Assessing Sexual Health and Healthy Relationships at Duke University: An Analysis of Quantitative Survey Methods and Design

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Abstract

Assessment is a valuable tool often used by public health practitioners to better understand the context and scope of health issues plaguing the populations in which they serve. Practitioners working in the field of sexual health on college campuses face barriers to fully understanding the extent of attitudes, motivations and behaviors surrounding student sexual activity. A quality assessment tool is vital to procuring this information for practitioners. Practitioners use findings to identify the sexual health needs of students on campus and conceptualize and implement effective solutions that target these needs. A review of a current sexual health assessment tool used at Duke University revealed opportunities for quality improvement in the survey design. Assessments that lack quality survey designs are inefficient or incapable of collecting the data practitioners need. This paper reviews evidence to help redefine the purpose of sexual health assessment at Duke University. Core attributes of gold-standard survey design including validity, reliability, accuracy, and relevancy are applied in the development of a new quality assessment tool. In submitting the tool to an assessment analysis in which standards of quality are critically reviewed, preliminary conclusions identify several quality indicators within the tool. The product of this activity is a quality survey instrument that better meets the sexual health assessment needs of DuWell at Duke University. The new survey will aid practitioners in understanding the full context and scope of sexual activity and behaviors on campus for the purpose of developing appropriate response strategies.

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Introduction

The current dogma defining the world of evaluation and data analytics can be described succinctly as "needing tomorrow's answers, today." Pressures are being placed on virtually every actionable realm of society to track, manage, assess, and improve outcomes. Competition often fuels these pressures, with the need to provide the highest quality of products, for the lowest cost, at the fastest rate, in a league where every endeavor is a contest. Applicable to almost any field, if used effectively, assessment can help businesses to secure higher profits, finance personnel to make better informed investments, marketing materials to appeal to the most likely of customers, physicians to choose the best treatment protocols, and public health practitioners to implement the most effective programming and prevention mechanisms to help populations achieve the highest attainable levels of health. In a race with only itself, public health largely takes on the nation's most pressing issues with limited funding, support, and acknowledgment. There is little room for error, and every decision and program must be backed by the highest-degree of evidence to support its potential for success. Evidence may not only come from both field experience and research, but a critical understanding and appreciation for the context surrounding the public health issues practitioners seek to address. Population assessments, program evaluations, and health information data queries all can provide valuable insight to this context that will help public health practitioners to determine the best course of action and conceptualize the most effective solutions for the populations they serve.

For some practitioners, however, this is easier said than done. For example, several types of practitioners work in populations that function as rotating targets, continuously evolving, growing and shifting in their needs, wants, and demands from the public health sector. College students, and the associated cultures unique to individual campuses, exhibit this behavior on an annual basis as shifts occur in student population. While every school going to consume distinctive challenges related to their own inherent norms, student needs often fluctuate throughout their time at school, and can vary based on the social groups, genders, ethnicities and backgrounds present on campus. Additional complications arise in topic areas such as sexual health and healthy relationships. Given the sensitive nature of sexual health, the topic is traditionally explored behind closed doors and students are often uncomfortable with open discussion. Likewise, public health practitioners working in sexual health on college campuses face multiple barriers in obtaining the information they need to understand the context and scope of their issue, and subsequently develop and implement effective solutions.

To address these unique challenges of both the population and subject matter, practitioners who choose to develop a sexual health assessment must be cognizant of key attributes of their unique student population and also be sensitive to the personal nature of the topic area. As with any assessment, practitioners should take the additional steps necessary to assure the assessment will yield quality results, such as designing the instrument to meet clear measurement objectives that will answer the practitioner's questions with relevance and accuracy (Iarossi, 2006). An assessment method carefully designed with these considerations and quality methods in mind, yields opportunity to open the doors for practitioners to develop and present targeted and effective sexual health programs and resources.

Background

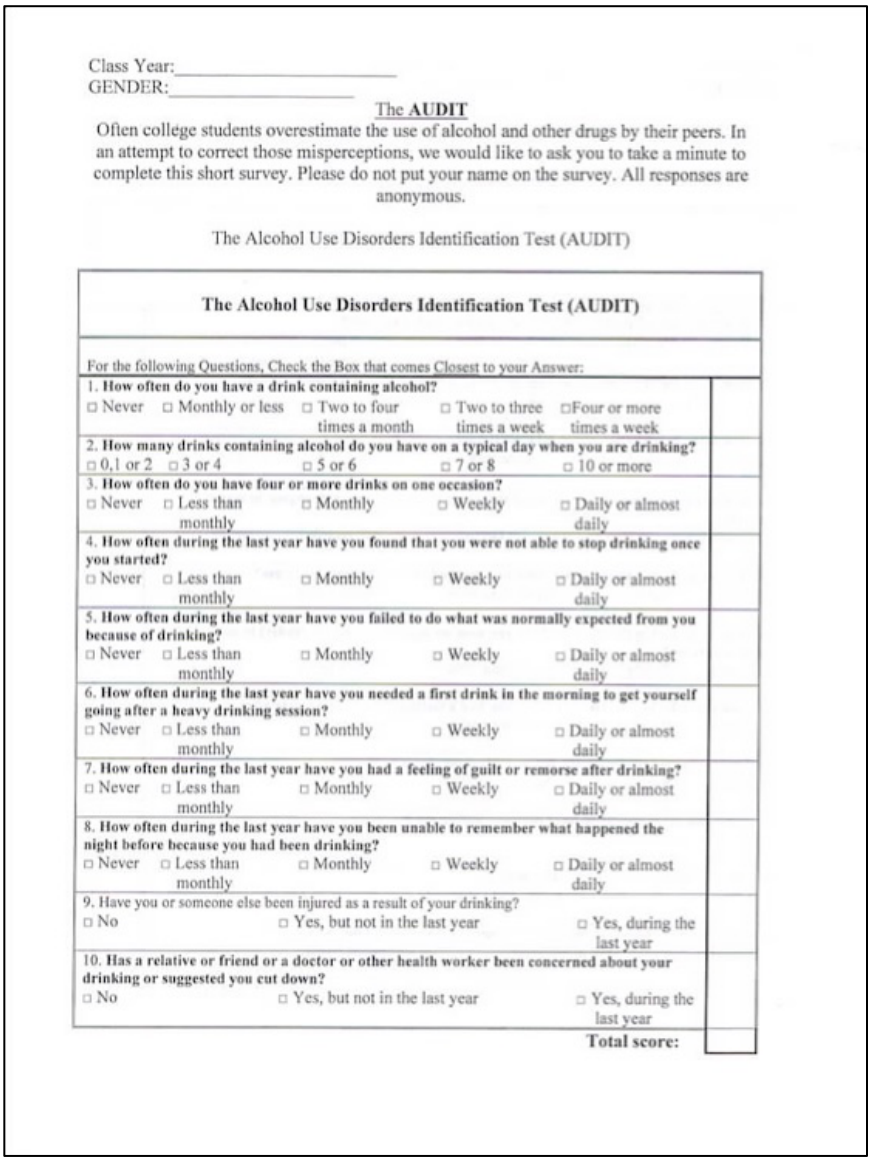
In the Spring of 2018, DuWell, the wellness 'hub' of Duke University within the Office of Student Affairs, set off on a mission of similar purpose to capture and identify sexual health risks and behaviors among their undergraduate students. Situated on the first floor of the newly erected Student Wellness Center on Duke's West Campus in Durham, North Carolina, DuWell serves as the nucleus of a highly developed model of holistic wellness, responsible for all wellness programming and the coordination of interrelated student wellness resources on campus. DuWell's unique approach to holistic wellness includes a comprehensive educational framework that addresses topics such as sexual health, alcohol, tobacco and other drugs, and how they impact student life (DuWell, 2018). To ensure their framework is aligned closely with documented student needs, evaluative instruments help DuWell to monitor and assess behaviors related to wellness on campus so that programming can be tailored to the unique population that is Duke University. Evaluations give key insight to the types of issues students may be facing, and allow for the reallocation of resources to specific needs on campus, should they be identified. By targeting wellness programming and tailoring education to this particular population, resources are developed more intentionally and often prove to be more effective (Hawkins, Kreuter, Resnicow, Fishbein, & Dijkstra, 2008). In the realm of Sexual Health, it is important to understand the full context of sexual activity and what behaviors or risks are occurring. In an effort to help providers gain insight to this context, it was decided that an evaluative tool would be developed in DuWell for the purpose of assessing sexual activity and related behaviors of students at Duke University.

This tool, hereafter referred to as the Sexual Activity Identification Test (SAIT), was developed with the ideology of modeling a similar quantitative tool often used in DuWell assessments to measure levels of student alcohol use. The Alcohol Use Disorders Identification

Test (AUDIT), is a 10-item screening tool developed by the World Health Organization (WHO) to assess alcohol consumption, drinking behaviors, and alcohol-related problems (2001) [Figure 1]. The AUDIT uses quantitative questioning and an internal scoring mechanism to determine categorical levels of risk and use, (i.e.; Low, Intermediate, or High.) Each of the 10 questions within the AUDIT corresponds with a specific well-defined metric of various patterns or behaviors associated with alcohol use. The AUDIT is designed to approximate the participants' level of risk using a Likert-scale, with each categorical response associated with a numerical score. A score of 8 or more is considered to indicate hazardous or harmful alcohol use (high risk), while lower scores ranging from 4-7 are considered to indicate moderate use (intermediate risk), and scores below 3 are considered to indicate low levels of use and minimal risk. The AUDIT is set up so that it can be easily scored and interpreted by either the participant or the evaluator. The AUDIT has been validated across genders and in a wide range of racial/ethnic groups and is well suited for use in primary care settings (WHO, 2001). At DuWell, the instrument is disseminated to student groups, specifically athletic teams, on an annual basis and responses are scored, categorized by group or team, and ranked in regards to categorical level of risk and use. This evaluative tool helps DuWell to better understand campus norms in terms of student alcohol use and deploy appropriate resources based on those risks.

Created to mirror the practicality of the AUDIT, the SAIT [Figure 2] seeks to evaluate sexual activity, sexual behaviors, and problems-related to sexual health by quantifying and generalizing the results of overall or inherent measures of sexual risk. These sexual risk measures are acquired through a series of 11 questions that encompass various patterns or behaviors related to sexual activity.

Figure 1. *Alcohol Use Disorders Identification Test (AUDIT).*



Class Year:_____
GENDER:_____

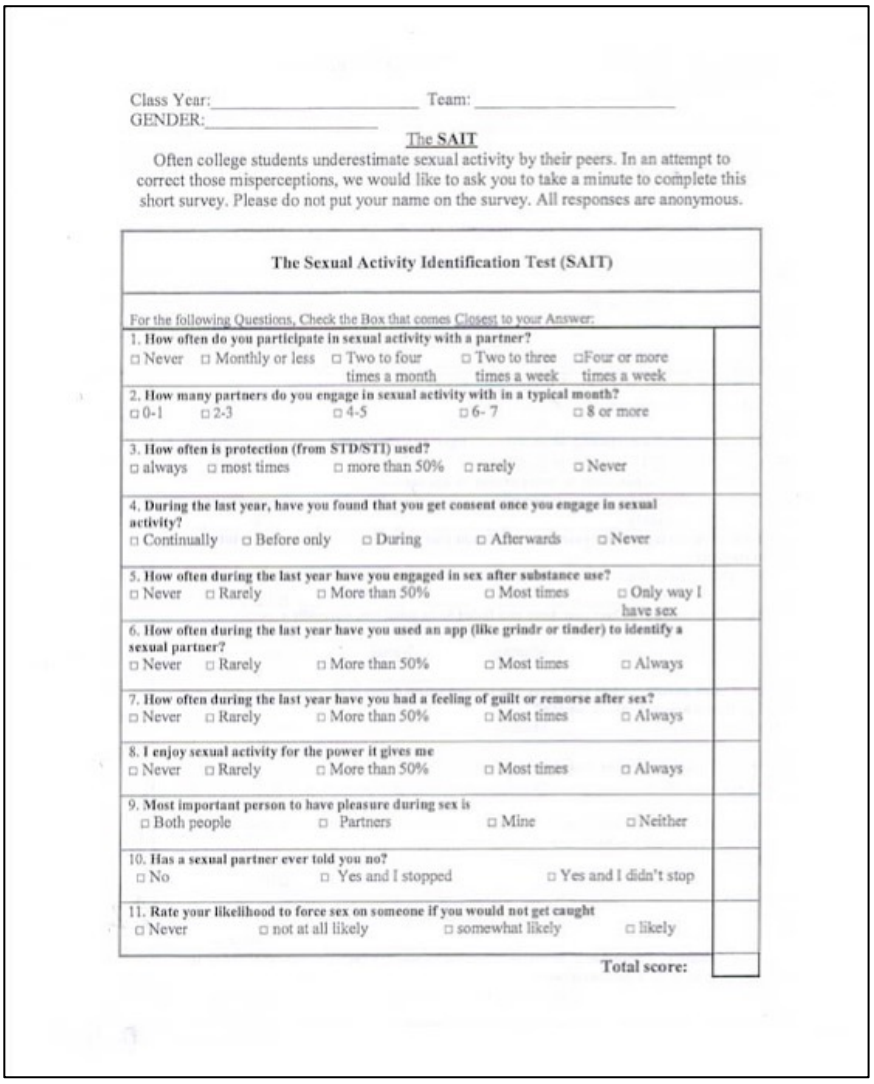
The **AUDIT**

Often college students overestimate the use of alcohol and other drugs by their peers. In an attempt to correct those misperceptions, we would like to ask you to take a minute to complete this short survey. Please do not put your name on the survey. All responses are anonymous.

The Alcohol Use Disorders Identification Test (AUDIT)

The Alcohol Use Disorders Identification Test (AUDIT)	
For the following Questions, Check the Box that comes Closest to your Answer:	
1. **How often do you have a drink containing alcohol?** □ Never □ Monthly or less □ Two to four times a month □ Two to three times a week □Four or more times a week	
2. **How many drinks containing alcohol do you have on a typical day when you are drinking?** □ 0,1 or 2 □ 3 or 4 □ 5 or 6 □ 7 or 8 □ 10 or more	
3. **How often do you have four or more drinks on one occasion?** □ Never □ Less than monthly □ Monthly □ Weekly □ Daily or almost daily	
4. **How often during the last year have you found that you were not able to stop drinking once you started?** □ Never □ Less than monthly □ Monthly □ Weekly □ Daily or almost daily	
5. **How often during the last year have you failed to do what was normally expected from you because of drinking?** □ Never □ Less than monthly □ Monthly □ Weekly □ Daily or almost daily	
6. **How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?** □ Never □ Less than monthly □ Monthly □ Weekly □ Daily or almost daily	
7. **How often during the last year have you had a feeling of guilt or remorse after drinking?** □ Never □ Less than monthly □ Monthly □ Weekly □ Daily or almost daily	
8. **How often during the last year have you been unable to remember what happened the night before because you had been drinking?** □ Never □ Less than monthly □ Monthly □ Weekly □ Daily or almost daily	
9. Have you or someone else been injured as a result of your drinking? □ No □ Yes, but not in the last year □ Yes, during the last year	
10. **Has a relative or friend or a doctor or other health worker been concerned about your drinking or suggested you cut down?** □ No □ Yes, but not in the last year □ Yes, during the last year	
Total score:	

Figure 2. *Sexual Activity Identification Test (SAIT).*



Class Year:_____ Team:_____
GENDER:_____

The SAIT

Often college students underestimate sexual activity by their peers. In an attempt to correct those misperceptions, we would like to ask you to take a minute to complete this short survey. Please do not put your name on the survey. All responses are anonymous.

The Sexual Activity Identification Test (SAIT)

For the following Questions, Check the Box that comes Closest to your Answer:

1. How often do you participate in sexual activity with a partner? □ Never □ Monthly or less □ Two to four times a month □ Two to three times a week □Four or more times a week	
2. How many partners do you engage in sexual activity with in a typical month? □ 0-1 □ 2-3 □ 4-5 □ 6- 7 □ 8 or more	
3. How often is protection (from STD/STI) used? □ always □ most times □ more than 50% □ rarely □ Never	
4. During the last year, have you found that you get consent once you engage in sexual activity? □ Continually □ Before only □ During □ Afterwards □ Never	
5. How often during the last year have you engaged in sex after substance use? □ Never □ Rarely □ More than 50% □ Most times □ Only way I have sex	
6. How often during the last year have you used an app (like grindr or tinder) to identify a sexual partner? □ Never □ Rarely □ More than 50% □ Most times □ Always	
7. How often during the last year have you had a feeling of guilt or remorse after sex? □ Never □ Rarely □ More than 50% □ Most times □ Always	
8. I enjoy sexual activity for the power it gives me □ Never □ Rarely □ More than 50% □ Most times □ Always	
9. Most important person to have pleasure during sex is □ Both people □ Partners □ Mine □ Neither	
10. Has a sexual partner ever told you no? □ No □ Yes and I stopped □ Yes and I didn't stop	
11. Rate your likelihood to force sex on someone if you would not get caught □ Never □ not at all likely □ somewhat likely □ likely	
Total score:	

Once developed, the SAIT was piloted in the Summer and Fall of 2018 to a wide range of undergraduate student groups on Duke's campus, including athletic teams, student living groups (SLGs), and Greek Life organizations. In all, the SAIT was disseminated to over 300 undergraduate students over the course of four months. During a review of pilot responses, it became evident that the tool was not well received by students, and had innumerable issues in regard to the quality, validity, and intent of the quantitative questions it depicted.

Methodological and Practical Concerns with the SAIT

A number of issues and concerns were raised by participants and practitioners alike throughout review of SAIT pilot data. For example:

Unlike the AUDIT, items within the SAIT do not correspond with evidence of increased sexual risk, and higher scored responses for each question do not directly relate to a higher level of sexual risk. This is reflected in Q1, which asks how often the respondent participates in sexual activity with a partner. Not only does the question not define sexual activity, but frequency of sexual activity alone does not equate to increased sexual health risk, instead, it is often factors surrounding the sexual activity that do. Q3 attempts to target one of these factors by asking about the respondent's frequency of the use of protection (from STD/STI). However, without identifying the circumstances in which the respondent is answering, risk cannot be inferred. Those in single monogamous relationships likely identify themselves as low risk for the transmission STD/STI's and therefore have little to no need for the use of protection. Does this put them at a higher level of sexual risk? No, in fact, the circumstances of their sexual activity are protective of accruing additional sexual risk. Similarly, someone who is not sexually active would logically select "Never" for this question, as they have no need at all for the use of protection. This would classify the respondent as high risk, giving them a score of 4, despite never participating in sexual activity in the first place. Q4 encompasses the obtainment of consent once engaging in sexual activity. While the question of consent is often the fundamental issue in sexual assault and misconduct cases, and therefore highly correlated with sexual risk, the question is phrased as "once you engaged in sexual activity" mitigating the entire point of obtaining consent prior to initiating activity, which would be a contributing factor in reducing sexual risk. Similar to question three, the response variables for this question risk misclassifying

respondents as high risk, despite never participating in sexual activity if they select "Never". Q7 asks the respondent if they have had a feeling of guilt or remorse after sex, Q8 asks about enjoyment of sex for the feeling of power, and Q9 asks who is the most important person to have pleasure during sex. Similar to previous examples, these factors in themselves do not infer increased sexual risk, and identification of extenuating circumstances would need to be available to determine their potential for contributing to risk.

Response variables for each metric do not build on a consistent Likert-scale. This is evident looking at nearly every question within the SAIT. Ordinal responses, such as those offered in the SAIT, are often used to describe a range of responses along a continuum. This is an essential component of calculating levels or degrees of frequency, agreement, or in this case, risk. However, for risk to be measured along a continuum as this questionnaire intends, with higher coded values inferring higher levels of risk, response options must have a pre-coded numerical value and have mutually exclusive categories. Mutual exclusivity is not present in all but one question (Q10), within the SAIT. This is a major flaw in terms of data validity, in that the respondent's answer choice is entirely subjective to their own interpretation of categorical meaning. Q5-Q8, for example, provide response options of "Never, Rarely, More than 50%, Most times, or Always". These responses offer no logical way to differentiate the subjectively perceived values of "More than 50%" and "Most times", rendering them useless to a mutually exclusive continuum of risk.

It is impossible to form generalizations from responses collected or use data in any other capacity than of a specific question, due to poorly worded questions and inconsistent response options. One of the benefits to conducting assessments like the AUDIT is that data received is

able to infer generalizations about alcohol consumption and alcohol related behaviors on Duke's campus. This is due to its clearly defined topic, validated questions, and consistent and reliable measurement properties. The SAIT does not share these same properties as highlighted in previous examples, and therefore generalizations about risk based on score value cannot be made. Instead, the only real information we can retrieve from the SAIT is that from individual response metrics. For example, Q2 asks about the number of sexual partners the respondent engages with in a six-month period. The question does not specify which six-month period, whether it be in the past, present or future. It also differs in standard time frame than other questions within the SAIT, which ask the respondent to recall the last year, and does not hold mutually exclusive response options. Given this, the only information that can be gained from collected responses is basic face value of what the question asks. Specifically, how many students selected each option, of the total number of students who completed the SAIT. Generalizations cannot be made to level of risk inferred or how sexually active Duke Students are, which are both items the instrument intended to collect in the question.

The issue of poorly worded questions, and therefore inability to from generalizations, is not unique to Q2, but many other questions within the SAIT. Another example is found in Q9, which asks about who's pleasure is most important during sex. The response options are, "Both people, Partners, Mine, or Neither". Despite the previous observation that this topic alone is unrelated to risk, the responses are again also up to the respondent's subjective perception of the options provided. Generalizations cannot be made from this question as there is no way of telling how the respondent interpreted each option. Logically, there is no distinguishable difference between "Both People and Partners". While this is largely an example of poor wording and an issue with grammar, it renders the data collected from this question unquantifiable and inherently useless.

There are other components that were important to SAIT's original conception that are not available in the piloted instrument. Similar to the AUDIT, the SAIT was intended for both participant and provider use in identifying their levels of risk, of course pertaining to sexual activity. However, there is no scoring mechanism available to the participant upon questionnaire completion. Responses are collected and scored individually at a later time, but due to anonymity of the tool, results do not make it back the participant. While not a utility that is necessarily required to meet assessment needs of DuWell, it does bring into question what design considerations were made in the development of the SAIT, and why the product does not align with its advertised function.

Ensuring Quality in Survey Design

A quality survey is one designed with specific purpose, and has corresponding goals for measurable properties (Biemer & Lyberg, 2003). While the AUDIT is a validated tool to assess alcohol risk, reassigning it for the purpose of assessing sexual health risk or behaviors does not ensure validity or quality within the SAIT. There is no evidence that the AUDIT questions and responses correspond to actual risk items as measured by the SAIT.

It is also important to keep in mind that what may be informative data of sexual health risk on campus cannot always be used to assume or generalize about student behavior, attitudes and motivations in terms of overall sexual health. In *The Power of Survey Design, (2006),* Iarossi dedicates an entire chapter to the concept of how easy it is to ask the wrong questions in survey design. This resonates with the lived experiences of those troubled by the range of errors present within the SAIT, both as a respondent as well as a Graduate Assistant tasked with data analysis. While often forgotten, improving survey design is one of the easiest and most cost-

effective steps that can be taken to improve the quality of survey data (Iarossi, 2006). The goal should be to make improvements so that differences in answers reflect actual differences in where people stand on the issues, instead of their interpretation of the questions (Fowler, 1995). In a retrospective review of the SAIT, differences in interpretation of various survey questions resulted in an unquantifiable number of data errors. Iarossi points out what may be perceived as minor data errors or biases, can result in a "range of errors involved in sensitive or vague opinion questions may be twenty or thirty percentage points" (Warwick and Lininger, 1975; Iarossi, 2006). In light of this, Iarossi suggests following an existing general principle to substantially improve survey design by following the two basic rules that make up good survey, relevancy and accuracy. He later goes on to explain,

> "Relevance is achieved when the questionnaire designer is intimately familiar with the questions, knows exactly the questions' objectives, and the type of information needed. To enhance accuracy, the wording, style, type, and sequence of questions must motivate the respondent and aid recall… A question is relevant if the information generated is appropriate for the purpose of the study" (Iarossi, 2006).

In short, practitioners must be explicit in what they want to measure and why; it is not possible to ask relevant questions without first knowing what the goals are (Fowler, 1995).

Following this guidance, improvements could likely be made to both the relevance and accuracy of questions within the SAIT. However, acknowledging that the intrinsic function of both the AUDIT and SAIT is to make generalizations by quantifying levels of risk, simply redesigning the SAIT will continue to limit measurement properties of assessment, and will result in another ill-fit instrument that does not fully meet DuWell's assessment needs. Instead, a new robust, well designed assessment tool that does not solely operate on inferring risk measures, will better aid DuWell practitioners in understanding the full context and scope of

sexual activity and behaviors on campus for the purpose of developing appropriate response strategies. In re-examining these needs, as well as redefining the purpose and goals of a sexual health assessment on Duke's campus, measurement properties can be aligned appropriately and a quality instrument can be developed.

This paper seeks to review literature on current survey methods used in sexual health assessments across college campuses, and core attributes of gold-standard survey design, for the purpose of applying findings to the development of a new survey instrument that will better meet sexual health assessment needs of DuWell.

Methods

Re-defining purpose: Identifying priorities and objectives for assessment

According to Biemer & Lyberg, (2003) in *Introduction to Survey Quality*, the first step (1) in the survey development process is to determine the research objectives. Defining key objectives is a critical phase often best accomplished by identifying small set of research questions to be answered by the survey, usually in collaboration with survey sponsors or researchers commissioning the survey (Biemer & Lyberg, 2003).

An interview was conducted with DuWell's Student Development Coordinator for Sexual Health and Healthy Relationships, and Duke Student Wellness Center's Director of Assessment to identify objectives and priorities for a sexual health assessment and expand the scope of data currently available. Discussion primarily focused on Duke's current participation in a national survey to collect student health data, and usability of said data, to avoid doubling of efforts in obtaining information the university already subscribes to. This survey, ACHA-National College Health Assessment II (ACHA-NCHA II), is a national research survey organized by the American College Health Association (ACHA) to assist college health service providers, health

educators, counselors, and administrators in collecting data about their students' habits, behaviors, and perceptions on the most prevalent health topics (ACHA, 2018). In the Fall of 2017, 52 institutions of higher education participated in the survey, attaining a sample size of 31,463 students. National response rates for 2018 have not yet been released, however, the 2018 Institutional Report for Duke University Graduate and Undergraduate students shows 455 and 339 respondents, respectively. Data captured within the survey encompassed a wide range of findings, including General Health; Disease and Injury Prevention; Academic Impacts; Violence, Abusive Relationships and Personal Safety; Tobacco, Alcohol and Marijuana Use; Sexual Behavior; Nutrition and Exercise; Mental Health; Sleep; as well as Demographics and Student Characteristics (ACHA, 2018). Categories deemed of interest to the purpose of the analyses included Violence, Abusive Relationships and Personal Safety, which included variables covering topics of consent and emotionally, physically, and sexually abusive sexual relationships, as well as Sexual Behavior, covering topics of sexual partners, types of sexual activities performed, and patterns of use of protection for a variety of purposes and intentions. The collected data is useful to give an overview of prevalence and frequency related to sexual behavior, but lacks the level of detail required to understand why and with what intention they are occurring.

It was concluded that while ACHA survey provided adequate baseline sexual behavior data about Duke students, questions remained about the best ways for DuWell practitioners to develop appropriate response strategies relevant to the full context and scope of sexual health and healthy relationships on campus. To identify appropriate strategies, practitioners were asked what specific metrics would be of most value to them in reaching their ultimate purpose, i.e; What do you want to know? In summary, practitioners shared that they wanted to learn about

Duke students' attitudes, motivations and behaviors in relation to sexual health and healthy relationships.

These objectives informed a literature review and guided a search for valid and proven assessment methods used in similar contexts. The search terms used were…the search engines used were…This search revealed surprisingly few published research studies or validated tools. In fact, initial exploratory searches exposed dense concentrations of the topics high risk sexual behaviors and sexual assault on college campuses, with little data to explain why students do the things that they do, or how they feel about certain sexual health topics. While imperative to a well-rounded sexual health program, assessing sexual assault on college campuses was not a stated priority for the practitioners. Articles and tools to assess sexual assault on campus were not included in the literature review because the incidence and prevalence of risky behaviors or sexual assault within a population do not tell you why those items are occurring or in what context. To develop well-aligned interventions that can be effective in addressing the identified risks, this literature review focused on attitudes, motivations, norms and barriers to sexual health and healthy relationships on campus.

Moving forward, this review focuses on literature surrounding contextual elements related to sexual health in addition to baseline behavioral risks. One particularly useful reference was *Instruments of High Risk Sexual Behavior Assessment: A Systematic Review.* This article, published in 2016, identified and organized several questionnaires that met this criterion of context. The authors included the National Survey of Sexual Attitudes and Lifestyle (NATSAL), Youth Risk Behavior Surveillance Survey (YRBSS), Sexual Risk Survey (SRS), and Sexual Health Behavior Beliefs and Self-Efficacy Scales (SHBBS) (Mirzaei, Ahmadi, Saadat, & Ramezani, 2016), among others. Additional literature of interest to this search included topics of potential relevancy to the purpose of the assessment, such as communication, consent, and the

influence of alcohol on sexual behaviors. A validated methodology, the Sexual Risk Behavior Beliefs and Self-efficacy (SRBBS) scale, was found to align well with goals set out by DuWell practitioners, seeking to assess important psychosocial variables affecting sexual risk-taking and protective behavior. The SRBBS variables include items on attitudes, norms, self-efficacy, and barriers to condom use, across several sexual health topic areas. [Table 1] summarizes findings of this review and outlines topic areas identified for further consideration, while the model below [Figure 3] illustrates the development process used in finalizing assessment priorities for variables needed to meet practitioner objectives, which were determined following a culmination of interview responses and evidence in literature.

Figure 3. *Development model for identifying assessment priorities and functions.*

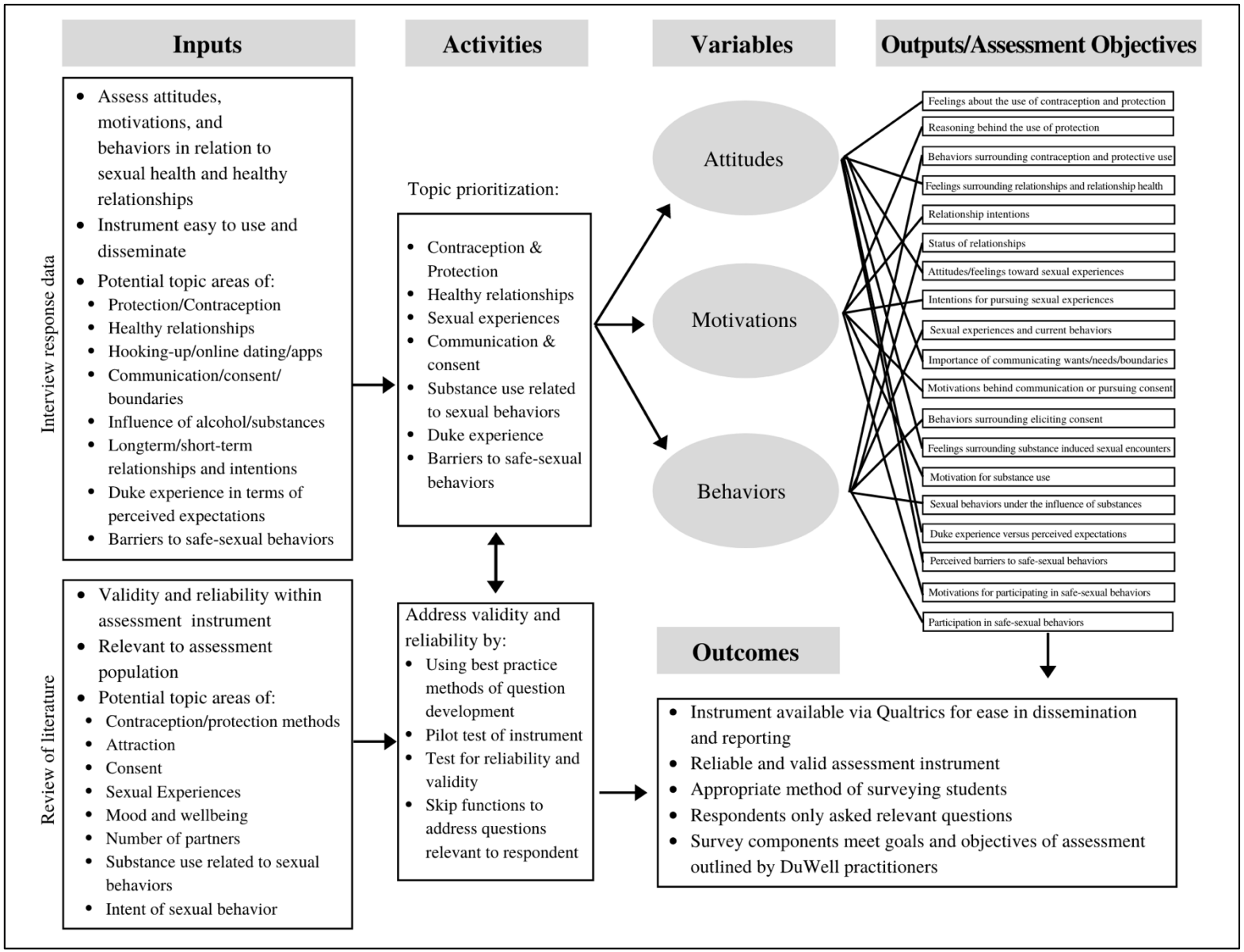


Table 1. *Sexual health behavior assessment instruments identified in review of literature.*

Assessment	Purpose	Methods	Topic Areas of Interest
NATSAL[1]	Assess sexual attitudes and behaviors of UK adults	Interview and self-completed questionnaire	Contraception, attraction, sexual experiences, number of partners, consent, mood and well-being
YRBSS[2]	Assess sexual behaviors related to health outcomes of US high-school students	Self-completed questionnaire	Contraception and protection methods
SRS[3]	Measure sexual risk among US college students	Self-completed questionnaire	Number of partners, sexual experiences, intent of sexual behavior, contraception and protection methods
ACHA-NCHA II[4]	Assess sexual behaviors related to health outcomes of US college students	Self-completed questionnaire	Sexual Experiences, consent, substance use related to sexual behaviors, contraception and protection methods
SHBBS[5]	Measure important psychosocial variables affecting sexual risk-taking and protective behavior	Self-completed scale	Sexual risk-taking behaviors and protective behaviors

[1]The National Survey of Sexual Attitudes and Lifestyles: The British National Surveys of Sexual Attitudes and Lifestyles, or Natsal, are among the largest and most detailed studies of sexual behavior in the world (NATSAL, 2019)

[2] Youth Risk Behavior Surveillance Survey: The Youth Risk Behavior Surveillance System (YRBSS) monitors six categories of health-related behaviors that contribute to the leading causes of death and disability among youth and adults, including Sexual behaviors related to unintended pregnancy and sexually transmitted diseases, including HIV infection (CDC, 2019).

[3] Sexual Risk Survey: The SRS provides researchers with a valid and comprehensive measure of sexual risk taking that can be used to clarify inconsistent findings in the literature and to assess outcome in programs designed to prevent and reduce sexual risk behaviors among college students (Turchik & Garske, 2009).

[4] American College Health Association- National College Health Assessment II: A national research survey organized by the American College Health Association (ACHA) to assist college health service providers, health educators, counselors, and administrators in collecting data about their students' habits, behaviors, and perceptions on the most prevalent health topics (ACHA, 2018).

[5] The Sexual Risk Behavior Beliefs and Self-efficacy (SRBBS) scales: Developed to measure important psychosocial variables affecting sexual risk-taking and protective behavior. The variables measured by the SRBBS scales are attitudes, norms, self-efficacy, and barriers to condom use (Basen-Engquist et al., n.d. & Fisher et al., 2010)

Identifying a target population

The next step in the survey design process (2) is to the define the target population for assessment. The target population should be the group of persons for whom the study results will apply and about which inferences will be made from survey results (Biemer & Lyberg, 2003). Given the purpose of the assessment to use collected data to better inform sexual health programming initiatives for DuWell, the target population should be Duke University undergraduate students currently enrolled in a residential program in Durham, North Carolina. Persons excluded from this population should be those under the age of 18, as minors cannot legally consent to participating in a research survey without parent/guardian signature.

Determining mode of administration and sampling approach

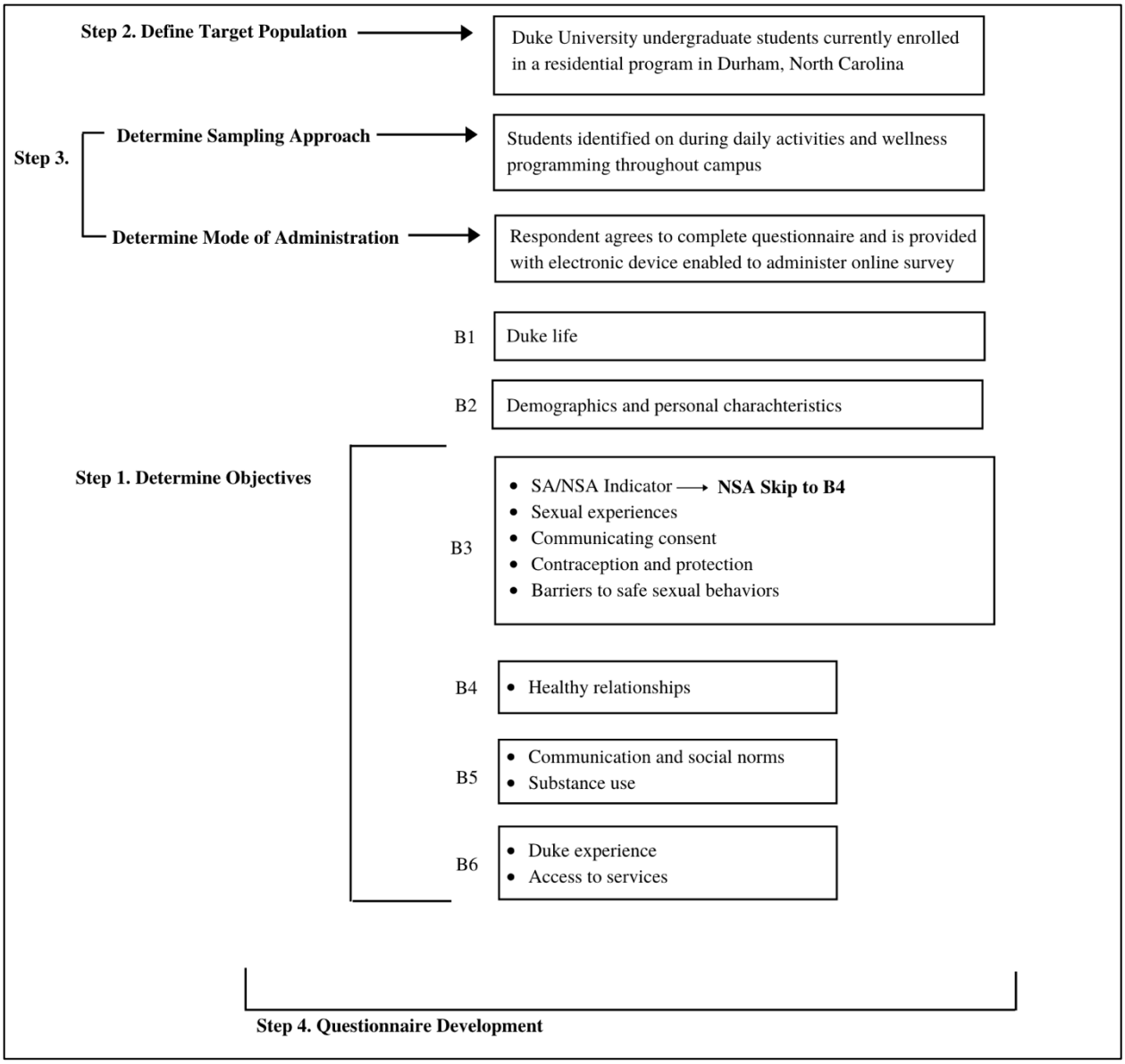
With assessment objectives and priorities outlined and a specified target population, the next phase in survey design (3) is determining its mode of administration. This step takes into consideration sampling design choices and potential constraints in survey dissemination (Biemer & Lyberg, 2003). As described earlier, previous iterations of sexual health assessment have been distributed via paper surveys to student groups, organizations, and athletic teams, averaging sample sizes of approximately 300 students (DuWell, 2018). The distribution methodology was solely based on student contact accessible to the DuWell office, which often occurred as a result of meetings or health coaching sessions. Because students were largely surveyed in specific groups, there was room for significant sampling bias as these groups may not have been entirely representative of the general population. To make appropriate inferences about the target population of undergraduate students at Duke University, it is important to ensure sampling is carried out in a way that will effectively reach a variety of students, and not just specific groups.

An essential characteristic of the mode of administration is that it works to promote and ensure adequate response rates. While previous interview discussions included the notion of *avoiding* the doubling of efforts in obtaining information already collected in the ACHA-NCHA II survey, such as baseline characteristics and prevalence of sexual behaviors, response rates for this annual assessment have been habitually low. In light of this, it may actually be valuable to ask similar baseline questions for the purpose of increasing the depth and validity of data collected. Additionally, asking some of these questions may be essential to the students understanding of subsequent questions and topic areas, so a benefit of including baseline questions is to aid in student recall. Low response rates may be attributed to the length of the survey which takes a rather large time commitment to complete, as well as the mode of administration, which is online, through a survey link sent by email. To ensure this assessment does not fall to a similar demise, it is essential that the questionnaire is kept relevant to the respondent. One way to do this is by use of skip-functions, whereby only questions appropriate to the respondent are included. The skip-functions method requires that the survey be delivered via an online platform, which carries certain benefits and downfalls. As demonstrated with ACHA-NCHS II, a lengthy online survey disseminated through email is quick to be ignored and forgotten by busy students. To bypass potential barriers to completion, respondents will be invited to complete an electronic survey in a variety of locations and settings on campus. Once a student agrees to take the survey, they will be provided an iPad or other portable electronic device specifically set up to administer the questionnaire. Benefits to this mode of administration include the ability to conveniently sample the population, enable the use of skip-functions, and ensure that once respondents begin taking the survey it is completed and submitted. These factors contribute to a respondent's confidence in anonymity, ease practitioner burden of data entry and analysis, as well as eliminate potential data entry errors.

Survey design and questionnaire development

The model below [Figure 4], illustrates the proposed survey design based on determinations of identified objectives and priorities, target population, mode of administration, and sampling approach. The fourth step (4) in the survey design process is questionnaire development, which involves using research objectives and priorities to determine the data elements to be collected in the questionnaire. As illustrated in Figure 4, objectives were included and organized within the proposed survey design *prior* to questionnaire development as a method of outlining necessary components and considerations (Biemer & Lyberg, 2003). Using this technique helped to identify key features in addressing participant relevancy, such as ensuring that data elements are appropriately tailored to respondent characteristics. Drawing upon the data and evidence in design also served as a primer for survey flow in the questionnaire development process. The end product of the questionnaire development phase is the survey mechanism itself, as illustrated in [Figure 5] in the following section.

Figure 4. *Steps in Proposed survey design process.*



Questionnaire

Figure 5. *Proposed survey mechanism.*

Start of Block: Introduction

Thank you for your interest in completing this questionnaire. The purpose of this survey is to assess Duke student's attitudes, motivations, and behaviors surrounding sexual health and healthy relationships. Survey responses will be used to help Duke Wellness in developing better informed programs, resources and tools available to meet student needs on campus. Due to the intimate and personal nature of this survey, responses will be recorded anonymously. Estimated completion time of this survey is less than 5 minutes.

If you have any questions about the survey, or have questions about its purpose, please contact us at: Duwell@studentaffairs.duke.edu

End of Block: Introduction

Start of Block: Duke Life

The following questions will pertain to your life on campus. Keep in mind that responses are confidential and will be recorded anonymously.

Q1. Are you a current Duke Student?

- o Yes
- o No

Skip To: End of Survey If Are you a current Duke Student? = No

Q2. Which option best describes your current academic status?

- o Undergraduate Student
- o Graduate or Professional Student

Q3. Are you a member of any of the following types of groups? Please select all that apply.

- ☐ Club Sports
- ☐ Duke Athletics
- ☐ Greek Life
- ☐ Student Living Groups (SLGs)
- ☐ Student Club or Organization
- ☐ Other _____

End of Block: Duke Life

Start of Block: Personal Demographics

The following questions ask about your basic demographics and characteristics. Keep in mind that responses are confidential and will be recorded anonymously.

Q4. Please indicate the race/ethnicity that you would use to best describe yourself.

- o American Indian, Alaskan Native or Native Hawaiian
- o Asian or Pacific Islander
- o Biracial or Multiracial
- o Black or African American
- o Hispanic or latino/a
- o White
- o Other

Q5. Please select the option that best describes your gender identity.

- o Male
- o Female
- o Non-binary/non-conforming
- o Self-identify: _____
- o I'd prefer not to answer

Q6. Please select the option that best describes your sexual identity.

- o Asexual
- o Bisexual
- o Gay
- o Lesbian
- o Pansexual
- o Queer
- o Questioning
- o Straight/Heterosexual
- o Another Identity: _____
- o I'd prefer not to answer

End of Block: Personal Demographics

Start of Block: Sexual Experiences (SA/NSA Indicator)

The next set of questions are about your sexual experiences. By sex, we mean oral sex, vaginal or anal intercourse. Please remember that your answers are strictly confidential.

Q7. Have you **ever** had **any** kind of sex?

- o Yes
- o No
- o I don't know
- o I'd prefer not to answer

Skip To: End of Block If Have you ever had any kind of sex? = No

Q8. What types of sexual activities have you engaged in? Please select all that apply.

- ☐ Oral sex
- ☐ Vaginal intercourse
- ☐ Anal intercourse
- ☐ I'd prefer not to answer

Q9. How many sexual partners (oral sex, vaginal or anal intercourse), have you had in the within the last 12 months?

- o None
- o 1
- o 2
- o 3
- o 4 or more
- o I don't know
- o I'd prefer not to answer

Skip To: End of Block If How many sexual partners (oral sex, vaginal or anal intercourse), have you had in the within the... = None

Q10. Thinking about your sexual partner(s) within the last 12 months, which options describe them? Please select all that apply.

- ☐ Someone I hooked up with one time
- ☐ Someone I was hooking up with more than once
- ☐ Someone I was "talking" to or dating non-exclusively
- ☐ Someone I was dating exclusively
- ☐ Someone I was engaged or married to
- ☐ Other, please describe: _____
- ☐ I don't know
- ☐ I'd prefer not to answer

Q11. Within the last 12 months, did any of the following factors have an influence on your sexual behaviors or activity? Please select all that apply.

- ☐ My own relationship or pursuit of a relationship
- ☐ My own sexual needs/wants/desires
- ☐ My partner's sexual needs/wants/desires
- ☐ Curiosity in trying new sexual experiences
- ☐ Wanting to feel close to someone
- ☐ Pressure from friends or peers
- ☐ Social norms/societal pressure
- ☐ Wanting to feel powerful or in control
- ☐ Intoxication (Alcohol or other substances)
- ☐ No influential factors
- ☐ Other, please describe: _____
- ☐ I don't know
- ☐ I'd prefer not to answer

Q12. How often do you check in to ensure that both you and your partner consent to the sexual activities you are about to engage in?

- o Always
- o Most of the time
- o About half the time
- o Sometimes
- o Never
- o I don't know
- o I'd prefer not to answer

Q13. Please select the option that best matches how closely you agree with each statement.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I am comfortable with my current level of sexual activity	o	o	o	o	o
I am comfortable pursuing sexual relationships with individuals I am interested in	o	o	o	o	o
I am comfortable communicating my sexual wants/needs/desires with sexual partners	o	o	o	o	o
It is important to me to use protective methods or barriers to reduce my own sexual risk	o	o	o	o	o
I am comfortable asking my partner to use a protective method or barrier before engaging in sexual activities	o	o	o	o	o

Q14. How likely are you to use a condom or protective barrier (or request that your partner does) when engaging in the following sexual activities?

	Extremely likely	Moderately likely	Neither likely or unlikely	Moderately unlikely	Extremely unlikely	Not applicable, I do not engage in this activity	I'd prefer not to answer
Oral sex	o	o	o	o	o	o	o
Vaginal Intercourse	o	o	o	o	o	o	o
Anal Intercourse	o	o	o	o	o	o	o

End of Block: Sexual Experiences

Start of Block: Healthy Relationships

The following questions are about your romantic relationships on campus. Keep in mind that responses are confidential and will be recorded anonymously.

Q15. Which option best describes your current romantic relationship status?

- o Single
- o In a relationship
- o Married or engaged
- o I don't know
- o I'd prefer not to answer

Q16. Please select the option that best matches how closely you agree with each statement.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I am happy with my current relationship status	o	o	o	o	o
I have someone I can confide in and that I trust at Duke	o	o	o	o	o
I feel supported in my friendships and relationships at Duke	o	o	o	o	o
It is easy for me to connect with people and form friendships and relationships at Duke	o	o	o	o	o
My friendships and relationships add value to my life at Duke	o	o	o	o	o

End of Block: Healthy Relationships

Start of Block: Communication and Social Norms

The following questions are about communication methods and social norms. Keep in mind that responses are confidential and will be recorded anonymously.

Q17. How would you let someone know you are interested in them? Please select all that apply. By interest, we mean romantically or sexually.

- ☐ Clearly verbally
- ☐ Body language
- ☐ Texting/messaging
- ☐ Flirting/dropping hints
- ☐ Acts of kindness
- ☐ Telling friends
- ☐ I wouldn't let them know
- ☐ Other, please describe: _____
- ☐ I don't know
- ☐ I'd prefer not to answer

Q18. How easy or difficult do you find communicating your own wants/needs/intentions with friends or someone you are interested in?

- o Extremely easy
- o Moderately easy
- o Slightly easy
- o Neither easy nor difficult
- o Slightly difficult
- o I don't know
- o I'd prefer not to answer

Q19. Have you ever used a social or dating app while at Duke?

- o Yes
- o No
- o I don't know
- o I'd prefer not to answer

Display This Question:

If Have you ever used a social or dating app while at Duke? = Yes

Q20. If yes, which apps have you used?

- o Tinder
- o Bumble
- o Grindr
- o OKCupid
- o Hinge
- o Happn
- o Coffee meets bagel
- o Other, please specify: _____

Display This Question:

If Have you ever used a social or dating app while at Duke? = Yes

Q21. What are you looking for when using these apps? Please select all that apply.

- ▢ Looking to make new friends
- ▢ Looking for a relationship
- ▢ Looking for someone to hook up with
- ▢ Just for fun or not looking for anything
- ▢ Other, please specify: _____
- ▢ I don't know
- ▢ I'd prefer not to answer

Q22. While at Duke, have you ever consumed alcohol with the purpose of lowering inhibitions around peers or someone you were interested in?

- o Yes
- o No
- o I don't know
- o I'd prefer not to answer

Q23. While at Duke, have you ever felt remorseful or regretful for engaging in a sexual activity while under the consumption of alcohol?

- o Yes
- o No
- o I don't know
- o I'd prefer not to answer

End of Block: Communication and Social Norms

Start of Block: Duke Experience and Access to Services

This final set of questions asks about your Duke experience and access to services at Duke University.

Q24. If any, what type of sexual health education did you have prior to arriving at Duke? Please select all that apply.

- ☐ None that I know of or remember
- ☐ Conversation(s) with Parents/Guardians
- ☐ Conversation(s) with siblings or peers
- ☐ School Health Education
- ☐ Personal Research
- ☐ Other, please describe: _____

Display This Question:

If any, what type of sexual health education did you have prior to arriving at Duke? Please selec... != None that I know of or remember

Q25. Thinking about the sexual health education you received, which of the following components or topics were covered? Please select all that apply.

- ☐ Types of contraception (for the prevention of pregnancy)
- ☐ Types of protective barriers (for the prevention of both pregnancy and STI/STDs)
- ☐ Proper use of protective barriers
- ☐ Transmission of STIs/STDs
- ☐ Signs or symptoms of STIs/STDs
- ☐ Forming or maintaining healthy relationships
- ☐ Consent
- ☐ Understanding sexuality or sexual preference
- ☐ Abstinence-only
- ☐ Other, please describe: _____

Q26. Do you feel that you have the tools and information you need to make well informed decisions regarding your own sexual behaviors and sexual risk?

- o Yes
- o No
- o I don't know

Q27. Please select the option that best matches how closely you agree with each statement.

	Strongly agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
If I needed sexual health resources, I would know where to go or who to contact on campus	o	o	o	o	o
I am comfortable seeking out sexual health resources on campus	o	o	o	o	o
Condoms or other protective barriers are easily accessible to me on campus	o	o	o	o	o
I am comfortable obtaining condoms from available resources on campus	o	o	o	o	o

Q28. What interactions have you had with the Duke Student Wellness Center?

	I have received or sought out services	I have intentions to seek out services	I don't have intentions to seek out services right now, but I know they are there if I ever need them	I didn't know these services existed
Student Health Services	o	o	o	o
Student Pharmacy	o	o	o	o
Physical Therapy	o	o	o	o
Counseling and Psychological Services (CAPS)	o	o	o	o
Dental Office	o	o	o	o
Duke Reach	o	o	o	o
DuWell	o	o	o	o
The Oasis	o	o	o	o

Display This Question:

If What interactions have you had with the Duke Student Wellness Center? = DuWell [I have received or sought out services]

Q29. What specific interactions have you had with DuWell? Please select all that apply.

- ☐ BASICS (Brief Alcohol Screening and Intervention for College Students)
- ☐ Party Monitor/Bystander Intervention Training
- ☐ Wellness Wednesday List-serve
- ☐ Moments of Mindfulness Events
- ☐ Wellness Tabling on Campus
- ☐ Health Coaching (Holistic Wellness)
- ☐ Sexual Health Education/Services
- ☐ Safer Sex Supplies
- ☐ Other, please describe: _____

End of Block: Duke Experience and Access to Services

End of Survey: Message

Thank you for taking the time to complete this survey.

As your wellness hub at Duke University, DuWell strives to provide the highest of quality services. Your participation helps us to achieve our goals of meeting and exceeding student needs on campus. Next time you're on West, stop by our office in the Student Wellness Center to learn more about our ongoing wellness initiatives, and daily activities!

Questions about this survey or other services provided by DuWell?
Email us at: duwell@studentaffairs.duke.edu

Assessment Analysis

The purpose of this analysis is to dig deeper into the constructs of quality survey design in light of the aforementioned assessment purpose, objectives and goals. The primary focus of this analysis will be addressing survey quality, which is often illustrated in the survey's ability to produce both valid and reliable measures. Validity looks at a question's ability to measure what it intends to measure, while reliability encompasses the consistency or stability of a measure. Both validity and reliability are compromised by common survey errors such as a previously discussed lack of relevancy and accuracy, poor wording choices, undefined terms, and unspecific questions among other issues (Iarossi, 2006). According to Fowler (2009), there are several requirements in designing a quality survey instrument, each of which contributing to the validity and reliability of measures. These requirements include selecting questions needed to meet assessment objectives, testing questions to make sure they can be asked and answered as planned, and delivering questions in a format that is clear and easy for both respondents and practitioners to work with. While all requirements were prioritized throughout the survey design and questionnaire development process, it is good practice to re-evaluate these constructs prior to pre-testing the questionnaire in a formal pilot. This enables the practitioner to make initial revisions, as well "flag" issues for attention in following tests (Fowler, 2009).

Ensuring that questions meet assessment objectives

To ensure that every question in the questionnaire meets or contributes to an assessment objective, Biemer and Lyberg (2003) recommends linking objectives to questions via a "Table of Correspondence". Very similar to the format of a Gantt Chart, a table such as this can be useful in identifying redundant or extraneous questions within the assessment instrument, as well as identifying any unmet priorities. Utilizing this approach can also reduce the risk of specification

errors found within respondent data, which can occur when survey questions fail to ask respondents about what is necessary to answer research questions. This was a common error revealed in analysis of the SAIT, in which respondents were asked questions about subject matter that did not necessarily meet the needs of the defined research objectives, which are available for reference in [Appendix A]. In an effort to avoid similar issues, a Table of Correspondence was developed for the new questionnaire as illustrated in [Table 2].

Table 2. *Table of correspondence.*

	Survey Questions[6]																							
Research Objectives	SQ7	SQ8	SQ9	SQ10	SQ11	SQ12	SQ13	SQ14	SQ15	SQ16	SQ17	SQ18	SQ19	SQ20	SQ21	SQ22	SQ23	SQ24	SQ25	SQ26	SQ27	SQ28	SQ29
RO1							✓														✓		
RO2							✓	✓													✓		
RO2							✓	✓															
RO4										✓	✓												
RO5										✓	✓		✓	✓	✓								
RO6				✓					✓														
RO7					✓	✓	✓																
RO8				✓	✓		✓																
RO9	✓	✓	✓	✓	✓	✓		✓					✓	✓	✓								
RO10							✓				✓	✓											
RO11							✓					✓											
RO12						✓	✓																
RO13																	✓						
RO14																✓							
RO15					✓																		
RO16																	✓	✓		✓	✓	✓	✓
RO17																		✓	✓	✓	✓		✓
RO18							✓											✓	✓				
RO19			✓	✓	✓	✓	✓	✓															

The results of [Table 2] indicate that all research objectives were met by one or more questions within the survey instrument. Additionally, all questions met one or more research objectives, eliminating concerns of extraneous or redundant questioning. This is especially

[6] Questions 1-6 were excluded from Table 2 due to their purpose of observing baseline participant characteristics as opposed to research objectives.

valuable given the focus on developing a concise instrument that could target multiple assessment areas, while not adding additional burden or barrier to the respondent completing the survey.

Testing questions

With assessment objectives addressed, Fowler (2009) proposes testing questions to make sure they can be asked and answered as planned by subjecting the questionnaire to a critical systematic review. While several validated tools are available for this purpose, the RTI Question Appraisal System (QAS-99) was chosen to help evaluate the questionnaire. The Centers for Disease Control and Prevention recommends the use of QAS-99 as a method for identifying and fixing miscommunication and other types of problems with questions, and suggests using QAS-99 before formal field testing of questions (CDC, 2008). This specific version of QAS-99 is based on a system that was developed for the Behavioral Surveillance Branch of the Centers for Disease Control and Prevention for evaluating questions within the Behavioral Risk Factor Surveillance System (BRFSS). An overview of the tool provides the following description:

> "The QAS guides users through a systematic appraisal of survey questions and helps them to spot potential problems in the wording or structure of the questions that may lead to difficulties in question administration, miscommunication, or other failings. The user examines proposed questions by considering specific categories of question characteristics in a step-wise fashion and, at each step, decides whether the question exhibits features that are likely to cause problems. In completing the appraisal, the user indicates whether the problem is present by circling YES or NO on an accompanying coding form and, for each YES circled, notes the reason a YES code was assigned" (Willis & Lessler, 1999).

Through the process of appraising survey questions, the system can help to identify where question improvements can be made, which questions should be "flagged for further testing", and can stimulate a collaborative review of questions that may benefit from group discussion. The system assesses potentially problematic components of survey questions through a series of "steps", each addressing areas of (1) Reading, (2) Instructions, (3) Clarity, (4) Assumptions, (5) Knowledge/memory, (6) Sensitivity/bias, (7) Response Categories, and (8) Other problems (Willis & Lessler, 1999).

Using this system, each question within the survey was subjected to review and subsequently scored with the QAS-99 Coding Form, which is available for reference in [Appendix B]. The appraisal shed light on a few issues of concern that were either missed in the development of the questionnaire or need further discussion to cultivate a sound solution. For example, Q10, which asks respondents to think about their sexual partner(s) within the last 12 months and choose all options that describe them, has response options that may be vague to the participant. By using the term "hooking up" without further definition, the question risks misinterpretation across participants with differing opinions of what "hooking up" means to them. It is important that this question is flagged so that wording can be addressed in future discussion groups. Another item identified in the appraisal involves Step 6, which addresses sensitivity/bias. Several questions throughout the survey address topics that are embarrassing, private, or involve illegal behavior. If not carefully worded to minimize bias, this may have an impact on the accuracy of participant's responses. For example, participants may not report behaviors that contradict what they deem to be socially acceptable, especially if the question negatively frames the behavior. While this was considered throughout the question development process given the high risk for this type of bias within any sexual health assessment, questions that involve a high potential for bias were flagged for additional discussion and review.

While only minor issues were identified and flagged, completing a critical systematic review provided preliminary evidence that the questionnaire could move onto the following phase of question testing, which likely will involve both focus group discussion as well as a formal pilot test.

Question delivery

A well designed format for question delivery is important to both the respondent completing the questionnaire and the practitioner responsible for collecting and analyzing data. For the respondent, the format should be easy to use and understand, reduce barriers to completion, and should be sensitive to the topic of assessment. From the practitioner's perspective, it should be simple to deliver to the target population, reduce barriers to data collection, and have clear processes for analyzing measures. Questionnaire delivery format can be broken down into two major components, the questionnaire itself and its mode of administration. In analyzing question delivery, we are looking to confirm that format choices are appropriate for each component, and work well together for respondents and practitioners.

As previously determined in developing the survey design, the assessment will be administered by an electronic device such as an iPad to students who opt in to completing the survey at various campus locations. This complements the survey instrument, which was developed using the web-based survey tool, Qualtrics. The use of iPads to administer the questionnaire aids respondents in that the format is clear, intuitive, and easy to use. The survey will be immediately visible on the device, so respondents can quickly begin entering information. Alternative to an in-person interview or hand-written survey, this format of administration provides privacy to respondents answering sensitive questions, and speeds up the time spent completing the survey. For practitioners, this eliminates need to train personnel to

conduct the assessment, as delivering the survey is as simple as asking a student to take it, and handing over the device. An added benefit is that Qualtrics collects respondent data immediately upon submission so there is no need for additional data entry by practitioners, and risk data error is significantly reduced. Following data collection, practitioners can run analyses of reported measures within the Qualtrics platform.

The format of the questionnaire itself is organized by categorical blocks to prepare respondents for the topic of questions they are about to encounter, as well as offer category-specific instructions. The use of blocks ensures that questions are organized in a logical way and guides respondents through the survey step-by-step, to reduce the potential for confusion. When it comes to selecting measures for analysis, this format can help practitioners to quickly and easily identify which questions to pull, reducing the time spent combing through data.

Although it is unclear what role question delivery format has on the overall quality of the assessment, this brief examination of format demonstrates how each design choice impacts both the respondent and practitioners' ability to work with the instrument. When question delivery format is poorly constructed or inconsiderate of the needs of each user, barriers to delivery and completion arise, bias can be introduced, and errors are more likely to be made. If allowed to occur, the validity and reliability of the assessment can be compromised to the same extent as if no consideration were taken in question development.

Analysis considerations

While this initial analysis suggests the assessment tool does in fact encompass each 'requirement' of a quality survey (per recommended methods of addressing survey quality), our capacity to measure the survey's ability to produce both valid and reliable measures is limited to these results, and our own interpretations of the tool. Further testing of the assessment tool will

be necessary to fully evaluate its measures of validity and reliability. This includes submitting the tool to focus group discussions to address items "flagged" in this analysis, as well as conducting a formal pilot within the target population. These succeeding steps are crucial to ensure the highest quality version of the tool is used in campus assessments, and data collected can be trusted to provide practitioners with valid and reliable responses.

Discussion

Despite limitations in obtaining measurable evidence of the quality of the assessment tool based on the preceding analysis, the process used to design and develop this assessment represents gold-standard methodologies of ensuring survey quality. These processes are based on a minefield of evidence to suggest their success, giving confidence to practitioners that there are few issues that could slip past the initial analyses and compromise survey quality.

There were, however, a few unanticipated challenges identified in the development process that were not discussed in any of the cited methods. In designing an assessment school for a specific university, it became evident that in order to ensure response items were relevant to the target population, they first needed to be vetted through a sample of students. This included both the language used frequently on campus and the social norms of dating and relationships. For example, when developing the measure to identify student use of social or dating apps, a general list of options that practitioners knew about would not suffice. It was important to first identify what apps were commonly used on Duke's campus among this population, to then offer those specific options. Iarossi (2006) touches on this issue when he speaks to considering relevancy and accuracy in question development, however, in this situation it was equally important to acknowledge what may be unknown, and throw away assumptions of campus norms. Another challenge untouched by previously cited authors was the issue of survey length

and removing barriers for completion. This was a particularly difficult component work through as most methods suggest repeating similar measure items throughout the survey to be able to ensure reliability. Acknowledging the target population, delivering a lengthy survey that meets these guidelines would result in students unwilling to complete the survey, or giving up prior to submission. From DuWell's perspective, it was more important for the assessment to deliver fewer, specific, high quality measures, as opposed to a quantity of measures that participants may not be willing respond to. While the bulk of this paper strictly adheres to evidence-based process and methodologies, flexibility was needed to fit the specific needs of the assessment in the context of where it would be used. Had these issues been ignored or bypassed in the development of the tool, the overall usefulness and applicability of the assessment may have been compromised. In all, finding a justified balance was a significant element of this activity.

The utility of this tool for future assessment practices at DuWell relies on submitting the tool to additional testing such as a focus group and formal pilot. Once these phases are completed and any identified issues addressed, practitioners must continually evaluate the tool's relevancy to the campus environment and adjust as needed. Likely, this will be an annual process and include student involvement to ensure the assessment adjusts to changes in campus culture and behavior. As modifications are made, practitioners will need to adapt and update the targeted solutions they develop with respect to current assessment data. Just as balance was valuable in the development of this assessment tool, future practitioners will need adapt to the ebb-and flow of the university. Over time, this design of this assessment tool is meant to evolve and grow with the campus environment, allowing practitioners to continually learn and respond to both the context and scope of sexual activity and related behaviors on campus.

In conclusion, assessment is a powerful method in which public health practitioners can identify the specific needs and deficits of the population they serve, and use their findings to

conceptualize and implement effective solutions. For practitioners working in a university setting, assessment is especially valuable given the unique behaviors, groups, and cultures that make-up the population of each school. The specificity of each population makes it difficult to generalize and apply the results of nationally conducted health assessments, and this extends to the field of sexual heath where topics are extensive and focuses wide-ranging. Because of this, developing and conducting assessments is a reality for many practitioners working on college campuses. At DuWell, assessment is an essential component of their model to develop and target wellness programming initiatives for Duke University. Despite a shared value of the need for assessment, the methods in which assessment measures are established vary greatly, often compromising the quality of the assessment and its ability to collect valid and reliable data. This is illustrated in earlier discussions that review the SAIT, an instrument created and used at DuWell for the purpose of sexual health assessment. The SAIT instrument was developed without following an evidence based design which limited the utility of the data it produced and this led to the recognition that DuWell needed a quality assessment instrument.

In closing, it is important to note that the SAIT did serve a purpose, albite one different from what was initially intended. The limitations of the SAIT as an assessment tool made it imperative for DuWell practitioners to engage in detailed conversations and thoughtful reflections as they developed a new instrument. This recognition enabled practitioners to analyze their goals, design choices and priorities for supporting students' sexual health on campus. As a result, DuWell practitioners are now positioned to pilot test and implement a quality assessment instrument by applying core principles of gold-standard, evidence-based survey design. The product of this study is a quality survey instrument that will better meets the sexual health assessment needs of DuWell at Duke University. As a result, DuWell practitioners will be better

able to understand the full context and scope of sexual activity and behaviors on campus positioned to develop more relevant and appropriate response strategies.

Leadership context

There are several implications for both the field of public health and its leaders as a direct result of this investigation and activity. First and foremost, the development of a quality instrument for the assessment of sexual health at Duke University will help practitioners to identify student needs and develop effective tailored solutions to their findings. This will have a significant impact on the availability of appropriate resources accessible to Duke Students, including programming, educational tools, and safer-sex materials. Ultimately, these solutions and services have potential to increase the likely hood that students will make well informed decisions in regards their own sexual activity, behaviors and relationships on campus. Often this can result in safer-sexual behaviors and reduce the risk of transmission of STD/STIs, HIV/AIDs, and unplanned pregnancies, among other health outcomes.

For public health practitioners, this investigation sheds light on the value of developing *quality* assessment tools, which can help practitioners to better understand the context and scope of their work and develop better informed solutions. This can bear weight on a solution's potential for success, increasing both effectiveness and efficiency of ones work within a community. As a result, assessment can save resources indispensable to practitioners, such as funding, personnel, and time.

Quality is an emphasized theme throughout this activity because, as demonstrated earlier on, there is a distinct difference in the utility of a poorly constructed assessment tool and a quality one. Within public health, leaders and practitioners feel more pressure now than ever to evaluate, assess, and measure the work that they are doing in an effort to validate its significance

to those external to the field. While this is essential to the growth and competitiveness of the field, practitioners need to ensure they do not lose sight of the original purpose of conducting their assessments. Practitioners should not "assess" for the purpose of saying they did, but to gain valuable insights and measures that will help to progress the work they do in the field. When this purpose is forgotten or ignored, critical considerations for the development of the tool are bypassed and the quality of the assessment is likely fatally compromised. As leaders in the field, practitioners need to be cognizant that not all assessment tools have been created equally, or with a specific purpose in mind. Practitioners cannot rely on trust alone that a tool will measure what it says it will, but should instead use their better judgement to critically appraise the instrument for what it truly is. If issues are found, it is the practitioner's responsibility to acknowledge them and bring it to a place where it can be addressed. In doing this, practitioners have the opportunity to serve as leaders of change, demanding a higher standard for the field public health and the work that is accomplished within it.

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Appendix

Appendix A. *Defined Research Objectives.*

RO1	Feelings about use of contraception and protection
RO2	Reasoning behind use of protections
RO2	Behaviors surrounding use of protection
RO4	Feelings surrounding relationships and relationships health
RO5	Relationship intentions
RO6	Relationship status
RO7	Attitudes/feelings toward sexual experiences
RO8	Intentions for pursuing sexual experiences
RO9	Sexual experiences and current behaviors
RO10	Importance of communicating/wants/needs/boundaries
RO11	Motivations behind communication and pursuing consent
RO12	Behaviors surrounding eliciting consent
RO13	Feelings surrounding substance induced sexual encounters
RO14	Motivations for substance use
RO15	Sexual behaviors under the influence of substances
RO16	Duke experience and access to resources
RO17	Perceived barriers to safe-sexual behaviors
RO18	Motivations for participating in safe sexual behaviors
RO19	Participation in safe-sexual behaviors

Appendix B. *QAS-99 Coding Form*.

QUESTION APPRAISAL SYSTEM (QAS-99):

CODING FORM

INSTRUCTIONS. Use one form for EACH question to be reviewed. In reviewing each question:

1) WRITE OR TYPE IN QUESTION NUMBER. ATTACH QUESTION.

Question number or question here:

2) Proceed through the form - Circle or highlight YES or NO for each Problem Type (1a... 8).

3) Whenever a YES is circled, write detailed notes on this form that describe the problem.

STEP 1 - READING: Determine if it is difficult for the interviewers to read the question uniformly to all respondents.	
1a. **WHAT TO READ**: Interviewer may have difficulty determining what *parts* of the question should be read.	YES NO
1b. **MISSING INFORMATION**: Information the interviewer needs to administer the question is *not* contained in the question.	YES NO
1c. **HOW TO READ**: Question is *not* fully scripted and therefore difficult to read.	YES NO
STEP 2 - INSTRUCTIONS: Look for problems with any introductions, instructions, or explanations from the *respondent's* point of view.	
2a. **CONFLICTING OR INACCURATE INSTRUCTIONS**, introductions, or explanations.	YES NO
2b. **COMPLICATED INSTRUCTIONS**, introductions, or explanations.	YES NO

STEP 3 - CLARITY: Identify problems related to communicating the *intent or meaning* of the question to the respondent.	
3a. **WORDING**: Question is lengthy, awkward, ungrammatical, or contains complicated syntax**.**	YES NO
3b. **TECHNICAL TERM(S)** are undefined, unclear, or complex.	YES NO
3c. **VAGUE:** There are multiple ways to interpret the question or to decide what is to be included or excluded.	YES NO
3d. **REFERENCE PERIODS** are missing, not well specified, or in conflict.	YES NO
STEP 4 - ASSUMPTIONS: Determine if there are problems with assumptions made or the underlying logic.	
4a. **INAPPROPRIATE ASSUMPTIONS** are made about the respondent or about his/her living situation.	YES NO
4b. **ASSUMES CONSTANT BEHAVIOR** or experience for situations that vary.	YES NO
4c. **DOUBLE-BARRELED**: Contains more than one implicit question.	YES NO
STEP 5 - KNOWLEDGE/MEMORY: Check whether respondents are likely to *not know* or have trouble *remembering* information.	
5a. **KNOWLEDGE** may not exist: Respondent is unlikely to *know* the answer to a factual question.	YES NO

5b. **ATTITUDE** may not exist: Respondent is unlikely to have formed the attitude being asked about.	YES NO
5c. **RECALL** failure: Respondent may not *remember* the information asked for.	YES NO
5d. **COMPUTATION** problem: The question requires a difficult mental calculation.	YES NO
STEP 6 - SENSITIVITY/BIAS: Assess questions for sensitive nature or wording, and for bias.	
6a. **SENSITIVE CONTENT** (general): The question asks about a topic that is embarrassing, very private, or that involves illegal behavior.	YES NO
6b. **SENSITIVE WORDING** (specific): Given that the general topic is sensitive, the wording should be improved to minimize sensitivity.	YES NO
6c. **SOCIALLY ACCEPTABLE** response is implied by the question.	YES NO
STEP 7 - RESPONSE CATEGORIES: Assess the adequacy of the range of responses to be recorded.	
7a. **OPEN-ENDED QUESTION** that is inappropriate or difficult.	YES NO
7b. **MISMATCH** between question and response categories.	YES NO
7c. **TECHNICAL TERM(S)** are undefined, unclear, or complex.	YES NO
7d. **VAGUE** response categories are subject to multiple interpretations.	YES NO

7e.	**OVERLAPPING** response categories.	YES NO
7f.	**MISSING** eligible responses in response categories.	YES NO
7g.	**ILLOGICAL ORDER** of response categories.	YES NO
STEP 8 - OTHER PROBLEMS: Look for problems not identified in Steps 1 - 7.		
8.	Other problems not previously identified.	YES NO