeastern university?

**RQ2:** How much of the sexual behavior while intoxicated variance is accounted for by the Theory of Planned Behavior?

**RQ3:** Which construct(s) within the Theory of Planned Behavior (Subjective Norm, Attitude Toward the Behavior, Perceived Behavioral Control, and Behavioral Intention) account for the largest proportion of variance when predicting specific sexual behaviors among college students while intoxicated?

**RQ4:** Using constructs from the Theory of Planned Behavior, what are the causal effects in predicting participation in specific sexual behaviors while intoxicated?

### **Theory of Planned Behavior**

The Theory of Planned Behavior (TPB) focuses on motivation factors of the individual as predictors of behavior<sup>39</sup>. The TPB is an expansion of the Theory of Reasoned Action (TRA) which makes the assumption that attitude (Attitude Toward Behavior) and perceived acceptance of a behavior (Subjective Norm) influence a person's intention to participate in the behavior. Intention, in turn, is purported to influence one's decision to participate in, or abstain from the behavior. TRA was expanded in 1991 to include the additional construct of Perceived Behavioral Control in order to account for factors beyond a person's control such as resources and opportunities. The TPB assumes all other cultural and environmental factors operate

through the models' constructs and do not independently predict behavior<sup>94</sup>. The following is a brief overview of the TRA/TPB constructs as they relate to the present study.

The construct, Attitude Toward Behavior represents an individual's overall belief about performing the behavior in question coupled with the importance or assessment of possible behavioral outcomes. The measures include beliefs about the consequences of the behavior (behavioral beliefs) and the corresponding positive or negative assumptions of each belief (evaluation of the outcome).

Subjective Norms are an individual's own estimate of the social pressure to perform or not perform the behavior. The measures include beliefs about how influential people would like them to behave (normative beliefs) and how motivated they are to comply with what these influential people think (motivation to comply). An influential person can include family members, best friends, or sexual partners. However, college students tend to be most motivated by the support and guidance of their peers on behavioral decisions.<sup>21, 65, 95</sup>

Perceived Behavioral Control refers to an individual's perception of their ability to perform the behavior and is composed of both internal (e.g., skills, locus of control) and external (e.g., situations, pressures) control factors. The measures of this construct include how much the individual feels they have control over the behavior (control beliefs) and the impact of these factors in facilitating or inhibiting the behavior (perceived power).

The theory posits the most important determinant of behavior is Behavioral Intention. The construct is defined as an individual's likelihood of performing the behavior and is shaped by attitude, norms, and perceived behavioral control.

## **Methodology**

### **Participants and Procedures**

A randomly selected sample of 4,000 students, aged 18-24 and enrolled full-time in a large southern university, was provided by the registrar. All participants received email notification to visit the online survey. Over the course of the study, participants received three additional email reminders to log on and complete the survey. Respondents were required to read an informed consent message prior to taking the survey, followed by instructions for completing the survey. To ensure anonymity, IP addresses, names and e-mails were not collected. The informed consent included a statement informing participants of their right to discontinue the survey at any point without retribution. Upon completion of the survey, the exit page offered participants local alcohol, sexual health, and mental health resources. In addition, the exit page provided participants with the option to exit the survey or to continue to an incentive page where they could submit contact information and be eligible for an incentive. The first two and last two participants were selected to receive the incentive, as recommended by the Institutional Review Board.

### **Measurements**

The instrument is designed to assess attitudes and behaviors associated with sexual risk taking in the college student population. The survey was formatted using Ajzen's guidelines for constructing TPB instruments.<sup>40</sup> Attitude, subjective norm, perceived behavioral control, and intention were assessed directly by means of

standard scaling procedures. The instrument was developed and validated using both qualitative and quantitative methodologies (Chapter 2).

### **Attitudes**

Attitudes about specific sexual behaviors engaged in while one is intoxicated were assessed across seven items using the following seven-point semantic differential scales: good/bad, beneficial/harmful, enjoyable/unenjoyable, healthy/unhealthy, risky/not risky, regretful/unregretful, and guilt/no guilt. To measure behavioral beliefs participants reported their likelihood of participating in sexual behaviors while intoxicated. Each item, specific to the sexual behavior, also applies a seven-point semantic differential scale (extremely likely/extremely unlikely, strongly agree/strongly disagree). The measures assessed social ease, increased fun, and likelihood of participation. Behavioral Outcomes were measured by asking respondents to report the personal value they place on participating in sexual behaviors while intoxicated. Respondents were also asked their feelings regarding possible consequences that may result from sexual activity under the influence of alcohol. For example, “When I drink I feel a greater desire to participate in oral sex”. Refer to Table 3-1 for the direct and indirect measures of attitude toward the behavior.

### **Subjective Norms**

The extent to which instrumental people (i.e. family, friends, peers, etc.) in the respondents’ lives approve and value their participation in sexual behaviors while intoxicated was assessed using the social norms construct of the TPB. Once again, seven-point semantic differential scales with the anchors strongly agree/strongly disagree were used as response options. To assess Normative Beliefs participants were asked if their close friends, current partner, or ideal future partner (influential

people) would approve of them participating in specific sexual behaviors while intoxicated. Motivation to Comply items asked participants how important it is for them to meet expectations of the influential people in their lives. Refer to Table 3-2 for the direct and indirect measures of subjective norm.

### **Perceived Behavioral Control**

Perceived Behavioral Control was measured using participants' level of confidence in the control of the behavior. Control beliefs evaluate how often an individual considers the consequences of participating in sexual behavior while intoxicated. Items assessing Perceived Power evaluate the opportunities and barriers influencing the individual participation in sexual activity while intoxicated. Refer to Table 3-3 for the direct and indirect measures of perceived behavioral control.

### **Behavioral Intentions**

Behavioral Intentions assess one's intention to participate in the behavior at the next event or opportunity. Respondents indicated their level of agreement relating to participation in specific sexual behaviors while intoxicated, namely oral, vaginal, and anal sex.

### **Behavior**

Of great importance to the aims of this study is the assessment of each individual behavior. Past research most often assesses a spectrum of sexual behaviors, making the inclusion of specific items relating to participation in each sexual behavior (oral, vaginal, and anal sex) while intoxicated critical. Additional behavior items assess participants' alcohol use.

## Analysis

A path analysis was conducted to assess the TPB construct relationships, as well as the strength of these relationships. Path analysis is a form of Structural Equation Modeling where simple bivariate correlations are used to estimate relationships.<sup>54</sup> In essence, a path analysis expands the focus of multiple regression models to include causal relationships. In a path analysis independent variables are described as exogenous constructs, and dependent variables as endogenous constructs.

Exogenous constructs compose multiple, correlated variables which are grouped together to create a single variable, whereas endogenous constructs are theoretically determined by factors within the model. Attitude toward the behavior, subjective norm, and perceived behavioral control are the exogenous constructs while the endogenous constructs include intention and behavior.

Of note is the inclusion of both direct and indirect measures in exogenous constructs. Additionally, direct and indirect measurement approaches are based on differing assumptions about the underlying cognitive structures. As a result, disadvantages for each measurement approach exist.<sup>39</sup> Direct measures are usually more strongly associated to intentions and behaviors than indirect measures. The association between direct measures and intention indicates the relative importance of attitude, subjective norm, and perceived behavioral control in explaining or predicting behaviors. It is critical to demonstrate these associations before analyzing indirect measures. Thus, a strong association should exist between indirect and direct measures to be certain of including appropriate beliefs as indirect measures. Additionally, the strong association indicates the adequacy of the composite beliefs (attitude, norms, and control) as measures of the respective TPB constructs.

Once this is demonstrated, indirect measures are of most interest for intervention and policy development. Attitude toward the behavior (direct measure) is composed of the indirect measures of behavioral belief and evaluation of behavioral outcomes. Subjective norms (direct measure) include the indirect measures of normative belief and motivation to comply. The direct measure of perceived behavioral control includes control beliefs and perceived power.

To examine the indirect measures a composite score was created to represent the direct construct, whereas:

$b_i$  = Value for the  $i$ th Behavioral Belief question

$e_j$  = Value for the  $j$ th Evaluation of Behavioral Outcomes question

$n_k$  = Value for the  $k$ th Normative Belief question

$m_\ell$  = Value for the  $\ell$ th Motivation to Comply question

$c_r$  = Value for the  $r$ th Control Belief question

$p_q$  = Value for the  $q$ th Perceived Power question

Therefore, composite scores of the constructs are as follows:

Attitude Towards Behavior:

$$A = \sum_i \sum_j b_i e_j$$

Subjective Norm:

$$S = \sum_k \sum_\ell n_k m_\ell$$

Perceived Behavioral Control:

$$P = \sum_r \sum_q c_r p_q$$

For example, the construct Attitude Towards Behavior includes the item “I would have more fun if I got drunk before participating in oral sex” to represent the behavioral belief and is paired with “When I drink I feel greater desire to participate in oral sex” which represents the evaluation of the behavioral outcomes. This pairing of variables produces the dependent variable used to describe the TPB construct Attitude Towards Behavior.

A path diagram offers a visual representation of the model and the complete set of relationships among the model’s constructs. The path analysis provides information on the pattern of inter-correlations among the TPB variables as it relates to participation in sexual behaviors while intoxicated. Construction of the path diagrams used the following guidelines:<sup>54</sup>

- The path flow must be one way.
- Connections between exogenous constructs must be two-way connections representing the correlation between the variables.
- A path can go from endogenous construct to another endogenous construct, but never from endogenous construct to an exogenous construct.

Included in the path diagram for the following regression models are the variances, estimated with Mean Squared Residuals, of the respective independent variables:<sup>96</sup>

$$\text{Intention} = \beta_0 + \beta_1 A + \beta_2 S + \beta_3 P + \epsilon$$

$$\text{Behavior} = \beta_0 + \beta_1 A + \beta_2 S + \beta_3 P + \beta_4 I + \epsilon$$

The endogenous variable is composed of measures assessing respondents’ alcohol use before and during sexual activity. The exogenous variables are the composite scores of each of the TPB constructs. To assess internal consistency Cronbach’s alpha was calculated for each of the construct scales. As presented in Table 3-4, the construct of Attitude Toward the Behavior demonstrates the best internal

consistency, across all three sexual behaviors. Subjective Norm was fair, with less favorable internal consistency for Perceived Behavioral Control items. Since the measures are based upon the theoretical and analytical interests of the research questions all items were retained.

Sequences of multiple logistic regression analyses were conducted to determine the relationships between the variables in the path model. Goodness-of-fit was calculated to determine the extent to which the theory explains the observed covariance matrix among the measured variables.

## **Results**

A total of 832 students responded to the online survey for a 20.8% response rate. A listwise deletion of cases with missing values was performed, resulting in 605 useable cases. Statistical analyses were conducted with SAS software version 9.2. Similar to the student body profile at the host institution respondent mean age was 20 (sd = 1.38) and the majority was female (67.5%). Also similar to the host institution, about 75% of respondents reported their race as white and 8.6% as African American. Approximately 17.5% of respondents defined their ethnicity as Hispanic. The majority described their sexual orientation as heterosexual (92.1%). Respondents were asked to indicate their current relationship status. Nearly 44% were in an exclusive, monogamous relationship, while 4.1% considered themselves to be in an open or non-monogamous relationship, defined as “free to see other people”. Almost 10% considered themselves openly dating, yet not involved in a relationship, and 35.4% reported neither dating nor in a relationship.

## **Preliminary Analysis**

A preliminary analysis assessed the variance of the combined TPB constructs when predicting intention to participate in specific sexual behaviors while intoxicated. The relationship between the independent variables, intention and behavior, required assessment prior to the application of multivariate techniques.<sup>39</sup> Zero order correlations were computed for each of the TPB constructs and are reported in an inter-correlation matrix for each sexual behavior (Tables 3-5 thru 3-7). The correlation analysis revealed strong linear relationships between the constructs Attitudes Toward the Behavior and Social Norms across all three sexual behaviors. Statistical significance for Perceived Control was present among oral sex behaviors while statistical significance for Intention was significant among both oral and vaginal behaviors.

## **Path Analysis**

A path analysis was conducted to determine the causal links between study variables. Structural Equation Modeling (SEM) simultaneously examines a series of interrelated relationships among measured variables and latent constructs.<sup>54</sup> Application of a multiple logistic regression technique determines the amount of variance accounted for by the theory constructs when predicting participation in sexual behaviors while intoxicated. The strength of the association between the dependent variable and the collective set of independent variables was calculated using the absolute fit indices: Chi-square, GFI (Goodness-of-fit Index), and Standardized Root Mean Square Residual (SRMSR). The models demonstrated sufficient fit (Table 3-7).

Overall path coefficients of the three models (Figures 3-1 through 3-3), indicated Attitude Towards Behavior as having the greatest impact on Behavioral Intention. The path coefficient for Subjective Norm was also significant, while the construct Perceived

Behavioral Control did not significantly impact Intention or Behavior in terms of direct paths.

Positive correlation coefficients in the oral sex path diagram (Figure 3-1) between the constructs Attitude, Norms, and Control, positively influence intention to participate in oral sex while intoxicated and as a result, behavior participation. Twenty seven percent of the intention to participate in oral sex while intoxicated is accounted for by the constructs of Attitude, Norm, and Control. Nine percent of the variance in behavior participation is attributed to both Intention and the direct path of Perceived Control to Behavior.

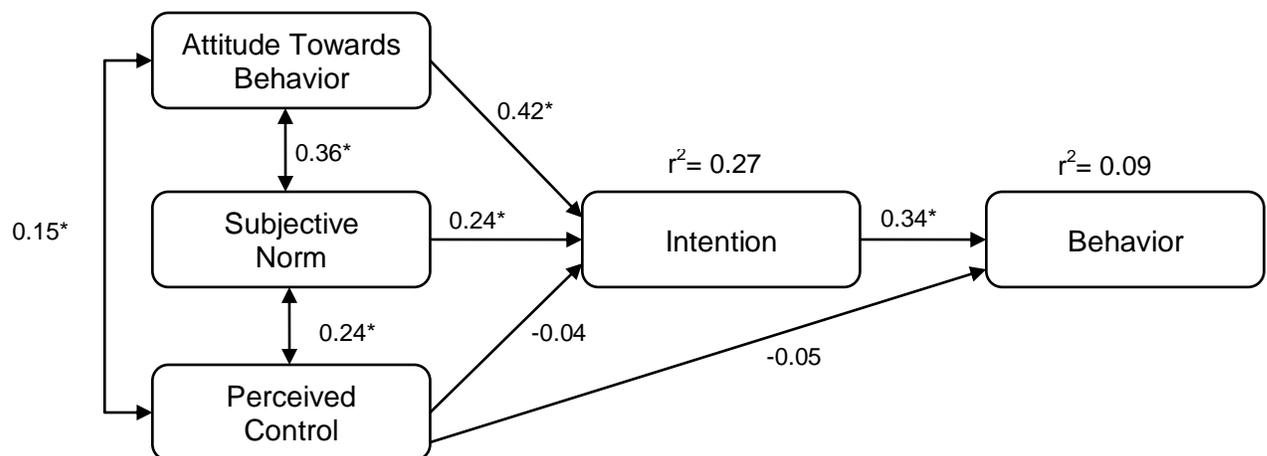


Figure 3-1. Path diagram for oral sex behavior.

Note: \* indicates statistical significance at the .001 level.

The vaginal sex diagram (Figure 3-2) again shows positive correlations between Attitudes, Norms, and Control. However, in this model a statistically significant direct path to behavior is represented by Perceived Control. Yet the variance explained by the

constructs remained quite low. Twenty eight percent of the variance of Intention is explained by the constructs of Attitude, Norms and Control. Eleven percent of the variance of Behavior is explained by Intention and Control directly.

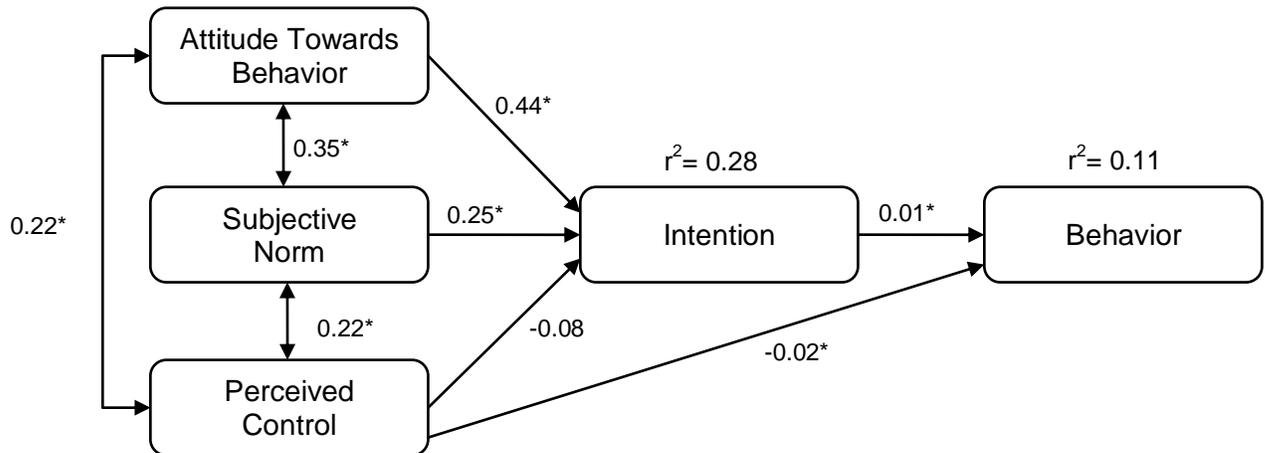


Figure 3-2. Path diagram for vaginal sex behavior.

Note: \* indicates statistical significance at the .001 level.

Similar to the oral sex model, the anal sex model (Figure 3-3) fail to produce statistical significance for the Perceived Control construct. In this model the variance explained by the constructs is lower than the other two models. In the anal sex model 16% of the variance of intention is explained by the constructs of Attitude, Norms, and Control and only 1% of the variance of behavior is explained by intention and the direct path of Control.

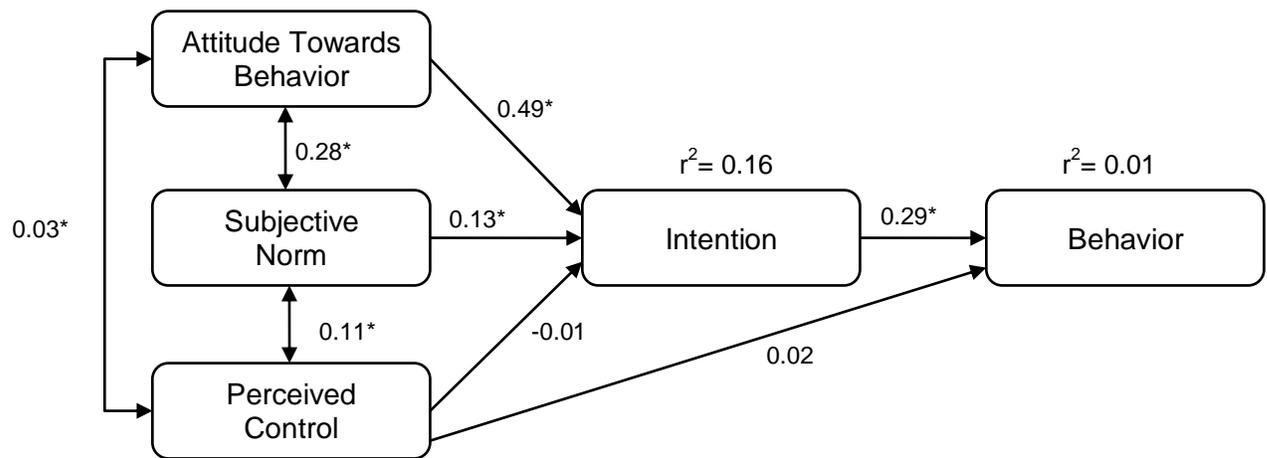


Figure 3-3. Path diagram for anal sex behavior.

Note: \* indicates statistical significance at the .001 level.

### Discussion

Alcohol use and sexual activity is difficult to assess, but this study makes an exploratory effort into the concomitant behaviors of alcohol intoxication and sexual activity. The present study adds to the literature by addressing measurement and validation of self-reported sexual behavior.<sup>31, 59</sup> In addition, the created instrument assessed participants' intention to participate in oral, vaginal, and anal sex behaviors while intoxicated. The path analysis found the construct of Perceived Behavioral Control to be a poor predictor of intention and behavior. Several reasons may account for this finding. First, the measures aren't well developed as there is high variance among the Control construct. Second, constructs contained within the TPB framework lack the predictive ability desired when studying specific sexual behaviors while intoxicated. The physiological effects of alcohol may influence physical control over sexual behaviors as

well as perceived control. Thus, future research investigating the predictive ability of the Theory of Reasoned Action is warranted.

The use of caution is warranted when generalizing study findings to a broader sample of college students. There is an indirect relationship between the differences in physical and social environmental characteristics between samples and the transferability of these findings. In addition, the cross sectional nature of this study should be noted. Future studies employing a longitudinal design offer the opportunity to gain a better assessment of participants' normative behaviors and lessens the impact of recall bias on the data. A major criticism of path analysis is its improper use of linear regression to find causal relationships though the main goal of regression is correlation, not causation. In addition, the underlying Theory of Planned Behavior is used to determine the linear combinations of variables that compose the constructs. Thus, path analysis relies heavily on the underlying theory; if the theory is flawed, the analysis is irrelevant. However, the present study provides a comprehensive description of the sexual behaviors of college students and aids in addressing the gap the literature by showing attitudes and norms to be better predictors of specific sexual intention and behavior than perceived behavioral control. Overall, perceived control lacks a statistically significant effect on intention, as well as participation in the respective sexual behavior. An exception was present in the model using vaginal sex; perceived behavioral control directly impacted behavior, but not intention to participate in the behavior.

Further research is needed in the continued development of the measures and investigation into an applicable theory. Perhaps the Theory of Reasoned Action, which

does not include the perceived behavioral control path, would be better suited for these risk behaviors. In addition, further research is needed with other college-student populations. Consideration for greater predictability of the instrument through addition of risk behaviors or other measures is also necessary.

### **Conclusions For Consideration**

This study assessed the lack of measurement consistency between studies evaluating alcohol use and sexual activity. Presently, comparisons and generalizations are difficult to conclude with the current behavioral measurements, thus leading to public health implications.<sup>32</sup> The Theory of Planned Behavior was applied to both predict and explain the health behaviors, as well as to guide the formatting and structure of individual items. The results showed Perceived Behavioral Control was not a significant predictor of intention to participate in specific sexual behaviors while intoxicated. However, perceived control was found to be statistically significant when predicating vaginal sex behavior directly. This leads the researcher to question the design of the measures or the applicability of the theory.

The present exploratory study increases our understanding of sexual risk behaviors influences by one's alcohol consumption. Perceptions, attitudes, and norms were assessed on a sexually-specific behavioral level. The information gleaned from this study impacts both future research with this population and development of effective public health interventions and policies.

Table 3-1. TPB attitude toward behavior direct and indirect measures

Construct	Item	Anchors
Attitude Toward Behavior (Direct Measures)	Q2-8Stem: Select response that most accurately reflects personal beliefs about your behaviors for each of the following: a. Oral sex while being drunk b. Vaginal sex while being drunk c. Anal sex while being drunk	Good-Bad Healthy-Unhealthy Beneficial-Harmful Enjoyable-Unenjoyable Risky-Not Risky Regretful-Unregretful Guilt-No Guilt
	Q11. I would be more social if I got drunk Q12. I would have more fun if I got drunk before participating in: a. Oral sex b. Vaginal sex c. Anal sex Q13. My chances of participating in _____ would increase if I got drunk. a. Oral sex b. Vaginal sex c. Anal sex Q31. When I drink I feel a greater desire to participate in: a. Oral sex b. Vaginal sex c. Anal sex	Strongly Agree- Strongly Disagree
Behavioral Beliefs (Indirect Measures)	Q32. When I drink it's easier to participate in: a. Oral sex b. Vaginal sex c. Anal sex Q33. When I drink before having sex a concern of mine is: a. Becoming pregnant or impregnating my partner b. Not being able to perform sexually c. That I may embarrass myself	Strongly Agree- Strongly Disagree
Evaluations of Behavioral Outcomes (Indirect Measures)		

Note: All anchors are on a seven point scale.

Table 3-2. TPB subjective norm direct and indirect measures

Construct	Item	Anchors
Subjective Norm (Direct Measures)	Q9. Most people I hang out with would approve of me participating in: a. Oral sex while intoxicated b. Vaginal sex while intoxicated c. Anal sex while intoxicated	Strongly Agree- Strongly Disagree
	Q10. The people in my life whom I value encourage me to participate in: a. Oral sex while intoxicated b. Vaginal sex while intoxicated c. Anal sex while intoxicated	
Normative Beliefs (Indirect Measures)	Q35. My close friends would approve of me participating in: a. Oral sex while intoxicated b. Vaginal sex while intoxicated c. Anal sex while intoxicated	Strongly Agree- Strongly Disagree
	Q36. My ideal future partner would approve of me participating in: a. Oral sex while intoxicated b. Vaginal sex while intoxicated c. Anal sex while intoxicated	
Motivation to Comply (Indirect Measures)	Q37. When it comes to sexual behaviors while intoxicated, how motivated are you to meet the expectations of your: a. Close friends? b. Current partner? c. Ideal future partner?	Strongly Agree- Strongly Disagree

Note: All anchors are on a seven point scale.

Table 3-3. TPB perceived behavioral control direct and indirect measures

Construct	Item	Anchors
Perceived Behavioral Control (Direct Measures)	Q43a. I am confident that I can limit my alcohol consumption.	Strongly Agree- Strongly Disagree
	Q43b. I can resist sexual pressures when drunk.	
	Q43c. It's difficult for me to refuse sexual advances when drunk.	
Control Beliefs (Indirect Measures)	Q34. What do you believe is the likelihood of your participations in the following behaviors while being intoxicated:	Extremely Likely - Extremely Unlikely
	a. Use a condom or other barrier method during vaginal sex.	
	b. Use a condom or other barrier method during anal sex.	
	c. Getting tested for sexually transmitted infections.	
	d. Consider your use of contraceptives.	
	e. Consider your chance of contracting a sexually transmitted infection.	
	f. Consider the financial costs associated with an unplanned pregnancy.	
Perceived Power (Indirect Measures)	Q42a. Availability of free alcoholic drinks influences my decision to get drunk.	Extremely Likely - Extremely Unlikely
	Q42c. Availability of free alcoholic drinks influences my decision to participate in oral sex.	
	Q42d. Availability of free alcoholic drinks influences my decision to participate in vaginal sex.	
	Q42e. Availability of free alcoholic drinks influences my decision to participate in anal sex.	
	Q42f. The availability of a condom would influence my decision to have sex.	
	Q42g. Pressures from sexual partners would influence my decision to have sex.	

Note: All anchors are on a seven point scale.

Table 3-4. Cronbach's alpha and factor loading for each TPB construct across the three sexual behaviors

Factor and scale	Specific Behavior Loadings		
	Oral	Vaginal	Anal
Attitude towards behavior			
Cronbach's $\alpha$	0.84	0.83	0.82
Personal beliefs of participating in sexual behavior while intoxicated	0.79	0.81	0.77
I would have more fun if I got drunk and participated in the sexual behavior	0.81	0.79	0.82
My chances of participating in the sexual behavior would increase if I got drunk	0.82	0.77	0.84
When I drink I feel a greater desire to participate in the sexual behavior	0.77	0.80	0.79
When I drink it's easier to participate in the sexual behavior	0.83	0.84	0.81
Subjective Norm			
Cronbach's $\alpha$	0.56	0.56	0.54
Most people I hang out with would approve of me participating in the sexual behavior while intoxicated	0.60	0.64	0.67
The people in my life whom I value encourage me to participate in the sexual behavior while intoxicated	0.73	0.66	0.59
My close friends would approve of me participating in the sexual behavior while intoxicated	0.64	0.78	0.76
My ideal partner would approve of me participating in the sexual behavior while intoxicated	0.72	0.83	0.81
When it comes to sexual behaviors while intoxicated, how motivated are you to meet the expectations of your close friends	0.68	0.70	0.65
When it comes to sexual behaviors while intoxicated, how motivated are you to meet the expectations of your current partner	0.70	0.74	0.71
When it comes to sexual behaviors while intoxicated, how motivated are you to meet the expectations of your ideal future partner	0.58	0.63	0.62
Perceived behavioral control			
Cronbach's $\alpha$	-0.17	0.46	0.31
Likelihood of barrier usage while being intoxicated	0.63	0.62	0.69
Consider contraceptive use while intoxicated	0.58	0.60	0.58
Consider STI transmission while intoxicated	0.62	0.62	0.59
Consider financial costs of unplanned pregnancy when intoxicated	0.58	0.56	0.56
Availability of free alcoholic drinks influences decision to participate in sexual behavior	0.56	0.57	0.61
All path variables	Cronbach's $\alpha = 0.83$		

Table 3-5. Correlation matrix for oral sexual behaviors

	Mean	SD	Range	A	SN	Constructs		
						P	I	B
Attitudes (A)	45.43	31.20	1-100	1.00	0.36*	0.15*	0.51*	0.16*
Social Norms (SN)	36.86	27.18	1-100		1.00	0.11*	0.39*	0.13*
Perceived Control (P)	21.87	15.53	1-50			1.00	0.04*	-0.04*
Intention (I)	5.51	1.96	1-7				1.00	0.34*
Behavior (B)	4.52	8.04	0-60					1.00

Note: \* $p < .01$

Table 3-6. Correlation matrix for vaginal sexual behaviors

	Mean	SD	Range	A	SN	Constructs		
						P	I	B
Attitudes (A)	44.85	30.91	1-100	1.00	0.35*	0.22*	0.51*	-0.16*
Social Norms (SN)	37.88	27.17	1-100		1.00	0.22*	0.39*	-0.16*
Perceived Control (P)	13.44	14.75	1-50			1.00	0.07	0.06
Intention (I)	5.48	2.04	1-7				1.00	-0.39*
Behavior (B)	5.73	9.71	0-100					1.00

Note: \* $p < .01$

Table 3-7. Correlation matrix for anal sexual behaviors

	Mean	SD	Range	A	SN	Constructs		
						P	I	B
Attitudes (A)	67.04	31.17	1-100	1.00	0.28*	0.03	0.52*	-0.16*
Social Norms (SN)	45.09	27.27	1-100		1.00	0.11*	0.27*	-0.08**
Perceived Control (P)	15.27	15.76	1-50			1.00	0.03	0.01
Intention (I)	6.49	1.21	1-7				1.00	-0.29
Behavior (B)	0.29	2.52	0-50					1.00

Note: \* $p < .01$ , \*\* $p < .05$

Table 3-8. Absolute fit indices for each sexual behavior model

	$\chi^2$	df	p-value	GFI	SRMSR
Oral	391.89	10	0.001	1.000	0.002
Vaginal	319.55	10	0.001	1.000	0.000
Anal	352.70	6	0.001	1.000	0.002

## CHAPTER 4 IDENTIFYING THE TYPOLOGY OF SEXUAL RISK BEHAVIORS: AN APPLICATION OF A CLUSTER ANALYTIC TECHNIQUE

### **Background**

Sexual behaviors and alcohol have a complex relationship. Alcohol affects cognitive function by impairing distal processing of behavioral consequences, therefore an intoxicated individual is more influenced by immediate, and often less deleterious, consequences. Thus, sexual activity with a new or casual partner offers greater opportunities for danger than alcohol-induced sexual activity with a steady partner.<sup>97</sup> Alcohol can increase risky sexual behaviors in the early stages of a relationship because partner familiarity and contraceptives other than condoms play a larger role as relationships mature.<sup>62, 98</sup> Corbin and Fromme found as trust between sexual partners increases the use of alternate forms of pregnancy prevention also increases.<sup>62</sup> Sexual partners felt safe within their defined relationship though the majority of participants (66%) had been with their partner for less than 6 months. The majority of sexually active participants had never been tested for HIV and only 20% were in a monogamous relationship where they knew their partner's history.<sup>62</sup> Numerous studies have included measurements on relationship status and other aspects of sexual risk-taking, but none have analyzed the specific effect of perceived relationship status on alcohol use and sexual activity intention.<sup>64-67</sup>

These findings have numerous public health implications. Greater attention should be focused on the application of contextual methods in data analysis to supplement contextual ideas (theories, models, and frameworks) to maximize efficiency and efficacy of behavioral interventions. Researcher suggests design interventions take into consideration the variation seen between target groups.<sup>57, 91, 99, 100</sup> Studies assessing

the heterogeneity of sexual risk groups could aid in the design and application of screenings and interventions.<sup>101, 102</sup> Cluster analysis is an exploratory technique that is useful in revealing unknown subtypes and understanding patterns and behavioral context.<sup>54</sup> The statistical technique has been used to develop patterns within multivariate data of alcohol use and sexual risk behaviors.<sup>102-104</sup>

Using a cluster analytic strategy,<sup>103</sup> the aim of this exploratory study is to identify the behavior-specific typology of sexual risk-taking among college students. The researcher was designed to answer the following research questions:

**RQ1:** What is the sexual behavior typology of sexually active college students enrolled full-time at a large southeastern university?

**RQ2:** What are the sexual risk-taking differences between the observed typology clusters?

**RQ3:** Among the observed clusters, are sexual coercion and abuse, unplanned pregnancy, and sexually transmitted disease more or less prevalent?

## **Methodology**

### **Participants and Procedures**

A total of 4,000 participants, aged 18-24 were randomly selected by the registrar and requested by the researcher to participate in the study. A total of 832 students participated for a 20.8% response rate. All participants were notified via e-mail, to visit the online survey. Over the course of the study, they received three additional email reminders to log on and complete the survey. Participants were required to read an informed consent message prior to taking the survey, which included instructions. Their IP addresses, names and e-mails were not collected in order to ensure anonymity. Participants were notified of their right to discontinue the questionnaire at any point without retribution. Upon completion of the survey, they were directed to an exit page

with local alcohol, sexual health, and mental health resources as well as the option to be re-directed to an incentive page. The separate page allowed participants to enter their contact information should they be interested in being considered for the incentive. Only the first two and last two respondents were selected to receive a \$50 gift card.

## **Measurements**

The instrument is designed to assess attitudes and behaviors associated with sexual risk taking in the college student population. It was the aim of the research to assess the spectrum of sexual behaviors, thus each item included the participation of each sexual behavior (digital, oral, vaginal, and anal sex) while intoxicated. Additional behavior items assessed alcohol use, relationship status, and consequences related to sexual activity.

Previous research has found relationship status strongly affects sexual risk taking in general.<sup>33, 60-62</sup> Surra et al. found most research focusing on the college population did not assess specific features of relationship status.<sup>63</sup> Further research in sexual risk-taking needs to include a more thorough assessment specific of perceived relationship status. Numerous studies have included measurements on relationship status and other aspects of sexual risk-taking, but none have analyzed the specific effect of perceived relationship status on alcohol use and sexual activity intention.<sup>64-67</sup>

The term sexual assault includes both sexual contact (fondling) and sexual penetration (rape). However, when forced digital penetration is the only complaint, a medical-legal examination cannot be performed.<sup>69, 70</sup> This is based on decades-old research identifying rape victims by pregnancy, syphilis or gonorrhea diagnosis, ignoring other physical or psychological trauma. Reports of digital-genital contact during sexual assault range from 26% to 55%.<sup>71-74</sup> Rossman and colleagues conducted a

retrospective study documenting the frequency and type of genital injuries in women who solely reported forced digital penetration.<sup>72</sup> During the 3-year span, 941 sexual assault case files were reviewed. Fifty-three cases solely experienced forced digital penetration or manipulation. Of this group, 81% presented genital injuries with a mean of 2.4 injuries per patient. Further research is needed to understand digital behaviors so as to best dictate policy. Little is known about the behavioral norm, such as if it is more likely to occur with other risk behaviors. Even less is known about digital behaviors among college students.

Another behavior of interest is oral sex, which refers to sexual activity involving oral (mouth) stimulation of one's partner's sex organs and includes both fellatio and cunnilingus.<sup>51</sup> For several reasons, oral sex can be a preferred form of sexual expression for adolescents and young adults. The behavior cannot produce an unwanted pregnancy, which is often the central focus of their concerns about sexual risks.<sup>75</sup> In some situations, oral sex may be preferred because it is perceived to involve less intimacy than intercourse.<sup>64</sup> In addition, some studies have found that oral sex is not judged to be a form of sexual activity at all, thus allowing participants to view themselves as not being sexually active.<sup>75, 76</sup>

Anal sex is another behavior of interest to this study. It is a behavior that is not often assessed in sexual-risk surveys even though it is the most efficient route for HIV transmission.<sup>10</sup> Between 20-25% of college-aged adults have participated in anal sex behaviors.<sup>10-12, 77</sup> Research also suggests those who participate in anal sex are more likely to participate in other risk behaviors.<sup>10</sup> Thus further investigation of these specific behaviors is warranted.

## **Analysis**

Data was entered and analyzed in R statistical software package version 2.9.2. Each survey item was coded numerically to facilitate analysis. Participant demographics were compared to a national sample of college students from the American College Health Association's National College Health Assessment II (ACHA-NCHA II).<sup>5</sup>

Among the respondents, the mean age was 20 (sd = 1.38) and a majority were female (67.5%), similar to the student body profile at the host institution. About 75% described themselves as white, 8.6% as African American and 17.5% defined their ethnicity as Hispanic. The majority described their sexual orientation as heterosexual (92.1%). Study participants were asked to explain their current relationship status. Results indicated that 43.7% were in an exclusive, monogamous relationship and 4.1% considered themselves to be in an open relationship where they were free to see other people (non-monogamous), 9.5% considered themselves openly dating yet not involved in a relationship, and 35.4% considered themselves neither dating nor in a relationship.

Study participants were compared to a national sample of college students from the 2010 National College Health Assessment II (Table 3-1).<sup>5</sup> The study sample composition is quite similar to that of the national sample of American college students, though some risk behaviors seem to be slightly higher among the study sample.

## **Results**

### **Cluster Analysis**

Cluster analyses were performed to group participants based on the following sexual risk variables: number of times respondents participated in digital sex, oral sex, vaginal sex, and anal sex; number of sex partners in the past 30 days; alcohol use in the past 30 days; heavy episodic drinking in the past 2 weeks; frequency of condom or

barrier method used during oral, vaginal, and anal sex; and frequency of STI testing and contraceptive use.

Using several clustering algorithms (Ward's, K-means, Expectation Maximization) the Bayesian Information Criterion (BIC) was applied as a clustering criterion to determine the best algorithm and number of clusters. The larger the value of the BIC, the stronger the evidence for the model as found in these results (BIC = -20,808).<sup>105</sup> It is important to note that each cluster algorithm produces different cluster solutions, as found in other research using clustering algorithms across various subject matters.<sup>104, 106, 107</sup> For each analysis the squared Euclidean distance coefficient was used as the measurement of proximity. The variables were standardized by transforming them to Z scores.

Ward's and K-means were each found to produce simple, two-cluster solutions between participation in high-risk versus low-risk sexual behaviors. In contrast, the Expectation Maximization (EM) algorithm distinguished a more sophisticated three-group solution. EM is a model-based method, where maximum-likelihood criterion is used for merging groups.<sup>105</sup> It is often used in collaborative filtering for information recommendation systems, such as those employed by websites which provide predictive music or book recommendations based upon user information.<sup>108-110</sup>

The EM clustering algorithm has three main limitations which must be noted and addressed.<sup>105</sup> First, the convergence rate can be slow if the variables are not well-separated with reasonable values. Second, the algorithm may not be practical for models with very large numbers of components. Finally, the algorithm will not proceed if clusters contain only a few observations or if the observations they contain are nearly

collinear. Thus, a listwise deletion of cases with missing values was performed, resulting in 492 cases in the cluster analysis. This is sufficiently small to avoid the first EM limitation but large enough for statistical power. A total of 22 clustering components or variables were used in the study, thus avoiding the second limitation of EM. In addition, careful attention was paid to the removal of outliers in order to address the third algorithm limitation. Clusters with very few elements were analyzed and those with extreme responses were removed. Upon removal of the outlier, the model-based clustering algorithm was re-run. The process was repeated until three outliers were removed and cluster groupings stabilized. The results were three distinct cluster-solutions, which were then selected for further analysis.

Since the clusters were created by maximizing differences between group means, testing for the differences using ANOVA would be irrelevant. Instead, a permutation test was applied to assess statistical significance via randomization and re-evaluation of the Kruskal-Wallis (KW) test statistic. As the variables had been standardized via z-scores they were uniformly scaled and allowed the permutation of responses per case. In other words, each case included the same responses but they were shuffled to a different variable. The model-based clustering algorithm was run again, forcing a three cluster solution and continued to be permuted and re-clustered in order to assess the distribution of all possible 3-cluster solutions for the dataset. A total of 1000 permutations created 1000 KW statistics for each of the 22 clustering variable questions and compared to the original KW statistic; resulting in descriptive variable profiles. Refer to table 4-2 for the full list of clustering variable profiles.

From the table it can be seen only 14 of the 22 variables were significant at the .05 level. The only sexual behavior item found to be insignificant was the proportion of times the respondent used a condom during vaginal sex. Upon closer inspection it was revealed there are high levels of condom usage in the low-risk group, as it can be expected. However, the middle and high-risk groups are not clearly delineated on this item, thus it was found to be insignificant. Relationship status may play an important role in vaginal condom usage and should be further explored following the discriminant analysis.

Neither alcohol consumption, nor the items assessing likelihood of condom usage while intoxicated were found to be significant. A possible explanation may be found investigating the variance. Sexual behavior items included higher variances than the alcohol items and may be due to the difference in scale. The alcohol consumption measures were categorically scaled and the items assessing likelihood of condom usage while intoxicated were based on a seven-point semantic scale. In contrast, the sexual behavior items allowed the user to enter a numerical response.

The first cluster comprised of 87.6% of the cases (431 respondents) and was labeled as low-risk takers. This group is characterized by less frequency of sexual activity (digital, oral, vaginal, anal) and fewer sexual partners. The second group was identified as medium-risk takers (n=42). Distinguishing features of this group included higher frequency of digital, oral, and vaginal sex activity, but with relatively few partners. In addition, this group is characterized by higher contraceptive use during their last sexual experience. The third group was labeled high-risk takers (n =19). This group was distinguished from the other two groups by greater numbers of sexual partners, less

condom usage, and greater frequency of anal sex activity, a highly-risky sexual behavior.<sup>10</sup>

### **Discriminant Analysis**

A multiple discriminant function analysis was conducted to test the validity of the cluster solution.<sup>11</sup> This analysis included variables not used in the cluster analyses that best discriminate between the clusters and aid in determining their ability to predict cluster membership.<sup>54</sup> The aim was to create linear functions of the discriminating variables that separate the observations into their respective clusters by comparing between and within group differences.

The discriminating variables include: race; age; gender; relationship status; history of sexually transmitted infections (self or partner); unwanted pregnancy (self or partner); experience with coercion or abuse; experience with unprotected sex due to drinking; and sex without giving or receiving consent due to drinking (self or partner). The demographic and psychographic variables were chosen due to their practical support as covariates of sexual risk-taking consequences. Due to a listwise deletion of 25 cases with missing values, 467 cases were included in the discriminant analysis.

Table 4-3 presents the results of the discriminant analysis and shows both discriminant functions were statistically significant ( $p < .05$ ). An examination of the group centroids (scatter-plot locations representing the typical position of each group – not shown here) revealed that Function 1 clearly separated the low-risk takers from the medium-risk takers, whereas Function 2 distinguished the high-risk takers from the medium-risk takers.

The structure coefficients of the discriminating variables also appear in Table 4-3. On Function 1, sexual penetration without consent (structure coefficient = 1.628) was

found to be most effective at distinguishing the low-risk takers from the medium-risk takers, followed by involvement in a physically abusive relationship (structure coefficient = 1.253), participation in sexual activity while intoxicated without giving consent (structure coefficient = -1.030), exclusive relationship status (structure coefficient = 0.993), testing for STIs within the past 12 months (structure coefficient = -0.950), being sexually touched without consent (structure coefficient = 0.761), unplanned pregnancy (structure coefficient = 0.749), open relationship status (structure coefficient = 0.725), gender (structure coefficient = -0.676), Latino ethnicity (structure coefficient = -0.623), participation in unprotected sex while intoxicated (structure coefficient = 0.498), victim of attempted sexual penetration (structure coefficient = -0.493) and participation in sexual activity while intoxicated without getting consent from their partner (structure coefficient = 0.390). The remaining discriminating variables had structure coefficients less than 0.3000, and thus were considered unimportant to the interpretation of Function 1. In order to better understand the discriminant analysis, the researcher consulted group means along with the structure coefficients to draw final conclusions. Thus, compared to the medium-risk takers, the low-risk takers were more likely to be in a committed, exclusive relationship, more likely to be tested for STIs within the past 12 months, less likely to have an unplanned pregnancy, and less likely to be a victim of or participate in coercion and abuse. The low-risk group was also more likely to be female, while the medium-risk group was more likely to identify their ethnicity as Hispanic.

On Function 2, participation in sexual activity while intoxicated without getting consent (structure coefficient = 3.096) and without giving consent (structure coefficient = 2.924), along with penetration without consent (structure coefficient = -2.521) were

found to be most effective at distinguishing the high-risk takers from the medium-risk takers. This was followed by physically and sexually abusive relationships (structure coefficients 1.293 and 1.241, respectively), unprotected sex while intoxicated (structure coefficient = 1.148), unplanned pregnancy (structure coefficient = -0.925), STI testing within the past 6 months (structure coefficient = -0.896), gender (structure coefficient = 0.871), attempted sexual penetration (structure coefficient = -0.734), Hispanic (structure coefficient = 0.683), and casually dating, but not in an exclusive relationship (structure coefficient = -0.536). Thus, compared to the medium-risk takers, the high-risk takers were more likely to participate in sexual activity without giving or getting consent, more likely to be in a physically or sexually abusive relationship, more likely to have unprotected sex while intoxicated and have an unplanned pregnancy, but less likely to have been tested for an STI within the past 6 months or been a victim of attempted sexual penetration. The high-risk group was also more likely to be casually dating without exclusivity, of the male gender, and Hispanic, than when being compared to the medium-risk group.

The classification results of the discriminant analysis also appear in Table 4-3. In classifying these cases, prior probabilities were used to determine group membership. Overall, the 20 discriminating variables correctly classified 87% of the respondents into the three risk groups. The variables were most effective in correctly classifying the low-risk takers (91.9%) and least effective in classifying the high-risk takers (15.8%).

## **Discussion**

Sexual behaviors among college students are multidimensional and may include various co-existing factors such as dating behaviors and alcohol intoxication. Current research fails to capture the spectrum of specific sexual behaviors (digital, oral, vaginal,

anal) and neglects the association of other behaviors such as alcohol use and relationship status. By understanding the heterogeneity of sexual risk groups, public health screenings and interventions can be better designed and implemented to fully cater to the individual's needs.<sup>101, 102</sup> Using a cluster analytic strategy,<sup>103</sup> this exploratory study identified the behavioral heterogeneity of specific sexual behaviors and described ways in which these patterns were associated with sexual risk-taking.

Cluster analyses revealed 3 distinct groups in the behavior-specific typology of sexual risk-taking among college students. Members of the low-risk group were more likely to be in an exclusive relationship and thus reported the least number of sexual partners, less frequency of sexual activity, less condom/barrier or contraceptive usage, and were least likely to be a victim of coercion/abuse. Though the medium-risk group had higher frequencies of sexual activity, it was characterized by more protective behaviors, such as higher proportion of condom/barrier usage and less frequency of partners than the higher-risk group. They were also more likely to be in an open relationship where they are free to see other people, whereas the high-risk group was primarily composed of those casually dating, but not in a relationship.

These results indicate an individual's effort to protect themselves from sexual-risk consequences is attributed to the duration and stability of one's relationship. These exploratory results lend further evidence towards the importance of relationship status in sexual-risk taking behaviors. In addition, cheating or perceived trust in their partner's behavior may provide further dimensionality in relationship status and the sexual-risk behaviors of college students. Further consideration of the measure and scope of risk-variables are needed in future research.

Hypothetically, results would have implications for surveillance, screening, interventions, and possibly policy development at the local or school level. Interventions to promote risk reduction may need adaptation for those with differing sexual behavior profiles. In addition, social norm campaigns aimed at heavy episodic drinking should focus on non-monogamous relationships, initial sexual activity and should address the role of the individual's beliefs about alcohol's effects. A cluster analytic technique could be applied to screen patients at Student Health Care Centers or provide real-time sexual health recommendations, similar to the recommendations when shopping on Amazon. As technology improves, so should applicable statistical techniques and tailored interventions, so as to best reach the target population.

### **Limitations**

Several limitations of the proposed study limit interpretation of the possible findings, such as the study relies solely on self-report measurements. However, Hamilton and Morris assessed the consistency of reported sexual partners and found the mode of survey administration (phone, face-to-face interviews, self-administered questionnaires) did not influence disclosure.<sup>112</sup> In addition, the researcher in the present study sought to remind participants at every step their responses were anonymous.

Another limitation to note is the cross-sectional study design which prevents conclusions about the causal relationships among the variables and does not follow participants longitudinally to view personally normative behaviors. The behavioral measurements were limited to assessing prevalence within the past 30 days. As behavioral consequences occur infrequently specific experiences may not be captured by the recall questions.<sup>59</sup> The results, however, seem to be consistent with studies relying on within-subjects analyses of event-level and daily report data.<sup>47, 62, 113-115</sup>

The results of this study may not be transferred to campuses without a similar environment and social scene. For the development of interventions and application of this data, a more ecological approach will need to be applied to further understand the intricacies of these behaviors. Though caution must be applied in generalizing the results, the proposed study would provide a comprehensive description of the sexual risk-behaviors of college students and aid in addressing the gap of the knowledge base.

Table 4-1. Comparison of study sample and the National College Health Assessment II Sample

	Current Study (n = 832)	ACHA-NCHA II* (n = 30,093)
Participation at least once within the past 30 days		
Oral	48.0%	41.7%
Vaginal	47.6%	45.4%
Anal	6.3%	4.7%
Number of drinks consumed last time they “partied”/socialized		
0	23.6%	32.6%
1-2	28.0%	19.6%
3-4	20.9%	18.4%
5-6	15.5%	13.3%
7-8	5.5%	6.8%
9 or more	6.5%	9.3%
Consumed 5 or more drinks in a sitting during the last 2 weeks		
N/A, Don’t drink	26.0%	26.8%
None	26.5%	40.6%
1-2 times	23.5%	21.0%
3-5 times	9.2%	9.1%
6 or more times	4.8%	2.6%
Experienced the following within the past 12 months, as a consequence of their drinking		
Sex without giving consent	2.9%	1.5%
Sex without getting consent	1.1%	0.4%
Unprotected sex	17.5%	11.6%
Experienced without consent during the past 12 months:		
Sexually touched	9.9%	5.9%
Attempted sexual penetration	5.9%	2.3%
Sexually penetrated	3.3%	1.5%
Intimate relationship that was (past 12 months)		
Emotionally abusive	9.8%	9.8%
Physically abusive	4.4%	2.4%
Sexually abusive	2.6%	1.6%

\* Data from ACHA-NCHA II Fall 2010 Report <sup>5</sup>

Table 4-2. Variable profile for three cluster solution

Variable	Mean and (Standard Deviation)			p-value
	Low-risk takers n = 431	Medium-risk takers n = 42	High-risk takers n = 19	
Frequency of digital sex activity	4.02 (6.26)	15.00 (14.63)	7.42 (9.22)	0.000*
Frequency of oral sex activity	3.05 (5.05)	13.55 (12.67)	4.16 (3.50)	0.000*
Frequency of vaginal sex activity	4.85 (7.07)	19.10 (13.57)	11.32 (13.63)	0.000*
Frequency of anal sex activity	0.01 (0.10)	1.98 (4.76)	2.26 (3.54)	0.000*
Number of partners – digital sex	0.61 (0.64)	1.17 (0.85)	1.58 (1.61)	0.000*
Number of partners – oral sex	0.54 (0.57)	1.26 (1.04)	1.53 (1.61)	0.000*
Number of partners – vaginal sex	0.59 (0.62)	1.26 (0.99)	1.21 (1.58)	0.000*
Number of partners – anal sex	0.01 (0.10)	0.69 (0.52)	1.37 (2.45)	0.047*
Proportion of condom/barrier usage – digital sex	0.53 (0.50)	0.93 (0.26)	0.74 (0.45)	0.000*
Proportion of condom/barrier usage – oral sex	0.47 (0.49)	1.00 (0.01)	0.58 (0.51)	0.000*
Proportion of condom/barrier usage – vaginal sex	0.20 (0.37)	0.61 (0.42)	0.24 (0.38)	0.200
Proportion of condom/barrier usage – anal sex	0.00 (0.00)	0.38 (0.48)	0.38 (0.47)	0.000*
Contraceptive usage at last experience – oral sex (No = 1, Yes = 2, N/A = 3)	1.80 (0.82)	2.45 (0.50)	2.47 (0.84)	0.000*
Contraceptive usage at last experience – vaginal sex (No = 1, Yes = 2, N/A = 3)	1.64 (0.64)	2.21 (0.42)	1.90 (0.74)	0.000*
Contraceptive usage at last experience – anal sex (No = 1, Yes = 2, N/A = 3)	1.10 (0.42)	1.88 (0.80)	1.90 (0.94)	0.005*
Number of days consumed alcohol during past 30 days (Never =1, Not within past 30 days =2, 1-2days =3, 3-5 days =4, 6-9 days =5, 10-19 days =6, 20-29 days =7, Daily =8)	4.36 (1.12)	5.02 (1.47)	4.58 (1.12)	1.000
Frequency of heavy episodic drinking (Last 2 weeks, 5 or more drinks) (N/A =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 =12)	3.50 (2.08)	4.07 (2.51)	4.58 (3.22)	1.000
Likelihood of condom/barrier usage while intoxicated during oral sex (Very likely =1 – Very unlikely =7)	5.77 (1.83)	6.69 (0.75)	6.47 (1.12)	0.991
Likelihood of condom/barrier usage while intoxicated during vaginal sex (Very likely =1 – Very unlikely =7)	2.66 (1.98)	3.95 (2.29)	3.21 (2.04)	1.000
Likelihood of condom/barrier usage while intoxicated during anal sex (Very likely =1 – Very unlikely =7)	3.38 (2.48)	4.64 (2.34)	3.79 (2.39)	0.998
Likelihood of considering testing for Sexually Transmitted Infections while intoxicated (Very likely =1 – Very unlikely =7)	4.80 (2.17)	4.88 (2.23)	5.21 (1.99)	1.000
Likelihood of considering condom/barrier usage while intoxicated (Very likely =1 – Very unlikely =7)	2.85 (2.00)	3.00 (1.99)	3.26 (1.73)	1.000

Note: All measures within the past 30 days unless otherwise stated. \* denotes statistical significance at the .05 level

Table 4-3. Multiple discriminant function analysis of three cluster groups

Function	Eigenvalue	% of Variance	Canonical Correlation	Wilk's Lambda	Chi-Square	df	p
1	0.15	66.2	0.36	0.81	97.34	40	0.000
2	0.08	33.8	0.27	0.93	33.64	19	0.020

Discriminating Variable	Structure Coefficients	
	Function 1	Function 2
Exclusive relationship (no=0, yes =1)	0.993	-0.131
Open relationship (no=0, yes =1)	0.725	0.062
Dating (no=0, yes =1)	-0.165	-0.536
STI testing past 6 months (no=2, yes =1)	-0.074	-0.896
STI testing past 12 months (no=2, yes =1)	-0.950	0.540
STI diagnosis (1 = no, 2 = yes for each of 8 common STIs)	0.021	0.062
Unplanned pregnancy (no=1, yes =2, unsure = 3)	0.749	-0.925
Emotionally abusive relationship (no=1, yes =2)	-0.021	-0.307
Physically abusive relationship (no=1, yes =2)	1.253	1.293
Sexually abusive relationship (no=1, yes =2)	0.068	1.241
Sexually touched without consent (no=1, yes =2)	0.761	0.422
Attempted sexual penetration (no=1, yes =2)	-0.493	-0.734
Sexually penetrated without consent (no=1, yes =2)	1.628	-2.521
Sex while intoxicated without giving consent (no=1, yes=2)	-1.030	2.924
Sex while intoxicated without getting consent (no=1, yes=2)	0.390	3.096
Unprotected sex while intoxicated (no=1, yes =2)	0.498	1.148
Age (under 21=1, over 21=2)	-0.123	0.172
Gender (male=1, female =2)	-0.676	0.871
Race (Caucasian=1, non-Caucasian=2)	-0.138	-0.094
Hispanic/Latino (no=2, yes =1)	-0.623	0.683

Actual Group Membership		Predicted Group Membership		
		Low-risk takers	Medium-risk takers	High-risk takers
Low-risk	n 431	396 (91.9%)	94 (2.1%)	4 (0.9%)
Medium-risk	42	31 (73.8%)	8 (19.0%)	0 (0%)
High-risk	19	16 (84.2%)	0 (0%)	3 (15.8%)

Percent of "grouped" cases correctly classified: 87%

## CHAPTER 5 IMPLICATION OF SEXUAL BEHAVIOR RESEARCH

### **Background**

Sexual behaviors, especially in combination with alcohol, can cause physical, emotional, and financial burdens. Oftentimes these behaviors result in Sexually Transmitted Infections (STIs), which remain a significant public health problem though it is largely unrecognized by the public, policymakers, and health care professionals.<sup>1</sup>

Despite the large amount of research into sexual behavior and alcohol use, there has been a lack of agreement as to the best way to measure and validate self-reports of sexual behavior and alcohol use.<sup>7, 31</sup> In addition, many instruments have been created to measure sexual behavior but few measure specific behaviors.<sup>7</sup> If a study is conducted with inappropriate measures or measures that are not sensitive to a certain sexual behavior, then such a study may reach inappropriate conclusions regarding the risk behavior. Noar, Cole, & Carlyle provide examples of this discrepancy as it related to condom use.<sup>34</sup> If a surveillance study is conducted assessing the percentage (proportional measure) of condom usage it does not take into account the frequency of sexual intercourse. If the community under surveillance reduces their frequency of intercourse it may lower risk but the outcome would not be portrayed by the proportional measure. Thus accurate behavior measurement is critical for a positive public health and policy impact.

The aim of this study was the examination of specific sexual behaviors and the role of alcohol use on the intention to participate in these behaviors. The specific purposes were three-fold: 1) to develop a survey instrument using both qualitative and quantitative methods; 2) to apply the Theory of Planned Behavior to assess the

perceptions, attitudes, prevalence and intentions of sexual-risk taking behaviors among college students; 3) to identify the typology of sexual risk-taking among college students using a cluster analytic technique.

## **Results**

Alcohol use and sexual activity is difficult to assess, but this study makes an exploratory effort into the development of measures specific to behavior and risk. The presented instrument development process aids in addressing measurement and validation of self-reported sexual behavior, which currently suffers from a lack of consensus in the literature.<sup>31, 59</sup> In addition, the created instrument is the first to assess a spectrum of specific sexual health behavior, including digital, oral, vaginal, and anal sex behaviors and how they relate to alcohol intoxication.

The applied eight-step instrument development process provided explicit guidelines for mix-modal analysis development. By reviewing the literature to identify relevant concepts of sexual behavior and alcohol use, 50 preliminary measures were cultivated to assess the specific sexual behaviors of erotic touch, digital, oral, vaginal, and anal sex. These measures were then reviewed by a panel of experts, who recommended the removal of erotic touch behaviors as they were not risk-related, resulting in the deletion of sub-questions from the behavior-specific items. Three additional questions were created to address the consequences of specific sexual behaviors. Definitions were clarified, items reworded, and skip patterns added.

Fifty three questions were presented to the target population during the cognitive interviews. This information led to changes in response options, readability, the creation of 3 screening questions and 4 sub-questions relating to specific-sexual behavior. Screen-capture software has previously been used as a methodology assessing

internet usage.<sup>83, 84</sup> Results of the present study prove it to be a cost effective, rich data collection technique for instrument development.

The piloted instrument contained 56 questions assessing digital, oral, vaginal, and anal sexual behaviors and the role of alcohol intoxication in these behaviors. The factor analysis resulted in the removal of two measures across 3 sexual behaviors (total of six items) due to poor loadings. The removed items included: “when it comes to (oral, vaginal, anal) sex behaviors, how motivated are you to meet the expectations of your parents” and “I am confident I can resist (oral, vaginal, anal) sex advances” respectively from the constructs Motivation to Comply and Perceived Behavioral Control. Another item was removed from further analyses as it loaded on the wrong factor. “Availability of free alcoholic drinks influences my decision to participate in digital sex” was theorized as part of Perceived Power but loaded on Control Beliefs. Exploratory factor loadings ranged from .56 to .84. Internal consistency was demonstrated for the instrument overall ( $\alpha = 0.83$ ) and for each factor except Perceived Behavioral Control (oral sex  $\alpha = -0.17$ , vaginal sex  $\alpha = 0.46$ , anal sex  $\alpha = 0.31$ ). Factor loadings and estimates of internal consistency are shown in Table 3-4. In addition to the elimination of questions with low factor loadings, the item assessing STI testing was revised to include both 6 month and 12 month sub-items.

During the pilot study, the total numbers of items were reduced from 56 to 49. The formal investigation of the 49 items was conducted with an additional sample 4000 students. Survey methodology remained the same except for one notable difference; the use of an incentive. By offering participants the opportunity to receive one of four

\$50 gift cards, the response rate increased 3%. Additional psychometric testing of the instrument is presented in a series of substantive papers (Chapters 3 and 4).

The Theory of Planned Behavior was applied to both predict and explain the health behaviors, as well as to guide the formatting and structure of individual items. The results showed Perceived Behavioral Control was not a significant predictor of intention to participate in specific sexual behaviors while intoxicated. However, perceived control was found to be a statistically significant when predicating vaginal sex behavior directly. A little over a quarter (27%) of the intention to participate in oral sex while intoxicated is accounted for by the constructs of Attitude, Norm, and Control. Only 9% of the variance in oral sex behavior participation while intoxicated is attributed to both Intention and the direct path of Perceived Control to Behavior. The vaginal sex path analysis again showed positive correlations between Attitudes, Norms, and Control. However, in this model Perceived Control had a statistically significant direct path to Behavior. Yet the variance explained by the constructs was still quite low. Twenty eight percent of the variance of Intention is explained by the constructs of Attitude, Norms and Control. Eleven percent of the variance of Behavior is explained by Intention and Control directly. Similarly, the anal sex model failed to find significance concerning the construct of Perceived Control. The variance explained by the constructs was even lower than the other two models. Sixteen percent of the variance of Intention was explained by the constructs of Attitude, Norms, and Control. Only 1% of the variance of anal sex while intoxicated was explained by Intention and Control.

The results of the path analysis lead the researcher to question the design of the measures or the applicability of the theory. The measures may not be well developed as there is high variance among the Control construct. Also, the TPB may not be a good fit as the physiological effects of alcohol may influence physical control over sexual behaviors as well as perceived control.

The cluster analysis revealed 3 distinct groups in the college student sample behavior-specific typology of sexual risk-taking among college students. Members of the low-risk group were more likely to be in an exclusive relationship and thus reported the least number of sexual partners, less frequency of sexual activity, less condom/barrier or contraceptive usage, and were least likely to be a victim of coercion/abuse. Though the medium-risk group had higher frequencies of sexual activity, it was characterized by more protective behaviors, such as higher proportion of condom/barrier usage and less frequency of partners than the higher-risk group. They were also more likely to be in an open relationship where they are free to see other people, whereas the high-risk group was primarily composed of those casually dating, but not in a relationship. Compared to the medium-risk takers, the high0risk takers were more likely to participate in sexual activity without giving or getting consent, more likely to be in a physically or sexually abusive relationship, more likely to have unprotected sex while intoxicated and have an unplanned pregnancy, but less likely to have been tested for an STI within the past 6 months or been a victim of attempted sexual penetration. Overall, the variables correctly classified 87% of the respondents into the three risk groups.

These results may indicate an individual's effort to protect themselves from sexual-risk consequences is attributed to the duration and stability of one's relationship. These

exploratory results lend further evidence towards the importance of relationship status in sexual-risk taking behaviors. In addition, cheating or perceived trust in their partner's behavior may provide further dimensionality in relationship status and the sexual-risk behaviors of college students. Further consideration of the measure and scope of risk-variables are needed in future research.

### **Limitations**

Caution must be applied in generalizing the results of this study to a broader college student sample. The present study focuses on traditional-aged college students who attend a 4 year institution. Though the sampled population was similar in demographic nature to the university population (Table 2-1), demographic variations of the student respondents may have influenced the results of the study.

The results may not be transferred to campuses without a similar environment and social scene. The sampled university has a vibrant athletic community and thriving night-life close to the campus. The environment students face include close proximity to drinking establishments, regularly occurring drink specials, social events, sporting events, and an abundance of house parties. In addition the data collection was conducted during a specific amount of time and thus does not follow respondents longitudinally to view personally normative behaviors. The self-report nature of the data collection limits the ability of the researcher to determine the extent of respondents' over- and under-reporting behaviors.

A major criticism of path analysis is its improper use of linear regression to find causal relationships though the main goal of regression is correlation, not causation. In addition, the underlying Theory of Planned Behavior is used to determine the linear combinations of variables that compose the constructs. Thus, path analysis relies

heavily on the underlying theory and if the theory is flawed, the analysis is irrelevant. Further investigation must occur on the application of the TPB and the intention to participate in specific sexual behaviors while intoxicated.

### **Implications**

Public health promotion initiatives are successful when they move beyond knowledge of protective factors. In order for positive behavior changes to occur, multiple efforts need to be made outside of personal behavior and knowledge. This is especially true among the inter-dependent behaviors of alcohol use and sexual activity. An ecological perspective emphasizes the interaction between and interdependence of factors within and across all levels of problem behaviors.<sup>94</sup> By applying an ecological perspective we are able to focus on an individual's interactions with their physical and socio-cultural environments.

### **Ecological Model**

Intervention points are identified via two key concepts of the ecological perspective: the interactive behavioral effects of multiple layers of influence and reciprocal causation where the individual both shapes and is shaped by the social environment.<sup>39, 94</sup> The concept of multiple layers of influence was identified by McLeroy and colleagues to systematically guide interventions.<sup>116</sup> The five levels of influence of the Ecological Model are intrapersonal, interpersonal, organization, community and public policy. Figure 5-1 provides a visual representation of the model and influence levels. The following sections identify levels of analysis within the ecological model, as it applies to specific sexual risk behaviors among college students and the results presented in this study.



Figure 5-1. The Ecological Model

### **Intrapersonal**

Intrapersonal factors are those items relating to the individual, such as demographics and psychological characteristics.<sup>39</sup> Health education is a core component of intrapersonal behavior changes. However, for lasting changes to occur, the individual must possess more than just knowledge. They must also possess the skills necessary to amend behavior. The results of this study provided a glimpse into the attitude, perceptions, and beliefs of specific sexual behaviors among college students. Special attention was paid to these psychological characteristics while under the influence of alcohol. Future interventions addressing intrapersonal factors of alcohol use and sexual behavior should provide real-time information, tailored to the individual. For example, the development of a college-based sexual-risk application (app) for cell phones or tablets (iPhone<sup>®</sup>, Android<sup>®</sup>, etc) would allow instant resources to be catered

to the individual's situational needs. The cluster analytic technique presented in this study may be applied in the development of tailored information as the presented results proved to be applicable and effective in public health issues. The statistical algorithm may be used to quickly address intrapersonal factors such as age and gender, as they relate to risky sexual behaviors, resulting in tailored information and resources.

### **Interpersonal**

The interpersonal level of the model relates to the physical environment and social network of the individual.<sup>39</sup> Sexual behaviors are interpersonal by nature, where relationships, social networks, and culture aid in the development of an individual's social identity, support and role definition. An individual's families', friends' and peers' attitudes and beliefs concerning their participation in specific sexual risk behaviors will help shape their intention and participation in those behaviors. These behaviors often co-occur with alcohol intoxication, thus it is important to analyze and address these behaviors as well.

Since social norm plays a role in the acceptability of the sexual behaviors, peer education programs would be viable intervention options for this level. By providing a safe, confidential environment with trained peers, a college student may be more comfortable to reveal the extent of their risk-taking. It is important to note the critical importance of including the topic of relationship status within this level of the ecological model. Couples peer-counseling, school sponsored safe date nights, and partner communication workshops would all be viable interventions to consider when addressing college student romantic relationships.

## **Organization**

The organizational level is characterized by commercial organizations, social institutions, associations, and clubs with rules, regulations, policies, and informal structures.<sup>39</sup> Prevention interventions at the university level could include pre-enrollment requirements of educational modules highlighting the consequences of sexual risk-taking behaviors as well as local resources. Moving beyond knowledge, we acknowledge resources in the institutional environment can help or hinder engagement in sexual behaviors. For example, a university may provide condoms for their students but fail to provide adequate access or discussion of contraceptive options. University level policies provide guidance and structure for prevention and guidance of behavior reporting. When assessing sexual risk it is exceptionally important to include interventions targeting co-occurring behaviors such as drug and alcohol abuse. Campuses with medical-forgiveness policies allow students to feel comfortable in seeking treatment for life threatening consequences of drug and alcohol abuse. Sexual assault is often a co-occurring behavior and thus specific school policies should be instituted to include follow-up visits with university's mental health services.

## **Community**

The community is a broader level of the university environment as it also includes surround areas. The community is both physical as well as functional and includes standards among groups and social network norms.<sup>39</sup> For example, the social environment of the university lends itself to a "party norm", as undergraduates perceive their peers as consuming alcohol, drugs and participating in sexual activity. The community includes "pre-partying" at private residences where it's more cost-effective to drink and easier for those under 21. Students then move to area clubs and bars to

possibly meet a romantic partner and continue drinking. Sexual behaviors can range from erotic touch, to digital, oral, vaginal, and anal sex. To address this risk-environment the availability and accessibility of resources at the community level becomes critical. City level policies and resources should be in agreement and provide a unified front to meet the high-risk takers in the environment where these behaviors occur. For example, the local student bus system could prevent alcohol-related accidents by providing night service between campus, popular student housing, and local drinking establishments. These buses could provide free condoms, information about local resources and social marketing campaigns targeting sexual-risk behaviors.

### **Public Policy**

Local, state, and federal policies and laws encompass the level of public policy in the ecological model.<sup>39</sup> This level can provide greater reach and accessibility to resources or the establishment of laws against sexual risk-behaviors such as alcohol use and the sexually-related consequences of intoxication. The term sexual assault includes both sexual contact (fondling) and sexual penetration (rape). However, when forced digital penetration is the only complaint, a medical-legal examination cannot be performed.<sup>69, 70</sup> Policy is based on decades-old research identifying rape victims by pregnancy, syphilis or gonorrhea diagnosis, ignoring other physical or psychological trauma. Results of the current study provide insight and policy need as digital sex behaviors were more likely to occur with other risk behaviors such as an increased number of sexual partners and alcohol intoxication.

### **Conclusions**

Oftentimes, it can be challenging to operationalize and apply the ecological model to health behavior change. However, the current study aids to specifically define the

interacting behaviors in order to better understand intrapersonal, interpersonal, and environmental factors associated with sexual behaviors of college students.

Further research should focus on continued development of the measures and specific properties of the 49-item instrument. The exploratory instrument should be applied with other college-student populations. In addition, consideration should be placed on the possibility of additional risk behaviors or measures to be added in order to better describe these public health perils. Perhaps the Theory of Reasoned Action, which does not include the perceived behavioral control path, would be better a better suited theory for these risk behaviors. In addition, the exploratory instrument should be applied with other college-student populations. Consideration should also be placed on the possibility of additional risk behaviors or measures to be added in order to better describe these public health perils.

The researcher also suggests continued review into the applied instrument development process as newer technologies and techniques are developed and assessed. For the development of interventions and application of this data, a more ecological approach will need to be applied to further understand the intricacies of these behaviors. Though caution must be applied in generalizing the results, the proposed study would provide a comprehensive description of the sexual risk-behaviors of college students and aid in addressing the gap of the knowledge base.

## APPENDIX A COGNITIVE INTERVIEW CONSENT

### **Cognitive Interview: Sexuality and Alcohol Survey Consent**

**Purpose of the study:** The purpose of this study is to explore behaviors and beliefs related to sexual behavior and alcohol consumption in undergraduate students at UF. Specifically, for this portion we will assess the questionnaire and how the participants will understand the question.

**What you will be asked to do in the study:** If you agree to participate, you will be asked to respond to a 48-item (with multiple sub-items) online questionnaire. The one-time only survey assesses demographic characteristics such as age, sex, and race/ethnicity as well as behaviors and beliefs regarding sexual behavior and alcohol consumption. You do not have to answer any question you do not wish to answer. You will not be penalized in any way for refusing to respond to the survey. The voice and screen capture program is being used to insure that we fully capture all comments. The recordings will be analyzed and then destroyed; at that point, your responses **will be** completely anonymous.

**Time required:** Approximately 30-50 minutes (one time only).

**Incentive:** No compensation will be provided for your participation.

**Risks:** There are no anticipated risks for participating in this study.

**Benefits:** You may benefit from learning about sexual risk-taking behaviors. In addition, you will be presented with local alcohol, sexual health, and mental health resources at the end of the survey.

**Confidentiality and Anonymity:** The recordings will be analyzed and then destroyed; at that point, your responses **will be** completely anonymous. You will not be asked to provide any information that can identify you. There is no way to connect you to your responses. Your email or IP address will not be collected for any reason.

**Voluntary participation:** Your participation in this study is completely voluntary. You have the right to withdraw from the study at anytime without consequence. You do not have to answer any question you do not wish to answer.

#### **Whom to contact if you have questions about the study:**

##### *Principle Investigator:*

Monica C. Webb, MPH, CHES, Doctoral Candidate, Department of Health Education and Behavior, University of Florida, Room 69, Florida Gym, PO Box 118210, Gainesville, FL 32611-8210, (352) 392-0583 ext. 1254, webbm@hhp.ufl.edu

##### *Faculty Supervisor:*

William Chen, PhD, Professor, Department of Health Education and Behavior, University of Florida, Room 6, Florida Gym, PO Box 118210, Gainesville, FL 32611-8210, (352) 392-0583 ext. 1284, chen0724@hhp.ufl.edu

#### **Whom to contact about your rights as a research participant in the study:**

UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250; (352) 392-0433

**Your consent to participate in this study will be implied by continuing to the next page and completing this survey.**

## APPENDIX B COGNITIVE INTERVIEW QUESTIONS

Hypothetically go through the survey and verbally discuss your thought process when answering the survey questions. **Do not provide any identifying information such as your name or email. Do not answer the questions on the survey, instead provide “hypothetical answers” (click on any/all response to ensure the response links are correct) and answer the questions below.** You do not have answer any question you find objectionable and you may leave at any time.

Once you are ready to begin, review the following questions and proceed to the survey’s consent as displayed on the computer screen. **Don’t forget you are NOT to provide YOUR answers to the survey questions but instead focus on the questions below.**

1. Do you understand the definitions:
  - a. One drink of alcohol
  - b. drunk
  - c. Sexually Transmitted Disease
  - d. digital sex
  - e. oral sex
  - f. vaginal sex
  - g. anal sex
2. Do you understand what the question is asking?
3. It is easy to recall the behavior in question?
4. It is difficult to recall the information because the behaviors are difficult to distinguish?
5. Does the question clearly describe the format of the answer?
6. Are the answer choices clear?
7. Does the question ask information you already have?
8. Does the design of the response alternatives affect the way you decide to answer?
9. Do you feel you need to edit your answer to satisfy personal and societal pressures?

APPENDIX C  
STUDENT EMAIL CONTACT

**Initial Email**

Subject: UF Sex & Alcohol Survey

Dear UF Student,

I am a UF doctoral student and I am writing to ask for your participation in a **Sexuality and Alcohol Survey**. The purpose of this study is to explore the attitudes and beliefs regarding sexual behavior and alcohol consumption in undergraduate students at UF. This survey is being conducted to better address your health needs.

Your name was randomly selected from the records at the UF Registrar's Office. If you choose to participate in this survey, **your answers will be completely anonymous**. No personal identification (IP address, names, emails, etc.) will be collected and thus you will not be connected to your answers in any way.

**The first two and last two participants will each receive a \$50 Visa gift card.** If you wish to be considered for the incentive you will be sent to an additional screen, separate from the survey, where you can enter your contact information. **Your information will not be linked to the survey, it is completely separate.** To receive the gift card you must pick it up in room 6 of the Florida Gym.

The survey is only available for **two weeks** so please act quickly. When you are ready to complete this 30 – 50 minute survey, please click on the following link:  
<http://www.zoomerang.com/Survey/WEB22BX4H8BXET/>

Thank you very much for helping us better understand the sexual behavior and alcohol consumption of UF undergraduates. If you have any questions or comments about this survey, please feel free to contact me at (352) 392-0583 x. 1254 or by replying to this email. If you wish to be removed from future notifications please reply with **unsubscribe** in the subject line.

Thank you for your help and Go Gators!

Sincerely,

*Monica C. Webb*

Monica C. Webb, MPH, CHES  
Doctoral Candidate  
Department of Health Education and Behavior  
University of Florida  
P.O. Box 118210, FLG 5  
Gainesville, FL 32611-8210  
Phone: 352.392.0583 ext. 1254  
Fax: 352.392.1909  
E-mail: webbm@hhp.ufl.edu



## Reminder Email

Subject: 2<sup>nd</sup> Notice: Sex & Alcohol Survey

Dear UF Student,

Last week, I emailed you introducing myself and asking for your participation in a **Sexuality and Alcohol Survey**. If you have already completed and returned the questionnaire, please accept my sincere thanks. If not, I urge you to please consider doing so today. Your opinions are very important as it identifies the attitudes and beliefs regarding sexual behavior and alcohol consumption in UF undergraduates. As a fellow UF student I am grateful for your help.

If you choose to participate in this survey **your answers will be completely anonymous**. No personal identification (IP address, names, emails, etc.) will be collected and thus you will not be connected to your answers in any way.

**The first two and last two participants will each receive a \$50 Visa gift card.** If you wish to be considered for the incentive you will be sent to an additional screen, separate from the survey, where you can enter your contact information. **Your information will not be linked to the survey, it is completely separate.** To receive the gift card you must pick it up in room 6 of the Florida Gym. When you are ready to complete this 30 – 50 minute survey, please click on the following link: <http://www.zoomerang.com/Survey/WEB22BX4H8BXET/>

The survey is only available for **a few more days** so please act quickly. If you have any questions or comments about this survey, please feel free to contact me at (352) 392-0583 x. 1254 or by replying to this email. If you wish to be removed from future notifications please reply with **unsubscribe** in the subject line.

Once again thank you for your help!

Sincerely,

*Monica C. Webb*

Monica C. Webb, MPH, CHES  
Doctoral Candidate  
Department of Health Education and Behavior  
University of Florida  
P.O. Box 118210, FLG 5  
Gainesville, FL 32611-8210  
Phone: 352.392.0583 ext. 1254  
Fax: 352.392.1909  
E-mail: webbm@hhp.ufl.edu



## Final Reminder

Subject: Last Opportunity: Sex & Alcohol Anonymous Survey

Dear UF Student,

Previously, I emailed you introducing myself and asking for your participation in a **Sexuality and Alcohol Survey**. I am a doctoral candidate in the College of Health and Human Performance and the anonymous survey is part of my dissertation research.

If you have already completed and returned the questionnaire, please accept **my sincere thanks**. If not, I urge you to please consider doing so today. Your opinions are very important as it identifies the attitudes and beliefs regarding sexual behavior and alcohol consumption in UF undergraduates. As a fellow UF student I am **grateful** for your help.

If you choose to participate in this survey **your answers will be completely anonymous**. No personal identification (IP address, names, emails, etc.) will be collected and thus you will not be connected to your answers in any way.

**The first two and last two participants will each receive a \$50 Visa gift card**. If you wish to be considered for the incentive you will be sent to an additional screen, separate from the survey, where you can enter your contact information. **Your information will not be linked to the survey, it is completely separate**. To receive the gift card you must pick it up in room 6 of the Florida Gym. When you are ready to complete this 30 – 50 minute survey, please click on the following link: <http://www.zoomerang.com/Survey/WEB22BX4H8BXET/>

The survey is only available for **a few more days** so please act quickly. If you have any questions or comments about this survey, please feel free to contact me at (352) 392-0583 x. 1254 or by replying to this email. If you wish to be removed from future notifications please reply with **unsubscribe** in the subject line.

Once again thank you for your help!

Sincerely,

*Monica C. Webb*

Monica C. Webb, MPH, CHES  
Doctoral Candidate  
Department of Health Education and Behavior  
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E-mail: [webbm@hhp.ufl.edu](mailto:webbm@hhp.ufl.edu)



## APPENDIX D SURVEY CONSENT

### Sex & Alcohol Survey Consent

**Purpose of the study:** The purpose of this study is to explore behaviors and beliefs related to sexual behavior and alcohol consumption in undergraduate students at UF.

**What you will be asked to do in the study:** If you agree to participate, you will be asked to respond to a 49-item (with multiple sub-items) online questionnaire. The one-time only survey assesses demographic characteristics such as age, sex, and race/ethnicity as well as your behaviors and beliefs regarding sexual behavior and alcohol consumption. You do not have to respond to any question you find offensive. You will not be penalized in any way for refusing to respond to the survey. Your responses to these questions are anonymous.

**Time required:** Approximately 30-50 minutes (one time only).

**Incentive:** The first two and last two participants will each receive a \$50 Visa gift card. If you wish to be considered for the incentive you will be sent to an additional screen, separate from the survey, where you can enter your contact information. *Your information will not be linked to the survey, it is completely separate.* To receive the gift card you must pick it up in room 6 of the Florida Gym.



**Risks:** There are no anticipated risks for participating in this study.

**Benefits:** You may benefit from learning about sexual risk-taking behaviors. In addition, you will be presented with local alcohol, sexual health, and mental health resources at the end of the survey.

**Confidentiality and Anonymity:** This survey is anonymous. This means you will not be asked to provide any information that can identify you. There is no way to connect you to your responses. Your email or IP address will not be collected for any reason.

**Voluntary participation:** Your participation in this study is completely voluntary. You have the right to withdraw from the study at anytime without consequence. You do not have to answer any question you do not wish to answer.

**Whom to contact if you have questions about the study:**

*Principle Investigator:*

Monica C. Webb, MPH, CHES, Doctoral Candidate, Department of Health Education and Behavior, University of Florida, Room 69, Florida Gym, PO Box 118210, Gainesville, FL 32611-8210, (352) 392-0583 ext. 1254, webbm@hhp.ufl.edu

*Faculty Supervisor:*

William Chen, PhD, Professor, Department of Health Education and Behavior, University of Florida, Room 6, Florida Gym, PO Box 118210, Gainesville, FL 32611-8210, (352) 392-0583 ext. 1284, chen0724@hhp.ufl.edu

**Whom to contact about your rights as a research participant in the study:**

UFIRB Office, Box 112250, University of Florida, Gainesville, FL 32611-2250; (352) 392-0433

**Your consent to participate in this study will be implied by continuing to the next page and completing this anonymous survey.**

APPENDIX E  
SURVEY INSTRUMENT

**Final Sex & Alcohol Survey**

**Remember: Your responses to these questions are anonymous.** This means that you cannot be linked to your responses. Your participation in this study is voluntary. You have the right to withdraw from the study at anytime without consequence. You do not have to answer a question if you find it objectionable.

**Definitions:** For the purpose of this survey you need to be familiar with the following terms

- **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 (1½ oz.) straight or in a mixed drink.
- **Drunk** is defined as having one's mental and physical abilities impaired by alcohol.
- **Sexually Transmitted Infection** is also known as Sexually Transmitted Disease. Includes a diagnosis of any of the following: Chlamydia, Syphilis, Gonorrhea, HIV or AIDS, Genital Herpes, Genital Warts, Human Papilloma Virus (HPV), Trichomoniasis
- **Digital sex** is defined as sexual penetration involving one's hands and fingers, or digits.
- **Oral sex** is the sexual activity involving oral (mouth) stimulation of one's partner's sex organs (includes both fellatio and cunnilingus).
- **Vaginal sex** refers to penis-vagina intercourse.
- **Anal sex** is a sexual activity in which the penis is inserted through the partner's anus into the rectum.

1. Do you believe that alcohol has the following effects?

	<b>No</b>	<b>Yes</b>
Makes me sexier	<input type="radio"/>	<input type="radio"/>
Facilitates sexual opportunities	<input type="radio"/>	<input type="radio"/>
Makes women sexier	<input type="radio"/>	<input type="radio"/>
Makes men sexier	<input type="radio"/>	<input type="radio"/>

Please select the response that most accurately reflects your personal beliefs about your behaviors for each of the following statements.

Note the adjective at the top of the columns

2.

<b>Good</b>						<b>Bad</b>
<input type="radio"/>						

---

Digital sex (sex using one's hands and fingers) while being drunk is:

<input type="radio"/>						
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

---

Oral sex (fellatio, cunnilingus) while being drunk is:

<input type="radio"/>						
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

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Vaginal sex while being drunk is:

<input type="radio"/>						
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

---

Anal sex while being drunk is:

<input type="radio"/>						
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

---

3.

<b>Healthy</b>						<b>Unhealthy</b>
<input type="radio"/>						

---

Digital sex (sex using one's hands and fingers) while being drunk is:

<input type="radio"/>						
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

---

Oral sex (fellatio, cunnilingus) while being drunk is:

<input type="radio"/>						
-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------	-----------------------

---

Vaginal sex while being drunk is:

<input type="radio"/>						
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---

Anal sex while being drunk is:

---

4.

**Beneficial**

**Harmful**

---

Digital sex (sex using one's hands and fingers) while being drunk is:

---

Oral sex (fellatio, cunnilingus) while being drunk is:

---

Vaginal sex while being drunk is:

---

Anal sex while being drunk is:

---

5.

**Enjoyable**

**Unenjoyable**

---

Digital sex (sex using one's hands and fingers) while being drunk is:

---

Oral sex (fellatio, cunnilingus) while being drunk is:

---

Vaginal sex while being drunk is:

---

Anal sex while being drunk is:

---

6.

<b>Risky</b>							<b>Not Risky</b>
<input type="radio"/>							

Digital sex (sex using one's hands and fingers) while being drunk is:

<input type="radio"/>							
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Oral sex (fellatio, cunnilingus) while being drunk is:

<input type="radio"/>							
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Vaginal sex while being drunk is:

<input type="radio"/>							
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Anal sex while being drunk is:

<input type="radio"/>							
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7.

<b>Regretful</b>							<b>Unregretful</b>
<input type="radio"/>							

Digital sex (sex using one's hands and fingers) while being drunk is:

<input type="radio"/>							
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Oral sex (fellatio, cunnilingus) while being drunk is:

<input type="radio"/>							
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Vaginal sex while being drunk is:

<input type="radio"/>							
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Anal sex while being drunk is:

<input type="radio"/>							
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8.

Guilt						No Guilt
<input type="radio"/>						

Digital sex (sex using one's hands and fingers) while being drunk is:

<input type="radio"/>						
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Oral sex (fellatio, cunnilingus) while being drunk is:

<input type="radio"/>						
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Vaginal sex while being drunk is:

<input type="radio"/>						
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Anal sex while being drunk is:

<input type="radio"/>						
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**Please check the circle that indicates your level of agreement or disagreement with each of the following statements.**

9. Most **people I hang out with** would approve of me participating in:

	Strongly Agree						Strongly Disagree
<u>digital sex</u> (sex using one's hands and fingers) while intoxicated.	<input type="radio"/>						
<u>oral sex</u> (fellatio, cunnilingus) while intoxicated.	<input type="radio"/>						
<u>vaginal sex</u> while intoxicated.	<input type="radio"/>						
<u>anal sex</u> while intoxicated.	<input type="radio"/>						

10. The **people in my life whom I value** encourage me to participate in:

	Strongly Agree						Strongly Disagree
<u>digital sex</u> (sex using one's hands and fingers) while intoxicated.	<input type="radio"/>						
<u>oral sex</u> (fellatio, cunnilingus) while intoxicated.	<input type="radio"/>						
<u>vaginal sex</u> while intoxicated.	<input type="radio"/>						



14. How would you describe your relationship status within the last 30 days?
- I am in an exclusive relationship
  - I am in an open relationship where we are free to see other people
  - I am casually dating, but not in a relationship
  - I am NOT dating or in a relationship
15. Have you participated in any of the following behaviors within the past 30 days?
- |                |     |    |
|----------------|-----|----|
| a. Digital Sex | yes | no |
| b. Oral Sex    | yes | no |
| c. Vaginal Sex | yes | no |
| d. Anal Sex    | yes | no |
16. Within the last 30 days, how many times did you participate in:
- digital sex (sex using one's hands and fingers)? \_\_\_\_\_ times
  - oral sex (fellatio, cunnilingus)? \_\_\_\_\_ times
  - vaginal sex? \_\_\_\_\_ times
  - anal sex? \_\_\_\_\_ times
17. Within the last 30 days, how many sexual partners have you had for each of the following behaviors?
- digital sex (sex using one's hands and fingers)? \_\_\_\_\_ partners
  - oral sex (fellatio, cunnilingus)? \_\_\_\_\_ partners
  - vaginal sex? \_\_\_\_\_ partners
  - anal sex? \_\_\_\_\_ partners
18. How many times did you use a condom or other barrier method during digital, oral, vaginal, or anal sex in the past 30 days?
- digital sex (sex using one's hands and fingers)? \_\_\_\_\_ times
  - oral sex (fellatio, cunnilingus)? \_\_\_\_\_ times
  - vaginal sex? \_\_\_\_\_ times
  - anal sex? \_\_\_\_\_ times
19. Within the past 30 days have you or your partner used birth control (a contraceptive) when participating in any of the following behaviors?
- |                |     |    |                                      |
|----------------|-----|----|--------------------------------------|
| b. Oral Sex    | yes | no | not applicable (did not participate) |
| c. Vaginal Sex | yes | no | not applicable (did not participate) |
| d. Anal Sex    | yes | no | not applicable (did not participate) |
20. Think back to the last time you participated in each of the following behaviors. Did you or your partner use birth control (a contraceptive) when participating in the behavior?
- |             |     |    |                                      |
|-------------|-----|----|--------------------------------------|
| b. Oral Sex | yes | no | not applicable (did not participate) |
|-------------|-----|----|--------------------------------------|

c. Vaginal Sex	yes	no	not applicable (did not participate)
d. Anal Sex	yes	no	not applicable (did not participate)

21. Have you or any of your sexual partners ever experienced an unplanned pregnancy?
- Yes
  - No
  - Unsure
22. Have you been tested for a sexually transmitted infection within the past 6 months?
- Yes
  - No
23. Have you been tested for a sexually transmitted infection within the past 12 months?
- Yes
  - No
24. Have you ever been told by a doctor or nurse that you had:
- |                                |     |    |
|--------------------------------|-----|----|
| a. Chlamydia                   | yes | no |
| b. Syphilis                    | yes | no |
| c. Gonorrhea                   | yes | no |
| d. HIV or AIDS                 | yes | no |
| e. Genital Herpes              | yes | no |
| f. Genital Warts               | yes | no |
| g. Human Papilloma Virus (HPV) | yes | no |
| h. Trichomoniasis              | yes | no |
25. Within the last 30 days, on how many days did you consume alcohol?
- Never used
  - Have used, but not in the last 30 days
  - 1-2 days
  - 3-5 days
  - 6-9 days
  - 10-19 days
  - 20-29 days
  - Used daily
26. Think back over the LAST 2 WEEKS. How many times have you had FIVE or more drinks in a row? (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 (1½ oz.) straight or in a mixed drink.)
- N/A, I don't drink

- b. None
  - c. 1 time
  - d. 2 times
  - e. 3 times
  - f. 4 times
  - g. 5 times
  - h. 6 times
  - i. 7 times
  - j. 8 times
  - k. 9 times
  - l. 10 or more times
27. On average how many alcoholic drinks does it take for you to become drunk?  
(Drunk is defined as having one's mental and physical abilities impaired by 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 (1½ oz.) straight or in a mixed drink.)
- a. 0
  - b. 1-2
  - c. 3-4
  - d. 5-6
  - e. 7-8
  - f. 9 or more
28. The last time you "partied"/socialized, how many drinks of alcohol did you have?  
(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 (1½ oz.) straight or in a mixed drink.)
- a. 0
  - b. 1-2
  - c. 3-4
  - d. 5-6
  - e. 7-8
  - f. 9 or more
29. Do you usually drink alcohol before participating in any of the following behaviors?
- |                |     |    |
|----------------|-----|----|
| a. Digital Sex | yes | no |
| b. Oral Sex    | yes | no |
| c. Vaginal Sex | yes | no |
| d. Anal Sex    | yes | no |
30. Do you usually drink alcohol during your participation in any of the following behaviors?
- |                |     |    |
|----------------|-----|----|
| a. Digital Sex | yes | no |
| b. Oral Sex    | yes | no |
| c. Vaginal Sex | yes | no |



34. What do you believe is the likelihood of your participations in the following behaviors while being intoxicated:

	Very Likely						Very Unlikely
Use a condom or other barrier method during <u>oral sex</u>	<input type="radio"/>						
Use a condom or other barrier method during <u>vaginal sex</u>	<input type="radio"/>						
Use a condom or other barrier method during <u>anal sex</u>	<input type="radio"/>						
Getting tested for sexually transmitted infections	<input type="radio"/>						
Consider your use of contraceptives	<input type="radio"/>						
Consider your chance of contracting a sexually transmitted infections	<input type="radio"/>						
Consider the financial costs associated with an unplanned pregnancy	<input type="radio"/>						

**Please check the circle that indicates your level of agreement or disagreement with each of the following statements.**

35. **My close friends** would approve of me participating in:

	Strongly Agree						Strongly Disagree
<u>digital sex</u> (sex using one's hands and fingers) while intoxicated.	<input type="radio"/>						
<u>oral sex</u> (fellatio, cunnilingus) while intoxicated.	<input type="radio"/>						
<u>vaginal sex</u> while intoxicated.	<input type="radio"/>						
<u>anal sex</u> while intoxicated.	<input type="radio"/>						

36. **My ideal future partner** would approve of me participating in

	Strongly Agree						Strongly Disagree
<u>digital sex</u> (sex using one's hands and fingers) while intoxicated.	<input type="radio"/>						
<u>oral sex</u> (fellatio, cunnilingus) while intoxicated.	<input type="radio"/>						
<u>vaginal sex</u> while intoxicated.	<input type="radio"/>						
<u>anal sex</u> while intoxicated.	<input type="radio"/>						

37. When it comes to sexual behaviors while intoxicated, how motivated are you to meet the expectations of your:

	Very Motivated						Not motivated at all
Close friends?	<input type="radio"/>						
Current partner?	<input type="radio"/>						
Ideal future partner?	<input type="radio"/>						

38. Within the last 12 months:

	No	Yes
Were you sexually touched without your consent?	<input type="radio"/>	<input type="radio"/>
Was sexual penetration attempted (vaginal, anal, oral) without your consent?	<input type="radio"/>	<input type="radio"/>
Were you sexually penetrated (vaginal, anal, oral) without your consent?	<input type="radio"/>	<input type="radio"/>

39. Within the last 12 months, have you been in an intimate (coupled/partnered) relationship that was:

	No	Yes
Emotionally abusive? (e.g., called derogatory names, yelled at, ridiculed)	<input type="radio"/>	<input type="radio"/>
Physically abusive? (e.g., kicked, slapped, punched)	<input type="radio"/>	<input type="radio"/>
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)	<input type="radio"/>	<input type="radio"/>

40. Within the past 12 months, have you experienced any of the following as a consequence of your drinking?

	No	Yes
Had sex with someone without <u>giving</u> your consent	<input type="radio"/>	<input type="radio"/>
Had sex with someone without <u>getting</u> their consent	<input type="radio"/>	<input type="radio"/>
Had unprotected sex	<input type="radio"/>	<input type="radio"/>

41. How often do you worry that:

	Never	Sometimes	Often	Always
You might get HIV or AIDS?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You might already have HIV or AIDS?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your partner may get HIV or AIDS?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You might get an STD or STI?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
You might already have an STD or STI?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Your partner may already have an STD or STI?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

42. Please check the circle that indicates how likely or unlikely you would be influenced by each of the following scenarios.

	Extremely Likely						Extremely Unlikely
Availability of free alcoholic drinks influences my decision to <u>get drunk</u> .	<input type="radio"/>						
Availability of free alcoholic drinks influences my decision to participate in <u>digital sex</u> .	<input type="radio"/>						
Availability of free alcoholic drinks influences my decision to participate in <u>oral sex</u> .	<input type="radio"/>						
Availability of free alcoholic drinks influences my decision to participate in <u>vaginal sex</u> .	<input type="radio"/>						
Availability of free alcoholic drinks influences my decision to participate in <u>anal sex</u> .	<input type="radio"/>						
The availability of a condom would influence my decision to have sex.	<input type="radio"/>						
Pressures from sexual partners would influence my decision to have sex.	<input type="radio"/>						

43. Please check the circle that indicates your level of agreement or disagreement with each of the following statements.

	Strongly Agree						Strongly Disagree
I am confident that I can limit my alcohol consumption	<input type="radio"/>						
I can resist sexual pressures when drunk	<input type="radio"/>						
It's difficult for me to refuse sexual advances when drunk	<input type="radio"/>						

44. Please check the circle that indicates your level of agreement or disagreement with each of the following statements.

The next time I get drunk I intend to engage in:

	Strongly Agree						Strongly Disagree
<u>digital sex</u> (sex using one's hands and fingers).	<input type="radio"/>						
<u>oral sex</u> (fellatio, cunnilingus).	<input type="radio"/>						
<u>vaginal sex</u> .	<input type="radio"/>						
<u>anal sex</u> .	<input type="radio"/>						

45. How old are you?

- a. 18
- b. 19
- c. 20
- d. 21
- e. 22
- f. 23
- g. 24

46. What is your gender?

- a. Male
- b. Female

47. Please indicate your race:
- White/Caucasian
  - Black/African-American
  - Asian
  - Native Hawaiian/Other Pacific Islander
  - American Indian/Native Alaskan
  - Other
48. Are you Hispanic or Latino?
- Yes
  - No
49. Which of the following best describes you?
- Heterosexual
  - Gay/Lesbian
  - Bisexual
  - Other

**Thank you for your participation in this anonymous survey.  
Your response is greatly appreciated!**

**If you think you would like to visit with someone regarding concerns about drinking, sexual behaviors, sexual assault, or related issues, a number of agencies in our area would be glad to help you. Here is a listing of places you may wish to contact.**

- **Student Mental Health Services** - 3190 Radio Rd.- 352-392-1171 - <https://www.counseling.ufl.edu/cwc/>
- **UF C.A.R.E.** - Center for Sexual Abuse/Assault Recovery Education - 392-1161 ext. 4362
- **Alachua County Crisis Center** - Crisis Hotline: 352-264-6789
- **Alcoholics Anonymous** - 352.372.8091 - <http://www.alcoholics-anonymous.org>
- **FL Recovery Center** - Vista (Shands) - 352.265.5497 - <http://shands.org/hospitals/vista>
- **Meridian Behavioral Healthcare, Inc.** - 352.374.5600 or 1-800-330-5615 - <http://www.meridian-healthcare.org>
- **RAINN** - Rape, Abuse & Incest National Network - 24-hour Hotline: 1-800-656-HOPE

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## BIOGRAPHICAL SKETCH

Monica C. Webb was born in 1981 in Somerville, New Jersey. She grew up in Miami and graduated high school from Maritime and Science Technology (MAST) Academy in 1999. Monica then attended the University of Florida (UF) as an undergraduate in Health Science Education where her passion for health education and behavior began. She graduated with a Bachelor in Health Science Education with a specialization in School Health in 2003. After graduation, Monica moved to Jacksonville, Florida and worked as a health educator at Darnell-Cookman Middle School. During her tenure at the nationally ranked school, she was awarded Teacher of the Year by her peers. Monica also earned a Master of Public Health degree from the University of North Florida (UNF) while in Jacksonville.

In 2006, Monica enrolled in the Ph.D. program in the Department of Health Education and Behavior at UF. During her time at UF as a graduate student she clarified her research focus and developed a line of investigation into the relationship between alcohol and sexual risk-taking among emerging adults.

Monica's doctoral dissertation included multiple scientific papers based on her research submitted for publication to scholarly journals. Monica was granted a Doctor of Philosophy in Health and Human Performance with an emphasis in Health Behavior in August 2011.