A within-subjects repeated measures comparative study of the effect of two data collection methods on disclosure rates of sensitive behaviours in a tertiary student sample.

A dissertation submitted to the University of KwaZulu-Natal, School of Applied Human Sciences (Psychology) in fulfillment of the requirement for the degree of Social Sciences, Masters

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Abstract

Researchers primarily rely on self-report data collection methods to question participants about their behaviours, emotions, attitudes, and beliefs. The challenge of eliciting truthful answers is often affected by the sensitivity of the research. Research which investigates sensitive topics such as crime, drugs, politics, race, religion, and sex can be particularly challenging as participants are hesitant to disclose their own information truthfully. The current research was focussed on three primary objectives. The primary objective of this research was to add to the existing knowledge surrounding the Unmatched Count Technique (UCT). This study aimed to investigate the efficiency of data collection methods: Unmatched Count Technique Type I and Type II (UCT Type I and Type II) in obtaining self-disclosure data on sensitive behaviours. This was done by investigating which data collection method (DCM), the UCT Type I and the UCT Type II yields higher rates of disclosure on sensitive sexual items as an analogue of validity as well as which DCM yields the lowest group rates of social desirability bias. Finally, the study aimed to understand the participant's experiences of each data collection method in terms of ease of use, anonymity, and protection of confidentiality

It is imperative to improve DCMs methods to an accurate picture of specific social issues, especially those that are considered to be private, sacred or sensitive. The results of this study demonstrate a significant difference in the participants' disclosure of sensitive items between the UCT Type I and the UCT Type II. The Unmatched Count Technique Type II did produce higher base rates than the Unmatched Count Technique Type I on several the sensitive questions. However, both UCT DCMs produced negative numbers. Within the present study, the social desirability test indicated that participants would choose to portray themselves in a favourable, or in a socially acceptable manner, regardless of the assurance of confidentiality. Significantly, participants agreed that their responses could not be linked to them as individuals for both UCT DCMs further demonstrating some of the protective factors the UCT is known for. This process clearly demonstrates the need for more research in this area to explore ways in which the UCT can be adapted to collect accurate data on sensitive behaviour.

Table of Contents

LIST OF TABLES AND FIGURES

Abbreviations and Symbols

ACASI	Audio Computer Assisted Self Interview
AIDS	Acquired Immune Deficiency Syndrome
CASI	Computer Assisted Self Interview
FTFI	Face-to-Face Interview
HEAIDS	Higher Education HIV and AIDS Program
HIV	Human Immunodeficiency Virus
ICVI	Informal Confidential Voting Interview
MCP	Multiple and Concurrent Partnerships
PMB	Pietermaritzburg
RRT	Randomised Response Technique
SRQ	Self-Report Questionnaire
UCT	Unmatched Count Technique
UKZN	University of KwaZulu-Natal
UNAIDS	United Nations Programme on HIV/AIDS

* indicates significant results (Alpha <= 0.05)

** indicates missing results

CHAPTER 1: Introduction

Researchers primarily rely on self-report data collection methods to question participants about their behaviours, emotions, attitudes, and beliefs (Catania, Chitwood, Coates & Gibson, 1990; Korb, 2011). There are many methodological challenges including participants varied interpretations of questions and response bias (Catania, Gibson, Chitwood, & Coates, 1990; D. R. Dalton, Wimbush, & Daily, 1994; Starosta & Earleywine, 2014) The challenge of eliciting truthful answers is often further affected by the sensitivity of the research. Research which investigates sensitive topics such as crime, drugs, politics, race, religion, and sex can be particularly challenging as participants are hesitant to truthfully disclose their own information (Blair, Imai, & Lyall, 2014; D. R. Dalton, Wimbush, J. C., & Daily, C. M., 1994; Starosta & Earleywine, 2014; Walsh, 2008). Thus, confidence in the quality of the information provided by participants is often uncertain, and the results of studies may be undermined and suffer from systematic bias.

Existing literature highlights a variety of problems, particularly for sensitive topics, which affect the validity and reliability of self-report Data Collection Methods (DCMs). Misreporting on sensitive topics is very common as research participants frequently edit responses to avoid embarrassment or repercussions (Korb, 2011; Randolph, Virnes, Jormanainen, & Eronen, 2006; Starosta & Earleywine, 2014; Tourangeau & Yan, 2007). Participants are less likely to respond accurately to sensitive research topics if they believe their anonymity and confidentiality are comprised or that it may potentially lead to stigmatization or legal ramifications (Kenyon, Buyze, & Colebunders, 2013; LaBrie & Earleywine, 2000; Walsh, 2008). Additionally, self-report surveys can be susceptible to both under- and over-reporting. These barriers are mainly seen in research which measures sexual behaviours (Korb, 2011; Starosta & Earleywine, 2014). Thus, it is essential that DCMs question participant behaviour in a manner that is minimally invasive while stressing to participants the protections afforded when agreeing to take part in social science research. This will further facilitate the most accurate descriptions of social issues, development, and assessment of intervention methods (Catania et al., 1990; Korb, 2011; Starosta & Earleywine, 2014)

Practical consideration of the suitability of DCMs often guide the format and self-report method used. With the aim of adding to the existing knowledge surrounding DCMs, this study aims to investigate the efficiency of data collection methods: Unmatched Count Technique Type I and Type II (UCT Type I and Type II) in obtaining self-disclosure data on sensitive behaviours, as an analog of reliability and validity. A secondary aim of this research is to

investigate subjective measures of survey quality, such as participants trust, ease of use, anonymity, and protection of confidentiality.

CHAPTER 2: Literature Review

2.1. Introduction

Asking direct questions about issues such as personal sexual behaviour can lead to significant biases due to varied interpretations of study questions by participants, response bias and social desirability (Comşa & Postelnicu, 2012; Starosta & Earleywine, 2014; Walsh, 2008). Research surrounding sensitive topics are particularly venerable to underreporting of stigmatized behaviours and over-reporting of normative behaviours (Catania et al., 1990; Starosta & Earleywine, 2014). Social science research relies heavily on the research participant's truthful disclosure of information in the form of self-reports. Underreporting and overreporting of sensitive behaviours are often the result of self-presentation as participants would like to be viewed in a positive or socially appropriate manner (Gaines, Kuklinski, & Quirk, 2006; Thornton & Gupta, 2004; Tourangeau & Yan, 2007). This often results in data that can only be interpreted with caution, as it may not accurately reflect the prevalence of those behaviours in the population of interest. Approaches which enable greater ease of use when self-administration or increased anonymity and confidentially thus become vital to estimate relevant behaviours and improve efforts at targeted prevention accurately.

2.2. Sensitivity and Social Desirability

Sensitive research is an extensive classification that reveals areas that may trigger increased response bias (De Jong, Pieters, & Fox, 2010; Korb, 2011; Preisendörfer & Wolter, 2014). While the sensitivity of a topic is primarily decided upon in term of the societal norms within the community, researchers continue to debate how to categorise the degree of sensitivity of topics (De Jong et al., 2010; Tourangeau & Yan, 2007). Research is considered to be sensitive in nature when the topics consist of socially criticized behaviour including research into racial, gender and religious behaviour (De Jong et al., 2010; Kenyon et al., 2013; Tourangeau & Yan, 2007). Naturally, any research which may be threatening, sacred, stigmatizing, containing an element of risk or which is considered to be an invasion of participants' privacy is sensitive (Tourangeau & Yan, 2007). Participants have varying reactions to sensitive questions including having concerns about the anonymity and confidentiality of their sensitive responses thus responding in a socially desirable manner (Comşa & Postelnicu, 2012; De Jong et al., 2010; Korb, 2011; Preisendörfer & Wolter, 2014). This, in turn, increases response bias to sensitive questions and thus limiting reliability and validity of the data collected.

Closely related to the issues of sensitivity are a response and social desirability bias. Response bias is the tendency for participants to over-report socially desirable behaviours, or to

underreport socially undesirable behaviours (Comşa & Postelnicu, 2012; De Jong et al., 2010; Tourangeau & Yan, 2007). Social desirability biased responding is defined as instances where participants alter their responses to be in accordance with socially accepted behaviour (Comşa & Postelnicu, 2012; De Jong et al., 2010; Tourangeau & Yan, 2007). Consequently, while survey responses are assumed to be truthful, participants can and do chose to portray them in a more favourable light or give answers which are perceived as more socially acceptable (De Jong et al., 2010; Tourangeau & Yan, 2007).

Numerous methodological studies focus on the ways in which participants respond to research, particular research regarding sensitive questions, to understand how bias affects participant responses (Blair et al., 2014; De Jong et al., 2010; Glynn, 2013; Tourangeau & Yan, 2007). Studies such as these also provide practical applications and statistical refinements to the UCT format; these publications question the performance of the UCT in minimising Social Desirable Responding to high risk sexual behaviour. Suggestion by Blair et al. (2014), Comsa, & Postelnicu (2013) and Thomas, Johann, Kritzinger, Plescia & Zeglovits (2017), indicate that it is imperative to ensure participants anonymity and confidentiality for participants to feel more comfortable to disclose sensitive information. Within this study, this will be determined by understanding which UCT DCMs enhances the truthful disclosure of information and while additionally reducing adverse effects of social desirability and bias.

The randomized response method, in which the sensitive item of interest is paired with innocuous questionnaire item, has been a dominant technique used to address this problem (Blair et al., 2014; Comşa & Postelnicu, 2012; De Jong et al., 2010; Glynn, 2013; Tourangeau & Yan, 2007). In recent years, an alternative method unmatched count technique (UCT) attracted attention as it enables the participant to disclose potentially sensitive information indirectly (D. R. Dalton et al., 1994; Glynn, 2013; Wolter & Laier, 2014). Proposed by Miller (1984), the unmatched count technique (UCT) is also known as the list experiment or the item count technique. Participants, when completing the UCT, are asked to count the number of items on a list which may include a sensitive item (Glynn, 2013; Miller, Olson, & Thorgeirsson, 1984; Preisendörfer & Wolter, 2014). The unmatched count technique (UCT) has been used in a wide variety of self-reports DCMs including drug use (Droitcour et al., 1991), employee theft (Wimbush & Dalton, 1997), and risky sexual behaviour (LaBrie & Earleywine, 2000).

For this study, a within-subject design was used as it allows every single participant to be subjected to every single treatment, including the control. A within-subject design allowed

participants to be his or her own 'control' thus allowing for a decrease in variability further increasing the power of the study (Wimbush & Dalton, 1997). The same group of participants will be required to complete every treatment. The word "treatment" is used to describe the different levels of an experiment for example if participants were required to take part in two different exercises (D. R. Dalton et al., 1994; Wimbush & Dalton, 1997). Each participants would therefore serve as their own baseline. In this case, participants will be required to complete the two Unmatched Count Techniques as different measurements for the same sensitive behaviours. The comparisons of UCT and other DCMs in these social experiments discussed below.

2.3. Data Collection Methods (DCMs)

A brief overview is provided below of the following five DCMs: the Self-Report Questionnaire (SRQ), Audio Computer-Assisted Self-Interview (ACASI), Face-to-Face Interview (FTFI), the Randomised Response Technique (RRT) and the Unmatched Count Technique (UCT). The focus of this research, however, is on one DCM, namely: the UCT. Following the overview is an outline of previous research comparing different DCMs to the UCT.

2.3.1. Self-Report Questionnaire (SRQ)

The Self-Report Questionnaire has been the most widely used self-report approach in which participants answer direct questions relating to items of interest, usually pencil and paper questionnaires (Korb, 2011; LaBrie & Earleywine, 2000; Wolter & Laier, 2014). Quantitative response formats of the SRQ can include Likert-type scales, true and false items or checklists, while qualitative response formats provide participants with an open option such as essay type formats (Hoffmann, de Puiseau, Schmidt, & Musch, 2017; Korb, 2011). For researchers as well as participants, the Self-Report Questionnaires are often the cheapest data collection method in terms of both time and money. As a result, SRQs are often used as the researcher can efficiently distribute surveys to a large sample of participants. Furthermore, depending on the data collection process, the items of interest may not be directly observable by the researcher, affording participants the opportunity to express their own views (Korb, 2011).

The directness of the questions used in the SRQ may cause participants self-reports to be comprised of bias, specifically regarding the recall and social desirability (Korb, 2011; Wolter & Laier, 2014). Despite the advantages of the SRQ, there are mixed reviews for comparisons completed between the UCT. In a study by Droitcour et al. (1991) which questioned receptive anal intercourse, the SRQ elicited a more truthful response than the UCT. While in a study by

LaBrie and Earleywine (2000), which questioned sexual risk behaviours and alcohol, the UCT proved to be more efficient at eliciting honest responses in three out of six items in comparison to the SRQ. Studies such as this highlight there are potential methodological problems associated with the use of traditional self-report questionnaires which directly affect the quality of the data. Despite the fact that participants' anonymity was ensured in these studies, being aware of all the factors which affect participants such as perception of anonymity is of the utmost importance in this study. Dalton et al. (1994) recommend improvements to techniques which ensure complete anonymity and do not require any direct account of behaviours from participants.

2.3.2. Face-to-Face Interview (FTFI)

Interviews conducted on a one to one basis between the researcher and participant are otherwise known as on the Face to Face Interview (FTFI). FTFIs are highly advantageous in allowing for personal communication (Korb, 2011; LaBrie & Earleywine, 2000). Rapport building during FTFI ensures that the participant feels at ease during the interview often allowing for clarification and exploration of questions. The FTFI can be informal or highly structured and often take place in an environmentally controlled room, free of distractions and increase the perceived anonymity (Korb, 2011; LaBrie & Earleywine, 2000). Due to the verbal nature of this survey strategy, participants are not always required to read the questions asked. Thus researchers are able to access illiterate samples or participants who could have possibly been excluded (LaBrie & Earleywine, 2000; Tourangeau & Yan, 2007).

Comparison of the FTFI and UCT are most often used in consideration of election and voter turnouts. Studies by Comsa & Postelnicu (2013) and Wolter, & Laier (2014) demonstrate the UCT elicited greater honest reporting by participants. Disadvantages highlighted in these studies indicate that participants find the FTFI to be time-consuming as an in-depth exploration of sensitive topics can require up to 1 hour and 30 minutes (Korb, 2011). Additionally, results of these studies indicate that the perceived lack of anonymity of the FTFI yields greater social desirability bias than UCT (Tourangeau & Yan, 2007). For researchers, FTFI can be costly in both time and money in terms of attaining the correct interview environment, possible training of interviewers as well as correct interview time (Korb, 2011).

2.3.3. Ecological momentary assessment/ diary approaches

New to this review, ecological momentary assessment (EMA) involves repeated sampling of participants' current behaviours and experiences in real time, in participants' natural

environments (Kleiman et al., 2017). The method has been successfully shown to minimize recall bias, allow the study of microprocesses that influence behaviour in real-world contexts maximize thus increasing ecological validity (Shiffman, Stone, & Hufford, 2008; Smiley et al., 2017). EMA was developed with the aim of improving reliable and valid measures of behaviour that are sensitive to change. The method originated with paper and pencil methods which are returned to the investigator after set periods of time such a week or more (Shiffman et al., 2008). Often also referred to as a diary approach, participants have been encouraged to complete a journal log or single page questionnaires (Kleiman et al., 2017).

With the advancement in technology, this method has also been used with handheld computer devices such as personal digital assistants (PDAs) has shown to be easily accessible within relatively short data-gathering periods (Crosby, Lavender, Engel, & Wonderlich, 2016; Shiffman et al., 2008). In a series of studies using this method, the method had a meager dropout rate in comparison to the traditional paper and pen method. Furthermore, in a study by Crosby et al. (2016) inter-item reliability for the sensitive items on each measure was high. The method has been critiqued, as measures used in the study were sensitive to change. The measures reflected differences in response to change in situational variables, such as classified status particularly within relationships with an authoritative figure (Crosby et al., 2016; Kleiman et al., 2017). As with all methods, EMA has its disadvantages. Within this review of the literature, it is clear that the method has been time consuming for the participants requiring participants to possible meet with research staff as well as complete written reports at intervals (Kleiman et al., 2017; Smiley et al., 2017). Similar to other self-report measures, no independent check on the accuracy of the data, as all data are collected in the absence of the research staff (Kleiman et al., 2017). Within these studies, researchers have suggested that the verification of behaviours should be sought through confirmation from others such as family or friends with whom the participant has frequent contact (Kleiman et al., 2017; Smiley et al., 2017).

2.3.4 Audio Computer-Assisted Self-Interview (ACASI)

With the development and advancement of computer systems, the Audio Computer-assisted Self-interviewing, or ACASI, was developed from over a decade of work related to computer-assisted interviewing systems including the computer-assisted self-administered interviews (CASI) and computer-assisted telephone interviews (CATI) (Randolph et al., 2006). The

creators of these systems aimed to provide methods, which standardize survey administration while allowing participants to respond to highly personal and sensitive questions (Randolph et al., 2006). The ACASI is a self-administered questionnaire on a computer screen, which displays the text of each question as well as a pre-recorded interviewer's audio recording through headphones.

The most significant advantage of the ACASI has perceived privacy, which has the potential for reducing misreporting of sensitive behaviours (Randolph et al., 2006). This has been demonstrated in research surrounding issues such as drug use, race attitudes and sexual behaviours (Randolph et al., 2006; Starosta & Earleywine, 2014; Wolter & Laier, 2014). Among these studies, comparison of the ACASI to the UCT in eliciting truthful answers to sensitive questions are mixed (LaBrie & Earleywine, 2000; Randolph et al., 2006; Wolter & Laier, 2014). The system has also been successfully used by participants who are illiterate, who have low computer literacy as well as the blind, due to the audio output as well as the coded answering method which can be easily standardised to groups of participants (Coutts & Jann, 2011; Randolph et al., 2006). However, majorities of these studies positively indicate that the UCT is better at eliciting honest responses than the ACASI (Coutts & Jann, 2011; Wolter & Laier, 2014).

2.3.5. Randomised Response Technique (RRT)

The Randomised Response Technique (RRT) relies on the pairing of an innocuous questionnaire item with the sensitive item of interest. A randomizing device such as the roll of a dice is used to determine whether the participant will answer the sensitive item or not (Coutts & Jann, 2011; Thornton & Gupta, 2004). The outcome of the randomization device is only the respondent knows thus a "yes" answer to the sensitive items cannot be interpreted as an admission of guilt (Comşa & Postelnicu, 2012; Thornton & Gupta, 2004). While this method has shown to increase disclosure rates, it does require complex statistical analysis and time-consuming for participants in comparison tothe UCT (Coutts & Jann, 2011; Tsuchiya & Hirai, 2010). The proportion of the sample that indicates "yes" to the sensitive item is calculated with the knowledge of the properties of the randomizing device. For a dice device, this may be a 50% chance of false positives for the sensitive item.

A study by Coutts and Jann (2008, in Coutts & Jann, 2011) made a comparison of a direct questioning method, 5 variants of the RRT and the UCT. Randomizing devices used included a manual coin toss, an electronic coin toss, phone number, bank notes and a combination of

these methods. Results of this study highlighted 3 essential factors: firstly, the RRT and direct questioning methods proved unreliable due to a strong false 'no' bias (Coutts & Jann, 2011). This indicates that participants were reluctant to give 'yes' answers to the sensitive items. Out of all the methods used in the Coutts study, the electronic coin RRT seemed to have the least 'no' biased. Secondly, the UCT indicated more expected and truthful estimates across the 6 sensitive behaviours in question, however, the standard error was high for the UCT (Coutts & Jann, 2011). Finally, as reported by participants of the study, the UCT proved to be a superior alternative to self-administered RRT (Coutts & Jann, 2011). Participants indicated that the UCT instructions were easier to understand often leading to higher disclosure rates. Additionally, the shorter response time required of the UCT ensured fewer non-responses.

2.3.6. Unmatched Count Technique (UCT)

Developed from Miller's item count method (1984, in Chaudhuri et al., 2007), the Unmatched Count Technique (UCT) is an indirect survey-based estimation method, aimed to provide participants with greater perceived privacy thus increasing participant truthfulness. Unlike the traditional SRQ, the UCT requires participants to indicate how many from a list of behaviours that is true or s/he had engaged in rather than identifying which items (Chaudhuri et al., 2007). In a studies by Dalton et al (1994), LaBrie et al (2000), Rayburn et al (2003) and Walsh et al (2008), the UCT had higher base rates then other direct survey methods particularly surrounding issues such as theft, racial issues, sexual risk behaviours and alcohol use as well as hate crime and victimization.

Aimed at providing a survey method that was easy to administration and greater perceived anonymity by participants, the UCT has demonstrated efficiency in collecting information particularly surrounding sensitive behaviours. As mentioned previously, research which has employed this method revealed higher base rates when investigating sensitive topics such as crime, drugs, politics, race, religion, and sex behaviour (D. R. Dalton et al., 1994; Glynn, 2013; LaBrie & Earleywine, 2000; Wolter & Laier, 2014).

In the UCT process, two randomly assigned groups of participants are required to identify from a list of randomly selected statements, how many of the statements apply to them, not which of the statements apply (D. R. Dalton et al., 1994). This process is indicated in Table 1 and is as follows: participants in the first group receive a series of statements with no sensitive item and respond by indicating the number of statements that are true for them. In the UCT process, the second group of participants receives a series of statements in which one of the statements

is the item of interest (D. R. Dalton et al., 1994). The participants are able to honestly indicate partaking in the sensitive item without directly admitting the behaviour to the researcher further reducing misreporting (Coutts & Jann, 2011; Thomas, Johann, Kritzinger, Plescia, & Zeglovits, 2016; Tsuchiya & Hirai, 2010).

Additionally, the UCT does not require a randomizing device, unlike the RRT, as the means of each sample group are calculated and then compared to interpret what portion of the second group responded positively to the sensitive item. The UCT format is particularly effectiveness in providing higher estimates of such sensitive behaviours including sexual behaviours as shown in studies by Coutts and Jann (2008), Dalton et al. (1994), La Brie and Earleywine (2000) and Walsh and Braithwaite (2008).

Table 1 – Calculation of UCT estimations

Estimate (p) = mean A – mean B Estimate (p) is the proportion of the sample disposed to the sensitive behaviour. Mean A = the mean number of statements designated by the subjects exposed to the sensitive statement. Mean B = the mean number of statements designated by the subjects not exposed to the sensitive statement. (D. R. Dalton et al., 1994)

It is important to note, the UCT yield aggregate base rates or proportions data rather than individual-level data {Arentoft, 2016 #38). As a result, prevalence data cannot tie the data to individuals but instead indicates proportions of the sample that is likely to have engaged in the sensitive behaviour. Furthermore, the UCT has several problems in terms of understanding of the technique and instruction of the surveys. Chaudhuri et al. (2007) highlight the format of the UCT which introduces a sensitive item to the second group of participants that may further create suspicions or confusion to the positive response to the item. This measurement error often results in proportions above 100% or negatives proportions of participants partaking in the sensitive behaviour. Chaudhuri et al. (2007) propose to improve the format on the UCT by modifying the way the sensitive item is incorporated into the second group surveys.

Regardless of the many studies which indicate the effectiveness of the UCT, there are known limitations in its use. Firstly, the UCT requires a large sample size in order to achieve reasonable levels of precision (Glynn, 2013). Secondly, analysis of the UCT does not provide a measure of the sensitive item for each respondent (Braithwaite, 2008; Glynn, 2013; Tsuchiya & Hirai, 2010). Finally, although the UCT procedure is simple and easy to understand, its estimates are often unstable and susceptible to negative base rates which occur during analysis (Blair et al., 2014; Tsuchiya & Hirai, 2010). Negative base rates are not suitable for further analysis as it is not possible to compare negative values with positive values.

There are numerous possible causes of negative base rates. Some research suggests that negative base rates may occur due to the following reasons: participants may be wary of non-sensitive items within the forms; participants may count the total number of favourable responses incorrectly or carelessly, or due to other participant errors such as purposeful misreporting {Alledahn, 2011 #36;Blair, 2014 #2;Chaudhuri, 2007 #4;Tsuchiya, 2010 #21}. This is an essential factor to consider when conducting the data analyses.

Resolving this issue, represented a significant challenge for future research thus with the suggestion from Chaudhuri and Christofides (2007) which will be known as the UCT type II within this study. The UCT type II remains similar to the UCT Type I format however participants receive a list set of non-sensitive, but related items. To further clarify, the UCT Type II differs in the format as each group of participants receives item options that are rephrased so that the non-sensitive item further blend with the sensitive items. Naturally, the aim was to negate some of the suspicious created for the sensitive item that stands out in the UCT Type I. In creating new and participant friendly ways of asking sensitive questions, this study aims to understand further how data collection formats contribute to the way in which participants' response to different data collection methods, further discussed below.

2.4. The present study

The current research was focussed on two primary objectives. The primary objective of this research was to add to the existing knowledge surrounding the UCT. This study aimed to investigate the efficiency of data collection methods: Unmatched Count Technique Type I and Type II (UCT Type I and Type II) in obtaining self-disclosure data on sensitive behaviours. As previously stated, it is imperative to improve DCMs methods to an accurate picture of specific social issues, especially those that are considered to be private, sacred or sensitive. This study built on research completed in 2013 and 2014 on the UCT, which aimed to investigate ways to

reduce disadvantages such as negative estimations. This study used the line of questioning and item selection processes from these prior studies, which focused on sexual behaviours. Results of the 2013 and 2014 studies will be discussed below. A secondary aim of this research was to investigate subjective measures of survey quality, such as participants trust, ease of use, anonymity, and protection of confidentiality. This research aimed to inform future research which may utilise the UCT for investigating sensitive questions.

CHAPTER 3: Research Methodology

3.1. Aims and Rationale

This research built on a prior study that aimed to generate and compare disclosure rates of sensitive sexual behaviours using two data collection methods (DCMs): the UCT Type I and the UCT Type II (Fynn, 2014). The formative research was conducted in two phases over 2013-2014 for the item selection and the baseline data of the UCT type II. This research aimed to extend previous findings by focusing on a comparison of the UCT methods. This research aimed to:

1. Investigate which DCM, the UCT Type I and the UCT Type II yields higher rates of disclosure on sensitive sexual items as an analogue of validity
2. Which of the different survey method, the UCT Type I and the UCT Type II yield the lowest group rates of social desirability bias
3. To understand the participant's experiences of each data collection method in terms of ease of use, anonymity, and protection of confidentiality

3.2. Hypotheses

The hypotheses regarding the UCT Type I and UCT type II are as follows:

A) Null hypothesis: There is no significant difference in the participants' disclosure of sensitive items between the Unmatched Count Technique Type I and the Unmatched Count Technique Type II

Alternate hypothesis: There is a significant difference in the participants' disclosure of sensitive items between the Unmatched Count Technique Type I and the Unmatched Count Technique Type II

B) Null hypothesis: There is no significant difference in social desirability bias between the Unmatched Count Technique Type I and the Unmatched Count Technique Type II.

Alternate hypothesis: There is a significant difference in social desirability bias between the Unmatched Count Technique Type I and the Unmatched Count Technique Type II.

C) Null hypothesis: There is no significant difference in the participants' experiences between the Unmatched Count Technique Type I and the Unmatched Count Technique Type II.

Alternate hypothesis: There is a significant difference in the participants' experiences between the Unmatched Count Technique Type I and the Unmatched Count Technique Type II

3.3. Research Design

This study forms part of a broader Ph.D. study investigating the disclosure rates of additional DCMs, namely: Face To Face Interviewing (FTFI), Self-Report Questionnaires (SRQ), Audio Computer-Assisted Self-Interview (ACASI), Unmatched Count Technique (UCT) type I, Informal Confidential Voting Interview (ICVI) and UCT Type II. This study focused on a comparison of two DCMs, UCT type I and UCT Type II, in a student population, as an analogue of reliability and validity. This research was a within-subjects repeated measure comparative study; all survey methods were administered via a closed cubicle computer based computer interface, MediaLab ™ software in the Psychology laboratory, UKZN (Picture 1). At the beginning of every survey, participants were requested to complete a demographic survey of necessary information such as their age, gender, race and year of study. This was then followed by a demonstration of all data collection methods to be completed. To further situate this study, two previous research will be discussed below.

Picture 1: Example of closed cubicle computer based computer laboratory

As indicated previously, this study builds on formative research which was conducted in two phases over 2013-2014 for the item selection and the baseline data of the UCT type II (Fynn, 2014; Shaik, 2013, 2016). Firstly, the 2013 study was a norming of sensitive behaviour pilot study conducted using a paper and pen SRQ format. The 2013 study focused on determining the sensitive of sexual behaviour questions is by creating a scale on which the study population rated many sensitive behaviours. Participants were firstly asked to indicate if the item was sensitive or not followed instructions to rate the items participants indicated to be sensitive. As mentioned earlier, sensitive in nature when the topics consist of socially criticized behaviour including research into racial, gender and religious behaviour (De Jong et al., 2010; Kenyon et al., 2013; Tourangeau & Yan, 2007).

The 2013 study contained a total of 186 randomized items related to sexual behaviour, sexually transmitted infections and substance abuse. The study aimed to discover which behaviours were deemed as sensitive and non-sensitive for a respreventive sample of the student population. Participants were instructed to indicate, according to a 4-point Likert scale, how sensitive they perceived each item to be. A factor analysis was completed in the 2013 study which correlated items according to sensitivity allowing for items, with a correlation of <0.4 or higher were noted as sensitive. Of the 186 items, 56 items were indicated to be sensitive and then rated on the Likert scale by the study population to better understand the degree of sensitivity of each item. Items which were indicated as sensitivity were further sub-divided according to two domains, namely, risky sexual behaviours and sex under intoxication.

The results of the 2013 study thus provided a framework for item selection to be used in the UCT format by clearly defining for the study population which items were considered to be sensitive items and non-sensitive items. For the UCT type II, it was useful to indentify items, which while not rated as sensitive by the sample, were domain related. As suggested by Chaudhuri and Christofides (2013), the UCT Type II differs in the format as each group of participants receives item options that are rephrased so that the non-sensitive item further blend with the sensitive items. The items chosen for this study were items related particularly to sexual behaviour as there is a critical need to critique current approaches and learn about the most effective methodologies which ensure accurate self-reporting.

The 2014 study and a second phase focused only on items related to sexual practices and alcohol abuse (Shaik, 2016). In accordance with a rigorous randomization process, participants were allocated to one of six DCMs: FTFI, SRQ, ACASI, UCT type I, ICVI or UCT Type II, and required to answer each sensitive items within the required format. Nested within the 2015 study, the UCT type II was first piloted. The results of the 2014 study thus provide a baseline for the UCT type II as well as other essential guidelines for studies such as this. The results of the 2014 study indicate positively for the UCT type II in comparison to most of the DCMs.

Results from the 2014 study demonstarted that in a comparison of UCT DCMs, the UCT Type II endorsed greater disclosure of sensitive test items than the UCT Type I. For example, 94 % of participants positively indicated for sensitive item “I have had more than two sexual partners in the last three months” using the UCT type II, while only 54% of participants positively indicated for the same item on the UCT type I. The aim of this study was to continue to contribute to the knowledge and improvement of methods such as this.

Unmatched Count Technique Type I (UCT Type I) and Unmatched Count Technique Type II (UCT Type II)

Within the current study, the format of the UCT Type I and the UCT Type II each contain sets of items (see table two). Within each set, a mixture of the 5-6 item is included which may include innocuous or sensitive-related items. The UCT embeds a sensitive item in a set of 5 innocuous items. This set is duplicated across two forms (Form A and Form B). The set containing the sensitive item occurs only on one of the forms. This allows for the calculation of the proportion of a sample endorsing the sensitive item. Demonstrated in Table 2 and 3.

Table 2 – Examples of Form A and Form B of the UCT Type I

Form A	
Set 1	*Set 2*
I use the internet from my cell phone.	I am careful with my diet.
I went to a private high school.	I have allergies.
I am on Facebook.	Reading is a hobby for me
I can speak more than 2 languages reasonably well.	I have watched the movie "Tsotsi."
I can type reasonably well.	I take vitamins almost every day.
	I am HIV positive
Form B	
Set 1	*Set 2*
I don't normally eat breakfast.	I use the internet from my cell phone.
I drink coffee.	I went to a private high school.
I drink tea.	I own at least one cell phone.
I have an internet connection at home.	I often watch television late at night. I watch the news on TV at least 3 times a week.
I know what a "conversion" is in rugby.	I have been to Durban.
I have been treated for a sexually transmitted infection (e.g., syphilis,	

gonorrhoea, genital herpes, genital ulcer, idrop)	

As indicated above and within the literature, data collection UCT Type I includes two sets for every sensitive item. Only one of the sets contained the sensitive item within a list of non-sensitive items. Additionally, these items are not related to the sensitive item. This format followed traditional guidelines and used for all sensitive items pertaining to sexual risk behaviours.

Table 3 – Form A and Form B of the UCT Type II

Form A	
Set 1	*Set 2*
	Have had unprotected sex while knowing I am HIV positive and/or have a sexually transmitted infection
Think sex is ok in a committed relationship	Have had diagnostic tests done in the last year
Have been slightly drunk	Have gone to a local clinic when sick
Take vitamins almost every day	Have gone to the chemist when sick
Can drive quite well after two drinks	Have seen a doctor in the last year
Have taken antibiotics in the last year	Know where to get condoms for free
Form B	
Set 1	*Set 2*
Have had sexual intercourse without a condom being used while under the influence of alcohol	
Can drive quite well after two drinks	Always use condoms when having sex
Have been slightly drunk	Have had diagnostic tests done in the last year
Know where to get condoms for free	Have engaged in light petting (kissing, fondling)
Have been tested for HIV	Take vitamins almost every day

Have often drunk alcohol	Know my HIV status

The DCM UCT Type II format included two sets for every sensitive item, similar to the UCT Type I. Only one of the sets (a or b, c or d and so on) will contain the sensitive item within a list of non-sensitive but related items, unlike the UCT Type I. The aim was to disguise the sensitive items within the sets so that it does not stand out as directly different from the other items. This format was used for all sensitive items included in the study with the non-sensitive, but related items between sets demonstrated above.

3.3.1. Additional scales

Participants were requested to complete a Hays, Hayashi, and Stewart (1989) Social-Desirability Scale to rate their attitudes/behaviour according to a 5- point Likert scale. The 5 question scale aimed to assess the likelihood of a participant's responding to sensitive questions in a socially desirable manner (Appendix 3). Finally, participants completed experience of participation. Participants were required to answer nine questions and rank the order their personal preference of DCMs. Question ranged from 'I am confident that my responses were anonymous' to 'I was comfortable responding to the questions in this format' (Appendix D2).

3.4. Apparatus and Sample

Following the guidance set in the literature by D. R. Dalton et al. (1994) and LaBrie and Earleywine (2000), consideration has been given to the importance of correct sample sizes and randomising of data collection methods in yielding quality data. This study made use of a counter-balanced design by randomising the order of DCMs. The counter-balanced design ensured that the DCMs were equally weighted within the study with no preference for a particular method. Additionally, this design ensures participants provide reliable data across all DCMs rather than tiring towards the end of the test and answering incorrectly for the last few DCMs. A randomiser by Urbaniak and Plous (1997) ensured optimal privacy and anonymity for participants as no two questionnaire sequence completed were the same (Table 1). This research made use of the computer based computer interface, MediaLab software on the Psychology campus of the University of KwaZulu-Natal, Pietermaritzburg.

Table 4 - Format of questionnaire random sequence

1 – 4231	/ 2 – 4132	/ 3 – 4312	/ 4 – 4213	/ 5 – 2431

/ 6 – 2143	/ 7 – 2431	/ 8 – 4312	/ 9 – 3214	/ 10 – 4312
/11 – 2134	/ 12 – 2143	/ 13 – 3241	/14 – 4321	

1- SRQ 2- ACASI 3- UCT Type I 4- UCT Type II

As a result of using an enclosed environmentally controlled cubicle for the entire survey, many of the inconsistency that may be a result of DCM variables and interviewer variables were controlled for during the more extensive Ph.D. study. Thus, being aware of the way in which a question can be phrased, the correct format in which it is asked as well as the amount of researcher and participant interaction all contribute to survey outcomes.

3.4.1. Sampling

Two primary recruitment methods were be used throughout this study. Initially, a non-probability convenience sampling method focused on recruiting the readily accessible University of KwaZulu-Natal students on the Pietermaritzburg campus. This included verbal recruitment of participants by the researcher in addition to written notifications of the study in and around central student meeting places such as campus cafeterias and campus lawns. These recruitment announcements informed participants about the details of the study, available time slots in which the study would be run as well as the incentive for participation. Participants were sent email reminders in order to ensure that they would arrive to participate. Participants were also given a group email contact if they showed interest or had further questions at a later time.

Participants who had completed the questionnaire were encouraged to send their friends and fellow students invitations to partake in the study, resulting in snowball sampling. Each of these sampling methods promoted a diverse sample of across all racial groups of male and female students 18 and older. Additionally, estimations by authors such as La Brie et al. (2000) and Dalton et al. (1994) indicate for optimal statistical power, a recommendation of a minimum of 40 to 50 participants per set of the UCT. Thus the aim was to sample a minimum of 240 participants to contribute to this study.

3.5. Ethical considerations

This study received full ethical clearance from the University of KwaZulu-Natal, Social Science Research Ethics Committee, ref no. HSS/11135/014M on 23 Mar 15 (Appendix D).

3.5.1. Informed consent

At the commencement of every survey slot, participants were provided with information and consent sheets. The information sheet contained all the information necessary for participants to understand their rights when taking part in this study. This information included details outlining the a) the background and purpose of the study, b) freedom to decline and the right to withdraw at any time and c) the required informed consent necessary for the voluntary nature of the study. Additionally, information sheets included information pertaining to incentives as well as the names and contact detail of the researcher and the overseeing research supervisors. Thus, all participants were allocated time at the beginning of the study to read this information in addition to this information detailed on screen at the beginning of the survey.

It was stressed to participants, in the event of stress or discomfort experienced as a result of participants in the study that they should free feel to contact anyone of these individuals. Counseling service provided by the School's Child and Family Centre of UKZN was provided for participants in the event of distress by referral. These details were provided to all participants. Finally, participants were requested to complete and sign the consent form to indicate their understanding and willingness to participate. Once signed, all consent forms were kept securely in a locked cupboard to assure participants of anonymity. All hard copies will be shredded and electronic copies deleted after 5 years.

3.5.2. Beneficence and confidentiality

With the aim of maximising non-maleficence and minimize the risk of harm in this study, participants are informed before, during and after of the options available to them. This includes the right to withdraw as well as opting to contact the researcher for counselling sessions at the Child and Family Centre. Additionally, participants were assured of the protection of their identity as each participant received a participant number recorded by the computer interface and kept separate from signed consent forms. All information collected on the electronic database was directly transferred to Microsoft Excel documents and later used in data analysis using SPSS software.

As participants are required to come to the data collection site and give up a portion of their time to complete the survey, each participant received an R20 incentive. The cost of incentives

for this study was covered by the supervisor, V. Solomon, as part of the more extensive Ph.D. project.

CHAPTER 4: Data Analysis

The data generated from this study were analysed using Microsoft Excel and IBM SPSS statistical software version 24. Descriptive analyses and frequency distributions were generated using Microsoft Excel.

The statistical analysis completed for the UCT DCMs was based on the guidance by LaBrie and Earleywine study (2000). The form A (form without the sensitive item) was subtracted from the mean from the mean from form B (form with the sensitive item). For example, mean A – mean B. The UCT format does focus giving participants the confidentiality and anonymity necessary to allow for honest responding and thus relies on the assumption that participants answer the UCT honestly. The value left thus indicates the proportion of participants who endorsed the sensitive behaviour or P. The symbol P refers to the proportion of participants who positively endorsed the sensitive item were then converted into percentages. This allowed for comparison of base rate estimates between the two DCMs.

Once the base rate estimates were calculated for each of the DCMs, the base rate estimates were then was entered into the online MEDCALC statistical software for proportion comparison analyse. The analysis was conducted in order to provide a comparison of the different proportions of each sensitive item; thus establishing whether a significant difference in disclosure rates exists between the DCMs. During data coding into Microsoft Excel, it became apparent that there were many invalid responses, thus within the SPSS analysis, many of the items were not appropriate for analysis resulting in negative base rate estimates. While the negative proportions calculated could not be analysised using SPSS, the online MEDCALC statistical software continued to complete the analysis. While the results of this anaylsis are not an accurate reflection of the proportion of participants whom may have partaken in this behaviour, it can be used to make some deductions about the comparison and use of each UCT DCM.

The Social Desirability was analysed using Microsoft Excel and SPSS statistical software 24. Participant responses to the social desirability scale were scaled from 0 to 5. Participants answered were recorded in Microsoft Excel by counting the two most extreme answers – definitely true or mostly true and definitely false or mostly false. Definitely true or mostly true were coded as 1 in questions 1 and 5, while definitely false or mostly false were coded as 0. Additionally for questions 2, 3, and 4, definitely false or mostly false were coded as 1, while

definitely true or mostly true were coded as 0. Each participants' score is then recalculated into dichotomous variables with 0 being "not concerned with social desirability" and 1 being "concerned with social desirability." Each participant score was calculated from the scaled values of 1 to 5. The guidance set by Hays et al. (1989) for interpretation of the participant's result does not clearly indicate a fixed cut-off point, however, in accordance with this study, even participants who are not concerned with social desirability answer at least one question in a manner that is not socially desirable. For the purposes of this study, a conservative cut point, 4 socially desirable responses, was used to categorize participants as "concerned with social desirability."

Finally, for the Experience of Participation, participants were required to answer nine questions regarding their experience of participation and rank the order their personal preference of DCMs. Each participant's responses were coded and entered into Microsoft Excel, which demonstrated the order of their individual preference for each question. The results of this analysis were then entered into SPSS statistical software 24. It was then possible to run an ANOVA analysis which tests for the significant difference between the means of several the two DCMs for each individual question.

CHAPTER 5: Results

5.1. Sample Demographics

Information provided by the Division of Management Information UKZN (personal correspondence, March 2013) indicated that of the 9645 students register for the year of 2013 in which over 58% of the population were female and 42% of the student population male. Additionally, Coloured, Indian and White racial groups make up the minority of the student population with up to 77% of the student population were African. Power calculations results completed using SPSS are indicated in table 5b will be further discussion below. Within this study, the recruitment methods used were aimed to ascertain the participant population was representative of the student population as possible. In total, 775 participants participated in the study. However, of the total sample, 48.3% were female, and 51.7% were male. While this did overrepresented males within the population, the difference did not negatively affect the analysis and results.

Table 5a

Demographic Information - Gender

Gender	Frequency	Percent
Male	401	51.7%
Female	374	48.3%

Table 5b

Sample power calculation

	Frequency
Mean, population	9645
Mean, the sample group	775
Alpha	0.05
Beta	0.2
Power	0.8

The racial profile within the study overrepresented minority populations traditionally. The White student population made up over 35% of the study population, followed by Indian students (26.6%), Coloured students (18.1%) and Black students (17%). Finally, 3.2% of the study population identified as other.

Table 5c

Demographic Information - Racial

Race	Frequency	Percent
Black	132	17.0%
White	272	35.1%
Coloured	140	18.1%
Indian	206	26.6%
Other	25	3.2%

The majority of research participants were between the ages of 18 and 23 years as indicated in table 5d, while the majority of the study population were 2nd-year students (table 5e).

Table 5d

Demographic Information - Age

Race	Frequency	Percent
18 - 20 years	238	30.7%
21 - 23 years	294	37.9%
24 - 26 years	194	25.0%
27 + years	49	6.3%

Table 5e

Demographic Information - Year of study

Race	Frequency	Percent
1st year	180	23.2%
2nd year	318	41.0%
3rd year	201	25.9%
4th+ year	76	9.8%

5.2. UCT Base Rate Estimates

Calculation of the base rate of the sensitive behaviour is obtained by calculating the estimate (p) which is equal to mean b (data set with the sensitive item) - mean a (data set without sensitive item), as per LaBrie and Earleywine (2000). The base rate estimates were generated using SPSS as well as Microsoft Excel. The calculated estimate (p) is the proportion of participants to engage in the sensitive behaviour. Table 6 reports a summary of the calculated

base rate estimates of participants engaged the sensitive behaviours between the two DCMs. The results are discussed below. During data coding into Microsoft Excel, it became apparent that there were many invalid responses, thus within the SPSS analysis, many of the items were not appropriate for analysis resulting in negative base rate estimates. As it was not possible to compare items with negative proportions, no conclusions were reached by making a comparison of the UCT DCMs for these base rates behaviour levels for these sensitive items.

Table 6 – UCT Type I Base Rate Estimates

UCT Type I						
Item	Question	Confirmed Pairs	Mean [a]	Mean b	Base rate	Percentage
1.	I am HIV positive.	UCT2 - UCT1	3.89	3.91	-0.02	
2.	I have been treated for a sexually transmitted infection (e.g., syphilis, gonorrhoea, genital herpes, genital ulcer, idrop).	UCT3 - UCT4	4.18	4.16	0.02	2%
3.	I have refused to use a condom.	UCT6 - UCT5	4.17	4.18	-0.01	
4.	I have had unprotected sex whilst knowing I am HIV positive and/or have a sexually transmitted infection.	UCT7 - UCT8	4.21	4.17	0.04	4%
5.	I regret having had sex	UCT9- UCT10	4.20	4.11	0.09	9%
6.	I have had sexual intercourse without a condom being used whilst I was under the influence of alcohol	UCT12 - UCT11	4.09	4.15	-0.06	

* indicates significant results (Alpha <= 0.05)

** indicates missing results

Additionally, during data input, it was noted that one of the computer output was corrupted. This may have been the result of questionnaire creation error or computer malfunction. As a result, 66 participant's results across the UCT DCMs were excluded from the data analysis. This lead to a smaller sample size, 709 comprised of 368 females and 341 males, for the UCT DCMs comparison. Despite these errors, the sample size continued to be within the recommended size as LaBrie and Earleywine's (2000) and Glynn (2013) recommendations. As per Glynn (2013), the inadequate sample size is more likely to result in negative estimates when conducting the UCT.

Table 7 – UCT Type II Base Rate Estimates

UCT Type II						
Item	Question	Confirmed Pairs	Mean [a]	Mean b	Base rate	Percentage
1.	I am HIV positive	UCT19 – UCT20	4.12	4.17	-0.05	
2.	I have been treated for a sexually transmitted infection (e.g., syphilis, gonorrhoea, herpes, genital ulcer, idrop)	UCT23-UCT24	4.02	4.06	-0.04	
3.	I have refused to use a condom	UCT18 – UCT17	4.17	4.03	0.14	14%
4.	I have had unprotected sex while knowing I am HIV positive and/or have a sexually transmitted infection	UCT14 – UCT13	3.88	3.75	0.13	13%
5.	I regret having had sex	UCT22-UCT21	4.20	4.09	0.11	11%
6.	I have had sexual intercourse without a condom being used while under the influence of alcohol	UCT15 – UCT16	4.04	3.95	0.09	9%

* indicates significant results (Alpha <= 0.05)

** indicates missing results

5.3. Proportion Comparisons

Of the six sensitive items chosen for this study, only two indicated accurate base rates estimates which could be used for further analysis. The two items "I am HIV positive" and "I regret having had sex" could be used for further analysis. Using a proportion comparison, the valid base rate estimates for each of the DCMs were analysed in order to determine whether a significant difference exists in response rates. A summary is provided in table 8 below.

Table 8 - Summary of Proportion Comparison Analysis Results for UCT type I and UCT type II

Item	Question	UCT Type I* UCT Type II
1.	I am HIV positive	P = 0.0031
2.	I have been treated for a sexually transmitted infection (e.g., syphilis, gonorrhoea, herpes, genital ulcer, idrop)	P =< 0.0001
3.	I have refused to use a condom	P = < 0.0001
4.	I have had unprotected sex while knowing I am HIV positive and/or have a sexually transmitted infection	P = < 0.0001
5.	I regret having had sex	P = 0.2109
6.	I have had sexual intercourse without a condom being used while under the influence of alcohol	P = < 0.0001

∗ indicates significant results (Alpha <= 0.05)

** indicates missing results

The proportional comparison analysis reveals that for item 4, "I have had unprotected sex while knowing I am HIV positive and/or have a sexually transmitted infection," there was a significant difference between UCT type I and UCT type II ($p=<0.0001 < \alpha=0.05$). Therefore the null hypothesis is rejected as a significant difference in the participants' disclosure on item 4 between the UCT Type I and the UCT Type II. This analysis in addition to the base rate estimate for item 4, "I have had unprotected sex while knowing I am HIV positive and/or have a sexually transmitted infection", clearly indicate positive endorsement by participant is significantly higher for the UCT Type II (13%) in comparison to the UCT Type I (4%).

For item 5, “I regret having had sex,” there was no significant difference between the UCT Type I and the UCT Type II ($p=0.2109 > \alpha = 0.05$). These results indicate that the null hypothesis fails to be rejected between the UCT Type I and the UCT Type II for this item.

5.4. Social Desirability Scale

Table 8 below provides the results for the social desirability scale. Participants were classified according to the number of social desirability responses given for all 5 questions. For the purposes of this study, participants with 4 to 5 socially desirable responses were used to categorize participants as “concerned with social desirability.” The results of this analysis demonstrated that a total of 35.6% (276) participants were more likely to give socially desirable responses to sensitive questions.

Table 9 - Results for Social Desirability (SD)

Valid	Frequency	Percent
.00	29	3.7
1.00	92	11.9
2.00	222	28.6
3.00	156	20.2
4.00	158	20.4
5.00	118	15.2
Total	775	100%

5.5. Experience of Participation Scale

In the ranking of DCMs, participants answered nine questions regarding their experience of participation. In a comparison of the UCT type I and the UCT type 2, participants indicated a clear preference for UCT Type II (Appendix E). Additional analysis of these results indicated a significant difference between the two DCMs for several of the questions (table 11). The results based on the ANOVA conducted; showed several differences across the methods. With the exception of one question, these differences were significant enough to reject the null hypothesis.

Table 10 - Experience of Participation

Between Groups (UCT Type I and Type II)	Sum of squared	df	Mean Square	f	Sig
1. I am confident that my responses were anonymous	43.859	3	14.620	10.990	.000
2. I am confident that my responses will be kept confidential	46.655	3	15.552	11.693	.000
3. I was comfortable responding to the questions in this format	18.66	3	6.222	4.641	.003
4. I felt uncomfortable answering the questions in this way	28.717	3	9.572	7.140	.000
5. I trusted this process and felt my responses were protected	11.649	3	3.883	2.830	.038
6. There is no way that my responses could be linked to me as a person	7.600	3	2.533	1.820	.142
7. I felt uncomfortable disclosing sensitive information about myself	24.025	3	8.008	5.624	.001
8. I was comfortable enough, to tell the truth	28.360	3	9.453	7.123	.000
9. I was able, to tell the truth, and not worry about it being identified with me	22.442	3	7.481	5.434	.001

* indicates significant results (Alpha <= 0.05)

** indicates missing results

CHAPTER 6: Discussion

This study aimed to investigate the differences between Data Collection methods (DCMs) the UCT Type I and the UCT Type II and focused on sensitive sexual behaviours among a cohort of university students. This included investigating which method yielded firstly the greater rates of disclosure, the social desirability bias as well as finally understanding participants' experience of each of the DCMs.

One issue of this study was to address further some of the issues that were identified by previous studies, such as non-sensitive and sensitive item selection, simplified response formats and correct sample sizes (LaBrie & Earleywine, 2000; Dalton et al., 1994; Glynn, 2013; Wolter, & Laier, 2014). Careful consideration was given to the item selection and format of each questionniare to ensure that no difficulties were experienced by participants in understanding how the UCT format was to be answered. Additionally, an introduction, as well as test question to the UCT format, was completed at the beginning of each questionnaire. Participants were encouraged to stop and ask clarification questions at any point while completing the questionnaire. Within this study, participants were given clear and simple instructions which required them to select a number as a response within a single enclosed cubicle desk environment. The pratice question was efficiently completed by participants, further ensuring fewer errors which may have been attributed to the possibility of participants to count the total number of responses incorrectly or carelessly.

Additionaly, Chaudhuri and Christofides (2006) argued that a careful selection of distractor items would be required to circumvent the possibility of proportions above 100% or negative results. Within this study, the UCT Type I has many problematic proportions. This has been attributed to measurement error, which often results in proportions above 100% or negatives proportions of participants partaking in the sensitive behaviour. This is similar to findings within studies by Blair et al. (2014), Glynn (2013) and Tsuchiya and Hirai (2010). This may support the rational for item selection as demonstrated by the UCT Type II which resulted in fewer negative final proportions in a comparison to the UCT Type I. While the item selection phases completed in 2013 sampled to rate sensitive behaviours for the cohort of university students, the negative proportions which did occur within this study do speak to some distortion which should be further investigated.

The item seletion may have ensured the distribution of the sensitive but related items as part of the UCT Type II; it is imperative that the sensitive item is genuinely obscured and not affected by social desirability bias In accordance with Thomas et al. (2017), DCMs which function by completing an item count may be appropriate only for behaviours that have negative social connotations but are also infrequently practiced. Therefore, the sensitive topics questioned within this study may not appropriate as frequently practiced behaviours with both positive and negative connotations. While this study did focus on previously sampled items, it would be beneficial to consider items with only conventionally positive connotations or meaning such as religion, intelligence and health behaviours to create a baseline for the use of the UCT Type II before use in sensitive data collection. Finally, the UCT DCMs did not demonstrate any significant difference in gender or race. This may further show that more research is still needed in this field.

It is unclear exactly why the UCT DCMs continue to have high levels of measurement error. As discussed previously, negative proportions may occur if participants are wary of non-sensitive items within the forms; if participants count the total number of favourable responses incorrectly or carelessly, or if participant purposeful misreport (Alledahn, 2011; Blair et al., 2014; Chaudhuri & Christofides, 2007; Tsuchiya & Hirai, 2010). Thus, within this study, the negative proportion may be a result of incorrect memory recall or social bias by some participants.

6.1. UCT Base Rate Estimates

While the results of this study indicate several insignificant results, the distinct trend throughout the study may indicates a preference by participants for the UCT Type II. Firstly, in the investigation of the UCT Type I and Type II at yielding greater disclosure for the sensitive sexual behaviours. Of the six items, the analysis could be completed for three of the items for the UCT Type I while four of the items were analysed for the UCT Type II. The additional items could not be analysed due to the negative proportions calculated. As it is not possible to compare items with negative proportions, no conclusions reached by making a comparison of the UCT DCMs for these base rates behaviour levels for these sensitive items. It is important to note that negative proportions when calculating proportions were an indicator of more than half the sample of participants may have incorrectly reported on the sensitive issue.

These base rate findings are consistent with past studies findings by Shaik (2013) and Shaik (2016) that revealed higher base rate for UCT Type II when compared to the UCT Type I method. These findings revealed disclosure rates of sensitive behaviours when using the UCT Type II method for items: I have refused to use a condom" 14% , I have had unprotected sex while knowing I am HIV positive and/or have a sexually transmitted infection" 13% , "I regret having had sex" 11% and finally I have had sexual intercourse without a condom being used while under the influence of alcohol 9%. While the UCT Type I analysis could only be completed for sensitive items: I have been treated for a sexually transmitted infection 2%, I have had unprotected sex whilst knowing I am HIV positive and/or have a sexually transmitted infection 4% and I regret having had sex 9%.

6.2. Proportion Comparisons

Of the 6 items chosen for this study, only two of the sensitive items would traditionally be used for further comparisons of base rates estimation of the UCT DCMs. As indicated by Chaudhuri and Christofides (2013), this measurement error can be the result of incorrect interpretation of the instructions for completing the UCT format by participants. While Blair et al. (2014) and Tsuchiya and Hirai (2010) indicate that, the UCT estimates are often unstable and susceptible to negative base rates, which occur during analysis. However, within this study, items with negative base rates were also compared using an online proportion calculator MEDCALC statistical software. This is not an accurate reflection of the proportion of participants whom may have partaken in this behaviour but rather an analysis completed to compare the use of each UCT DCMs.

For the two items for which traditional analysis can be completed, the proportional comparison analysis reveals that for item 4, there was a significant difference between UCT type I and UCT type II ($p=<0.0001 < \alpha=0.05$). Therefore the null hypothesis is rejected as a significant difference in the participants' disclosure on item 4; I have had unprotected sex whilst knowing I am HIV positive and/or have a sexually transmitted infection, between the UCT Type I and the UCT Type II. This analysis indicated positive endorsement by participants for the UCT Type II (13%) in comparison to the UCT Type I (4%). However, for item 5, "I regret having had sex," there was no significant difference between the UCT Type I and the UCT Type II ($p=0.2109 > \alpha = 0.05$).

Analysis completed for the negative base rates completed by the online proportion calculator showed a significant difference between the UCT Type I and Type II. However, the directionality can not be asserted as part of this analysis. This study utilises many of the suggestions by authors such as Chaudhuri and Christofides (2007), Braithwaite (2008), Glynn (2013) and Thomas et al. (2016) to improve the format on the UCT, however, this analysis does demonstrate that additional work should be done to improve the analysis process and prevent unstable and susceptible estimates.

6.3. Social Desirability Scale

Randomized response methods such as the UCT was purposefully chosen for this study as one of the dominant techniques used to address issues such as Social Desirable Responding (Thomas et al., 2016). Participants benefited from the format of the survey as well as set up of the non-facilitator the cubicle system of the test to ensure that the experience of the questionnaire was truly indirect. With the aim of reducing negative effects of social desirability and bias within this study, participants were assured individual anonymity and confidentiality. Throughout the study, participants were encouraged to be truthful as the DCMs is an indirect survey-based estimation method.

The evidence of this study, however, was inconsistent with findings of other past comparison studies suggesting that social desirable response bias is minimised by the format of the UCT. While studies by Arentoft et al. (2016) and Gnambs and Kaspar (2015) indicate that the UCT format has shown to minimise this affect to some degree under self-administration conditions, the Hays five-item social desirability scale estimated that 35.6% of the sample across DCMs were more likely to give socially desirable responses to sensitive questions. For the purposes of this study, a conservative cut point, 4 socially desirable responses, was used to categorize participants as "concerned with social desirability." Over a third of the sample were thus likely to have answered the questionnaire in a socially desirable way. This analysis, however, can not be used to indicate the directionality of the bias.

An unexpected interpretation of the negative proportions calculations and results of the social desirability test may be that participants may have over-reporting the risky sexual behaviours within the questionnaire. This may be considered a novel way in which to interpret the results

of this study. The over-reporting within this study can be associated with impression management or over reporting of socially undesirable behaviours as a component of social desirability reporting and not initially considered for this paper. Alternatively, participants may have over reported on items which were not rated to be sensitive but related to the sensitive item. Hence, participants were more likely to confirm to gendered norms or dominant ideas .i.e. males will exaggerate risky sexual behaviours such as refusing to use a condom or even treatment of STIs.

The interpretation of the social desirability scale, in addition to the negative proportions calculated for the base rates, further demonstrates that low scoring participants who are not concerned with social desirability answered at least one question in a manner that was socially desirable. Although formats of survey methodology such as the UCT has gained popularity amoung researchers, the findings of this study indicate that participants will choose to portray themselves in a favourable or in a socially acceptable manner regardless of the assurance of confidentiality. Most significantly, participants have a natural tendency to continuously portray themselves as more humane (conformity to the gendered norm) than they actually are, thus further undermining research that aims to understand sensitive behaviours (Thomas et al., 2017).

6.4. Experience of Participation Scale

Finally, in an inquiry about the experience of participants, each item revealed significant differences amongst the UCT DCMs. As indicated in Appendix E, participants indicated a clear preference for UCT Type II. Additional analysis of these results showed several differences between the UCT methods. The results of the survey indicate a significant preference by participants for the UCT Type II for items such as “I am confident that my responses were anonymous” and “I am confident that my responses will be kept confidential” (Appendix F). These items focused primarly on understanding the way in which participants perceive the UCT DCMs as useful for the purpose highlighted such as anontmity and confidentailty. These results are reflective of literature by Dalton et al. (1994) and LaBrie et al. (2000) that indicates that the UCT format does provide participants with greater perceived protection in comparison to traditional SRQ formats. The results of this study thus explicitly demonstrated strength in using UCT Type II as it provides greater perceived protections in comparison to the UCT Type I.

As part of this scale, participants indicated positively for the UCT Type II for the item: “I was comfortable responding to the questions in this format” and is an encouraging indication for the use of non-sensitive but related items and the physical ease of using the test. However the item “I felt uncomfortable answering the questions in this way,” in particular, make reference to the set up of the room and location of the test (Appendix F). These items in reference to the usability of the questionnaire might have cancelled out the percieved benefits related to the UCT DCMs format if participants did perceive the set up of the non-facilitator cubicle system as detrimental. This should, therefore, be interpreted with caution. Notably within this settings, participants may have been alternatively battling test fatigue due to the test length.

Furthermore, participants indicated a preference for the UCT Type II for items “I trusted this process and felt my responses were protected,” and “I was able, to tell the truth, and not worry about it being identified with me” (Appendix F). These items do have some aspects linked to social desirbility as participants may consider if the DCMs allow for easy identification and if so, is the impression faviourable or truthful. Simply, these items questionned if participants believed they could be identified from their responses. Items such as these should be interpreted in relation to the first two items as participants did, to some degree, feel that the UCT type II was anonymous and confidential. This is further resonanted as participants indicated a preference for the UCT type II for the item “I was comfortable enough, to tell the truth” thus further demonstrating the perceived protection and possiblity that were more likely to be truthful.

These results should, however, be interpreted with caution as participants also indicated significance preference for the UCT Type II for items “I felt uncomfortable disclosing sensitive information about myself” and “I felt uncomfortable answering the questions in this way” (Appendix F). Interpretation of these results demonstrated inconsistencies regarding UCT DCMs participant were comfortable and at ease to answer, particularly for an item such as “I felt uncomfortable disclosing sensitive information about myself.” It is apparently from this item that questions pertaining to issues regarding sensitive sexual risk undoubtedly still can lead to sign significant biases, despite all efforts to promote confidentiality.

Finally, and most notably, there was no significant difference between UCT type I and UCT type II for item 6, “There is no way that my responses could be linked to me as a person” (sig

=.142> α=0.05). It is possible that due to the format of the test, some participants detected the nature of the UCT approach leading participants to be guarded and somewhat defensive in their responses. As a result, participants may have chosen to be dishonest in their responses further resulting in many of the negative or inaccurate results by each of the UCT DCMs.

CHAPTER 7: Limitations of the research

Within this study, several factors limit the conclusions which may be deduced. The UCT type II did not perform an expected. LaBrie and Earleywine (2000) and Chaudhuri and Christofides (2006) argued that when conducting the UCT, it was important to carefully consider the selection of distractor items as well as questionnaire format to avoid getting negative results. Within this study, the questionnaire format was simplified to a basic forced choice format lowering the cognitive demand on participants. Additionally, an intensive participant-driven approach was completed for item selection. However, many negative proportions were still found. Consideration should, therefore, be given to alternative shortfalls of the UCT.

Additionally, while it was beneficial to focuses on the comparison of the UCT DCMs by use of a within-subjects repeated measures comparative study, this may have resulted in the more significant error rate thus decreasing reliability and validity. Participants were asked to complete both the UCT Type I and the UCT Type II hence, to a certain extent, participants were aware of the methodical behind the technique which may have further created mistrust of the UCTs. As a result, participants may have chosen to misreport their behaviour which further ensured the study would be completed in a shortened amount of time. While it is advantageous to test the experience of participation by allowing participants to complete both the UCT DCMs, it has been detrimental to the proportion calculation as well as the social desirability testing. The traditional use of between-subject comparisons will be of greater use to the individual who is particularly interested in testing social desirability measures rather than merely rating participants experiences of each method.

Alternatively, consideration for future studies would be to consider DCMs testing over several stages over 2 years. First, test social desirability and completes one UCT method. At a second interval, test the sample again by completing the second UCT method and then asks a subsample of this study to complete experience of participation. The participant who takes part in the experience of participation sub-study will be instructed on how the UCT DCMs both work and should clarify any difference between them. Participants would then be asked to rate the methods understanding and having complete the DCMs themselves. Finally, as all the UCT Type II data has been gathered among university student, standards and norms for sexual behaviours may not be generalizable to all population.

CHAPTER 8: Conclusion

The present study is linked with and builds on previous research work, by approaching the research questions through the application of suggested modification to the UCT from various authors. While there is a significant difference in the participants' disclosure of sensitive items between the UCT Type I and the UCT Type II, the study found mixed results for items which could be analysed. The Unmatched Count Technique Type II did produce higher base rates than the Unmatched Count Technique Type I on several the sensitive questions. However, both UCT DCMs produced negative numbers. Although it was hoped that the UCT Type II would to elicit higher base rate estimates due to the modification, within this study, the UCT type II produced varying results.

Within the present study, the social desirability test indicated that participants would choose to portray themselves in a favourable, or in a socially acceptable manner, regardless of the assurance of confidentiality. The UCT results do not allow explicit difference to be indicated between the UCT Type I and the UCT Type II. Nevertheless, the discrepancies do exist throughout the study further indicating participants were more likely to confirm to gendered norms or dominant ideas.

Finally, the experience of participation very clearly demonstrates the UCT Type II for several factors including assurance of anonymity and confidentiality, while also demonstrating that participants were somewhat uncomfortable with using this method. Significantly, participants agreed that their responses could not be linked to them as individuals for both UCT DCMs further demonstrating some of the protective factors the UCT is known for. The findings from this research emphasized the growing knowledge regarding the appropriate use and versatile of emerging DCMs. Despite the shortcomings of these modifications, this process clearly demonstrates the need for more research in this area to explore ways in which the UCT can be adapted to collect accurate data on sensitive behaviour.

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APPENDICES

Appendix A: CFC Referral Confirmation

14 March 2013

To whom it may concern

This letter serves to provide the assurance that should any interviewee require psychological assistance as a result of any distress arising from the approved research process conducted by students in the Discipline of Psychology, School of Applied Human Sciences, Pietermaritzburg campus; it will be provided by psychologists and intern psychologists at the UKZN Child and Family Centre.

Yours sincerely

Professor D.R. Wassenaar

Academic Leader

Discipline of Psychology

School of Applied Human Sciences

Appendix B: Informed Consent Forms

Information and Consent for participation in the study: A comparative study of data collection methods on disclosure rates of sensitive behaviours

Who we are and what we are doing.

Hello, you have been invited to take part in a study to investigate the effect of different data collection methods on the rates of disclosure of sensitive behaviours amongst university students.

This study is designed to improve existing research knowledge on these issues as well as intervention and prevention programmes to address them. You will be asked to completing a series of data collection methods in addition to rating your experience of the different methods. This information can be used to help inform researchers on the best data collection method for finding out about people's involvement in sensitive behaviours that may put them at risk and may also then help inform the designing of prevention programmes.

Invitation to participate

We invite you to complete a series of questionnaires, comparing 4 different data collection methods. If you agree to participate, you will be assigned to a computer based questionnaire and asked a series of questions that concern matters related to alcohol, condom use, and sex.

There are no direct benefits for your participation in this study, but as a token of our appreciation for your participation and your time, we will pay you R20.00 for your participation. We will ask you to scan your fingerprint to ensure that each participant only does the study once. There will be no way to link the scan to your responses to questionnaires.

How your data will be used

The data collected from your participation will be entered into a database and analysed statistically. This will be used to understand which of the different survey methods works best for participants. The data will also be presented at conferences and be published. The data will also be written up as part of a series of Honours, Masters and Ph.D. dissertations by all the participating researchers.

Your questionnaire will be completely anonymous and confidential. We will ask you to complete a section on your demographics, like age and gender. None of your responses will be able to be linked to you personally.

It should take you 15 – 20 minutes or less to complete the questionnaires.

How you are protected.

Informed consent sheets will be kept separate from all data and will act a form of receipt. It will not be possible to identify personal details of any participant, so your participation and your responses will be entirely protected and confidential. This data will be shredded after entry into the database and stored electronically for 5 years, after which it will be destroyed. It will not be possible to connect your signed declaration of consent with the data.

Should you decide to participate, you may withdraw at any time without any consequence.

In the unlikely event that participation causes you any personal discomfort or distress, you may contact any of the researchers (listed below) for a referral to the counseling service of your College or to our School's Child and Family Centre. All these contact details are provided below.

If you have complaints or concerns about the study, you may contact the supervisor of the research, Vernon Solomon, (Solomon@ukzn.ac.za), supervisor of Mr. Solomon's Ph.D., Prof. Kevin Durrheim (durrheim@ukzn.ac.za).

You may also contact the Chairperson of the UKZN Humanities and Social Science Research Ethics Committee through the secretary Ms. P. Ximba (ximbap@ukzn.ac.za), 031 260 3587.

Thank you for your willingness to consider this and for your participation.

Researchers and Contact Details for concerns and questions

Research office: Ms. P. Ximba 031 260 3587

Course	Name	Email	Cell:
Masters:	Lauren Fynn	lsfynn@gmail.com	0731309693

PhD:	Vernon Solomon	Solomon@ukzn.ac.za	033 2605680
PhD supervisor	Kevin Durrheim	Durrheim@ukzn.ac.za	

Declaration of Consent

I …… (full names) hereby confirm that I understand the contents of this document and the nature of the research project, and I consent to participate in the research project.

I understand that I am liberty to withdraw from the project at any time, should I so desire.

Signature of Participant ……Date……..

Appendix C: Items and Questionnaire Format

Sensitive questions

1. I am HIV positive
2. I have been treated for a sexually transmitted infection (e.g., syphilis, gonorrhoea, genital herpes, genital ulcer, idrop)
3. I have refused to use a condom.
4. I have had unprotected sex whilst knowing I am HIV positive and/or have a sexually transmitted infection.
5. I regret having had sex
6. I have had sexual intercourse without a condom being used whilst I was under the influence of alcohol

Non-sensitive and non-related

1. I use the internet from my cell phone.
2. I went to a private high school.
3. I am on Facebook.
4. I can speak more than 2 languages reasonably well.
5. I can type reasonably well.
6. I don't normally eat breakfast.
7. I drink coffee.
8. I drink tea.
9. I have an internet connection at home.
10. I know what a "conversion" is in rugby.
11. I have been to Durban.
12. I subscribe to electronic newsletters.
13. I live with my family.
14. I know the name of the premier of KwaZulu-Natal.
15. I have watched the movie "Tsotsi."
16. I take vitamins almost everyday.
17. I often watch television late at night. I watch the news on TV at least 3 times a week.
18. I use the internet almost every week.
19. I own a laptop computer

20. I own at least one cell phone.
21. Reading is a hobby for me.
22. I don’t drive when I have been drinking.
23. I have had the usual childhood illnesses.
24. I have allergies.
25. I am at risk for HIV.
26. I am careful with my diet.

Non-sensitive but related

1. Have often drunk alcohol
2. Sometimes drink alcohol socially
3. Drink alcohol in moderation
4. Have been slightly drunk
5. Have felt peer pressure to drink alcohol
6. Have engaged in light petting (kissing, fondling)
7. Know where to get condoms for free
8. Think sex is ok in a committed relationship
9. Am careful about risky sex
10. Have used a condom the last time I had sex
11. Always use condoms when having sex
12. Have drunk alcohol
13. Have had diagnostic tests done in the last year
14. Know about the 'morning after" pill
15. Have been tested for HIV
16. Know my HIV status
17. Can drive quite well after two drinks
18. I have gone to a local clinic when sick.
19. I have gone to the chemist when sick.
20. I have gone to the doctor when sick.
21. I have seen a doctor in the last year.
22. I have seen any kind of health practitioner in the last year
23. I have taken antibiotics in the last year.
24. I know where to get the contraceptive pill.
25. I sometimes drink alcohol socially.

Appendix D: Questionnaire format

Appendix d1: Experience of participation questionnaire

First: Please complete the section on demographics:

Please cross applicable

Age (please write):_____ Gender: Male □ Female □

Year of study at university: 1st □ 2nd □ 3rd □ 4th □

What population group/race would you describe yourself as?

Black □ Coloured □ Indian □ White □ Other □

Where is your place of residence whilst at university?

University Residence Digs (accommodation off campus with friends)

Live on my own Live at home with family/relatives

Other: _____

How are your studies being paid for? (tick more than one if applicable)

Self-funded (savings/working) Loan

Parents/relatives Financial Aid

Bursary/scholarship Other: _____

Thinking about your experience of responding to the items in this survey, please rate your experience using the scale below. Place each DCM in the order of your personal preference.

	1.	2.	3.	4.
1. I am confident that my responses were anonymous				
2. I am confident that my responses will be kept confidential				
3. I was comfortable responding to the questions in this format				
4. I felt uncomfortable answering the questions in this way				
5. I trusted this process and felt my responses were protected				
6. There is no way that my responses could be linked to me as a person				
7. I felt uncomfortable disclosing sensitive information about myself				
8. I was comfortable enough, to tell the truth				
9. I was able, to tell the truth, and not worry about it being identified with me				

Appendix d2: Social desirability scale

Finally, please rate the following statements about yourself in terms of how much each is true of you.

		1. Definitely true	2, Mostly true	3. Don't know	4. Mostly false	5. Definitely false
1	I am always polite, even to people who are unpleasant					

2	There have been occasions when I took advantage of someone					
3	I sometimes try to get even with people rather than to forgive and forget					
4	I sometimes feel resentful when I don't get my way					
5	No matter whom I'm talking to, I'm always a good listener					

Appendix d3: Unmatched Count Technique questionnaire

The sensitive items were placed in Sets 1 and 2 of Form A and B respectively. Participants will be randomly placed to respond to either Form A, B, C or D. Form C and D were reordered Form A and B respectively. The innocuous unrelated items, as well as the particular sensitive item (from a domain of sensitivity), was randomly determined after the norming study has taken place.

FORM A	FORM B
Set 1:	Set 1:
Innocuous unrelated item	Innocuous unrelated item
Innocuous unrelated item	Innocuous unrelated item
Innocuous unrelated item	Innocuous unrelated item
Innocuous unrelated item	Sensitive item
Innocuous unrelated item	Innocuous unrelated item
Set 2:	Innocuous unrelated item
Innocuous unrelated item	Set 2:
Innocuous unrelated item	Innocuous unrelated item

Innocuous unrelated item	Innocuous unrelated item
Sensitive item	Innocuous unrelated item
Innocuous unrelated item	Innocuous unrelated item
Innocuous unrelated item	Innocuous unrelated item

UNMATCH COUNTTECHNIQUE TYPE I

Please note, non-sensitive but related items all repeat at least twice.

Form A	
Set 1	*Set 2*
I use the internet from my cell phone.	I am careful with my diet.
I went to a private high school.	I have allergies.
I am on Facebook.	Reading is a hobby for me
I can speak more than 2 languages reasonably well.	I have watched the movie "Tsotsi."
I can type reasonably well.	I take vitamins almost everyday.
	I am HIV positive
Form B	
Set 1	*Set 2*
I don't normally eat breakfast.	I use the internet from my cell phone.
I drink coffee.	I went to a private high school.
I drink tea.	I own at least one cell phone.
I have an internet connection at home.	I often watch television late at night. I watch the news on TV at least 3 times a week.
I know what a "conversion" is in rugby.	I have been to Durban.
I have been treated for a sexually transmitted infection (e.g., syphilis,	

gonorrhoea, genital herpes, genital ulcer, idrop)	
Form C	
Set 1	*Set 2*
I have been to Durban.	I don't normally eat breakfast.
I subscribe to electronic newsletters.	I drink coffee.
I live with my family.	I own a laptop computer
I know the name of the premier of KwaZulu-Natal.2	I take vitamins almost everyday.
I have watched the movie "Tsotsi."	I have an internet connection at home.
	I have refused to use a condom.
Form D	
Set 1	*Set 2*
I take vitamins almost everyday.	I can type reasonably well.
I often watch television late at night. I watch the news on TV at least 3 times a week.	I have had the usual childhood illnesses.
I use the internet almost every week.	I know the name of the premier of KwaZulu-Natal.
I own a laptop computer	I have been to Durban.
I own at least one cell phone.	I know what a "conversion" is in rugby
I have had unprotected sex whilst knowing I am HIV positive and/or have a sexually transmitted infection.	
Form E	
Set 1	*Set 2*
Reading is a hobby for me.	I am on Facebook.
I don't drive when I have been drinking.	I can speak more than 2 languages reasonably well.
I have had the usual childhood illnesses.	I drink tea.

I have allergies.	I own a laptop computer
I am careful with my diet	I often watch television late at night. I watch the news on TV at least 3 times a week.
I regret having had sex	

Form F	
Set 1	*Set 2*
I use the internet from my cell phone.	I don't drive when I have been drinking.
I went to a private high school	I use the internet almost every week.
I am on Facebook.	Reading is a hobby for me
I can speak more than 2 languages reasonably well.	I live with my family.
I can type reasonably well.	I subscribe to electronic newsletters.
	I have had sexual intercourse without a condom being used whilst I was under the influence of alcohol

UNMATCH COUNTTECHNIQUE TYPE II

Please note, non-sensitive but related items all repeat at least twice.

Form A	
Set 1	*Set 2*
	Have had unprotected sex while knowing I am HIV positive and/or have a sexually transmitted infection
Think sex is ok in a committed relationship	Have had diagnostic tests done in the last year
Have been slightly drunk	Have gone to a local clinic when sick
Take vitamins almost everyday	Have gone to the chemist when sick
Can drive quite well after two drinks	Have seen a doctor in the last year
Have taken antibiotics in the last year	Know where to get condoms for free

Form B	
Set 1	*Set 2*
Have had sexual intercourse without a condom being used while under the influence of alcohol	
Can drive quite well after two drinks	Always use condoms when having sex
Have been slightly drunk	Have had diagnostic tests done in the last year
Know where to get condoms for free	Have engaged in light petting (kissing, fondling)
Have been tested for HIV	Take vitamins almost everyday
Have often drunk alcohol	Know my HIV status
Form C	
Set 1	*Set 2*
	Have refused to use a condom
Have gone to a local clinic when sick	Think sex is ok in a committed relationship
Know where to get condoms for free	Know my HIV status
Have used a condom the last time I had sex	Am careful about risky sex
Have been slightly drunk	Have often drunk alcohol
Can drive quite well after two drinks	Have seen a doctor in the last year
Form D	
Set 1	*Set 2*
Am HIV positive	
Know my HIV status	Have gone to the chemist when sick
Have seen any kind of health practitioner in the last year	Have engaged in light petting (kissing, fondling)
Am careful about risky sex	Know about the "morning after" pill
Take vitamins almost everyday	Have been tested for HIV
Always use condoms when having sex	Have gone to the doctor when sick
Form E	
Set 1	*Set 2*
	Regret having had sex

Have taken antibiotics in the last year	Have engaged in light petting (kissing, fondling)
Have had diagnostic tests done in the last year	Think sex is ok in a committed relationship
Have seen a doctor in the last year	Have used a condom the last time I had sex
Have gone to the chemist when sick	Have seen any kind of health practitioner in the last year
Have gone to the doctor when sick	Know about the "morning after" pill
Form F	
Set 1	*Set 2*
Have been treated for a sexually transmitted infection (e.g., syphilis, gonorrhoea, herpes, genital ulcer, idrop)	
Have gone to the doctor when sick	Have used a condom the last time I had sex
Have seen any kind of health practitioner in the last year	Have gone to a local clinic when sick
Have taken antibiotics in the last year	Always use condoms when having sex
Have been tested for HIV	Have often drunk alcohol
Am careful about risky sex	Know about the "morning after" pill

Appendix E: Ethics Approval

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

23 May 2014

Miss Lauren Stella Fynn
School of Applied Human Sciences
College of Humanities
Pietermaritzburg Campus
UKZN
Email: 208522355@stu.ukzn.ac.za

Dear Miss Fynn

RE: PERMISSION TO CONDUCT RESEARCH

Gatekeeper's permission is hereby granted for you to conduct research at the University of KwaZulu-Natal (UKZN) towards your postgraduate studies, provided Ethical clearance has been obtained. We note the title of your research project is:

"A within-subjects repeated measures comparative study of the effect of two data collection methods on disclosure rates of sensitive behaviours in a tertiary student sample".

It is noted that you will be constituting your sample by randomly handing out questionnaires to students, in order to collect data, on the Pietermaritzburg campus.

Data collected must be treated with due confidentiality and anonymity.

Yours sincerely

MR MC BALOYI
REGISTRAR

UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI

17 March 2015

Ms Lauren Stella Fynn 208522355
School of Applied Human Sciences - Psychology
Pietermaritzburg Campus

Dear Ms Fynn

Protocol reference number : HSS/1135/014M
Project title: A within-subjects repeated measures comparative study of the effect of two data collection methods on disclosure rates of sensitive behaviors in a tertiary student sample.

Provisional Approval – Full Committee Reviewed Protocol

This letter serves to notify you that your application received on 10 September 2014 in connection with the above, was reviewed by the Humanities and Social Sciences Research Ethics Committee on DATE. The protocol has been provisionally approved, subject to the following conditions set out below being addressed:

1. General

1.1 **On p.5 the PI indicates that the study will commence and be concluded in 2014. Did this in fact happen? If not, Please amend timelines accordingly.**

PLEASE NOTE: Each student involved in this study must submit their own ethical clearance application which will then be linked to this study.

This approval is granted provisionally and the final clearance for this project will be given once the above mentioned condition has been met. Note that data collection may not proceed until final ethics approval letter has been issued after the remaining conditions have been met and approved by the research ethics committee.

Kindly submit your response to Dr Shenuka Singh (Chair) % Research Office, Westville Campus as soon as possible

Yours faithfully

Dr Shenuka Singh (Chair)

Humanities & Social Sciences Research Ethics Committee
Dr Shenuka Singh (Chair)
Westville Campus, Govan Mbeki Building
Postal Address: Private Bag X54001, Durban 4000
Telephone: 27 (0) 31 260 3587/8350/4557 Facsimile: 27 (0) 31 260 4609 Email: singhsh@ukzn.ac.za / xmitmm@ukzn.ac.za / mvuma@ukzn.ac.za
Website: www.ukzn.ac.za

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Please note, Ethical Approval was only given on the 15 March 2015. For this reason, the dates and deadlines in the initial submission were later amended, and full approval was given. (Email communication from Shenuka Singh, 23 Mar 15).

Appendix F: Experience of Participation Results

Of the sample to complete the UCT DCMs:	Preference 1	Preference 2
1. I am confident that my responses were anonymous	UCT Type II –51 %	UCT Type I- 49%
2. I am confident that my responses will be kept confidential	UCT Type II –51%	UCT Type I- 49%
3. I was comfortable responding to the questions in this format	UCT Type II –51%	UCT Type I- 49%
4. I felt uncomfortable answering the questions in this way	UCT Type II –54%	UCT Type I- 46%
5. I trusted this process and felt my responses were protected	UCT Type II – 53%	UCT Type I- 47%
6. There is no way that my responses could be linked to me as a person	UCT Type II – 52%	UCT Type I- 48%
7. I felt uncomfortable disclosing sensitive information about myself	UCT Type II – 55%	UCT Type I- 45%
8. I was comfortable enough, to tell the truth	UCT Type II –55%	UCT Type I- 45%
9. I was able, to tell the truth, and not worry about it being identified with me	UCT Type II –51%	UCT Type I- 49%