

The Pennsylvania State University

The Graduate School

College of Nursing

**FACTORS INVOLVED IN HIV PREVENTION IN OLDER ONLINE DATERS:
A FEASIBILITY STUDY**

A Dissertation in

Nursing

by

Rachel Kathryn Wion

© 2018 Rachel Kathryn Wion

Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

May 2018

The dissertation of Rachel Kathryn Wion was reviewed and approved* by the following:

Susan J. Loeb
Associate Professor of Nursing
Dissertation Advisor
Chair of Committee

Donna M. Fick
Elouise Ross Eberly Professor of Nursing

Jacqueline Mogle
Assistant Professor of Nursing

Patricia B. Koch
Professor Emeritus of Biobehavioral Health

Judith Hupcey
Professor of Nursing
Associate Dean for Graduate Education and Research

ABSTRACT

Background: By 2020, 70% of all people living with human immunodeficiency virus (HIV) in the United States will be age 50 and older. Part of this growing proportion is attributed to contracting the disease later in life. Older adults continue to date and have sex well into their 80s. Online dating has gained popularity with adults age 50 and older as a means for finding potential romantic partners. There is a gap in the science related to what older adults who date online know about HIV prevention as well as the factors that might put them at risk for contracting the disease.

Purpose: This study explored the feasibility of conducting online research regarding HIV prevention factors (i.e., risk perception, sexual risk behaviors, and self-efficacy to take action to prevent HIV) in older adult online daters. Also, this research sought to modify and test instruments related to HIV prevention factors in an older adult population.

Methods: A cross-sectional, descriptive correlational design was employed. Adults age 50 and older who had used online dating sites within the past year were recruited online to complete a survey. The study instrument included HIV prevention scale items that had undergone two rounds of expert panel review. Based on the expert panel review, the HIV prevention scale items overall were comprised of (a) original items, (b) modified items, and (c) new items from both the Condom Use Self-Efficacy Scale and Sexual Risks Scale. The data were analyzed using descriptive and correlational statistics. The 31 items from the HIV prevention scale underwent exploratory factor analysis and confirmatory factor analysis (CFA) to determine factor structure and model fit.

Results: A total of $N = 280$ older adults participated in the study. SurveyMonkey Audience and Facebook were the best recruitment sites in terms of numbers of participants recruited.

Participants were not able to be recruited from online dating sites. Most of the participants (72.8%) desired a relationship that included sex and 64.6% ($n = 181$) had at least one sexual relationship in the past year. Of the sexually active participants, only 29% used a condom with every sexual encounter, 45% never used a condom, and 26% had inconsistent condom use. Participants' risky sexual behavior and low perceived susceptibility to HIV were incongruous with their agreement that they would take precautions to reduce their risk of contracting HIV. Higher self-efficacy had moderate to strong associations with the intention to take action to reduce the risk of HIV. In CFA, the HIV prevention items loaded on eight different factors in three different models. The factors for Model 1 (Mechanics, Advocacy, Intoxicants), Model 2 (Attitudes, Normative Beliefs, Perceived Susceptibility), and Model 3 (Intention, Expectations) had adequate to excellent model fit.

Conclusions: This study was the first to examine HIV prevention factors in older online daters as well as attempt to adapt instruments that measure HIV prevention factors in older adults. Older adults are dating online and have risky behaviors related to sex. Conducting an online survey examining HIV prevention factors in older online daters was both feasible and acceptable. The finding of participants with high levels of sexual risk behavior but low levels of condom use and low HIV risk perception suggests the critical need to target older online daters for HIV prevention interventions. The HIV prevention items were found to be appropriate for an older adult population.

TABLE OF CONTENTS

List of Tables	viii
List of Figures	ix
Acknowledgements.....	x
Chapter 1. Introduction	1
Statement of Problem	3
Stigma	4
Underestimation of Patient Risk by Healthcare Providers	4
Misdiagnosis or Late Diagnosis.....	5
Physiological Changes in the Reproductive System Related to Aging	5
Purpose of the Study.....	6
Research Questions	6
Potential Challenges to Research Questions.....	7
Conceptual Framework	8
Major Concepts.....	9
Minor Concepts.....	11
Definition of Key Terms	11
Human Immunodeficiency Virus.....	11
HIV Knowledge.....	12
HIV Risk Perception.....	12
HIV Risk Behaviors.....	12
Self-Efficacy	12
Older Adults.....	13
Assumptions	13
Significance	13
Summary.....	14
Chapter 2. Review of Literature.....	16
Older Adult Sexuality.....	16
Dating.....	17
Online Dating.....	18
Sexual Behavior.....	20
Sexual Difficulties	21
HIV Knowledge, Risk Perception, and Risky Sexual Behaviors in Older Adults	22
HIV Knowledge.....	23
HIV Risk Perception.....	24
HIV Risk Behaviors.....	26
Self-Efficacy in HIV Prevention in Older Adults	27
HIV Prevention Interventions.....	28
Empiric Studies.....	28
Prevention Program	33
Potential Conceptual Frameworks.....	34
Theory of Reasoned Action	34
Theory of Planned Behavior	36

Information-Motivation-Behavioral Skills Model.....	37
HMB as the Guiding Framework	38
Summary.....	40
Chapter 3. Methods.....	42
Research Design	42
Setting.....	43
Original Plan	43
Revised Plan	45
Online dating sites and applications	45
Facebook, Twitter, Craigslist, and Pennsylvania State University StudyFinder ...	45
SurveyMonkey Audience.....	47
Sample	47
Incentives	48
Measures.....	49
Screening Questions	49
Condom Use Self-Efficacy Scale	50
Sexual Risks Scale.....	52
Other Questions	55
Instrument Changes	55
Pretesting	55
Expert panel review	56
Data Collection.....	59
Data Analysis.....	61
Statistical Analysis.....	61
Factor Analysis	62
Summary.....	63
Chapter 4. Results	65
Sample Description	65
Correlational Analysis of HIV Prevention Scale Items.....	73
Exploratory Factor Analysis.....	77
Confirmatory Factor Analysis	80
Model 1	82
Model 2	85
Model 3	87
Results Related to Research Questions	89
Research Question 1	89
Research question 1a.....	91
Research question 1b	91
Research question 1c.....	92
Research question 1d	93
Research Question 2	94
Research question 2a.....	94
Research question 2b	95
Research Question 3	96

Research Question 4	99
Research question 4a.....	100
Chapter 5. Discussion	102
Feasibility of Conducting HIV Prevention Research Aimed at Older Online Daters	102
Modification of Existing HIV Prevention and Sexual Risks Instruments.....	104
HIV Risk Behavior and Prevention Measures.....	110
Strengths and Limitations of the Study	112
Study Implications and Future Research.....	115
Conclusion.....	118
References.....	119
Appendix A: Condom Use Self-Efficacy Scale.....	138
Appendix B: Sexual Risks Scale.....	140
Appendix C: Institutional Review Board Approval Letter	143
Appendix D: Recruitment Materials for Study.....	146
Appendix E: SurveyMonkey Audience and REDCap Informed Consents	148

LIST OF TABLES

Table 2.1.	HIV Prevention Intervention Characteristics by Study	29
Table 3.1.	Comparison of Internal Consistency of Subscales of Studies Using the SRS.....	54
Table 3.2.	SRS, CUSES, and New Items Pre- and Post- Expert Panel Review	57
Table 4.1.	Demographic Characteristics of the Study Sample	65
Table 4.2.	Health Difficulties and Dating Characteristics of the Study Sample.....	68
Table 4.3.	HIV Prevention Scale Item Descriptive Statistics	70
Table 4.4.	Correlation Table for HIV Prevention Scale Items 14 – 29	74
Table 4.5.	Correlations for HIV Prevention Scale Items 21 – 28.....	75
Table 4.6.	Total Variance of the HIV Prevention Scale Factors Explained	77
Table 4.7.	Rotated Factor Matrix of the Eight Factors Extracted from the HIV Prevention Scale Items	79
Table 4.8.	Costs Related to Recruitment Sites and Number of Participants Recruited	92
Table 4.9.	Number of Times Each HIV Prevention Scale Item was Skipped	93
Table 4.10.	Internal Consistency of the HIV Prevention Scale Items by Subscale	95
Table 4.11.	Descriptive Statistics for Sexually Activity Comparison	97
Table 4.12.	Selected HIV Prevention Scale Item Description for the Sexually Active Participants.....	98

LIST OF FIGURES

Figure 1.1	Health Belief Model	8
Figure 4.1.	Scree Plot of the Factors for the HIV Prevention Scale Items	79
Figure 4.2.	Factors and Factor Loadings for Model 1	83
Figure 4.3.	Factors and Factor Loadings for Model 2	86
Figure 4.4.	Factors and Factor Loadings for Model 3	88

ACKNOWLEDGEMENTS

I would like to acknowledge the tremendous amount of support and guidance that I have received over the years while working on my research. The Penn State College of Nursing provided an environment that enabled me to achieve my goals. I would like to thank my professors at Penn State for imparting their wisdom and advice regarding my education and research. I also am very appreciative of Dr. Leah Buck and Dr. Nikki Hill for giving me an opportunity to learn about research through both hands-on experience with their studies as well as dissemination of findings. I have learned a lot about becoming a nurse scientist from both of them.

I am grateful to my dissertation committee members for their support, belief in, and dedication to helping me achieve my research goals. They read through several drafts of what would eventually become my dissertation and provided excellent feedback and guidance. I would like to thank my advisor and committee chair, Dr. Susan Loeb for all of her support over the years. Dr. Loeb has been an excellent advisor and her dedication to my success as a student and future nurse scientist has been instrumental in helping me to achieve my goals in my graduate program. There are not enough words to thank her for this. I would also like to thank Dr. Jacquie Mogle, my committee member, for all of her help with the research methods in my dissertation work. She was very generous with both her expertise and her time and I could not have done this without her. I would like to thank my committee member Dr. Donna Fick for being a champion of my research and for providing me with excellent advice in moving my study forward. Finally, I would like to thank my committee member Dr. Patricia Koch for providing her expertise on my research topic.

I am especially appreciate of the financial support that I have received throughout the years for tuition, research, and conference travel. Thank you to the Jonas Center for Nursing Excellence, the Penn State Center for Geriatric Nursing Excellence, the Penn State College of Nursing Center for Nursing Research, and the Penn State College of Health and Human Development for your financial support.

Finally, I would like to my family. Thank you to my late grandpa Leo Herzog who helped to instill in me a love of knowledge. Thank you to both my mom and my sister for your guidance and unwavering support throughout this whole process. It is next to impossible to survive graduate school without the help of those closest to you and you made it so much better. Thank you to both of my nephews, Ethan and Leo, for just being you and giving me something to smile about at the end of a long day. To my dad: I hope I have made you proud and I wish you were here to share in my achievements. I miss you every day.

Chapter 1

Introduction

Almost 40% of all acquired immunodeficiency syndrome (AIDS) related deaths in the United States (US) are in people aged 50 and older and in 2014, 45% of all persons living with human immunodeficiency virus (HIV) are in this age group (Centers for Disease Control and Prevention [CDC], 2017a). By 2020 it is estimated that 70% of all people living with HIV will be aged 50 and older (Diverse Elders Coalition, 2014). The CDC originally labeled the statistical data pertaining to “aging” with HIV as being aged 50 and older (Linsk, 2000). Researchers continue to use age 50 as the lower limit age criterion when conducting HIV focused studies on older adults. In 2015, it was estimated that there were over 39,000 new diagnoses of HIV in the US; of these, older adults accounted for approximately 17% (CDC, 2017a). In addition to the cost of human lives is the financial cost of HIV/AIDS. Lifetime treatment costs in those infected with HIV are estimated to be \$379,668 in 2010 dollars (CDC, 2017b).

There are myriad causes behind the growing numbers of older people living with HIV (OPLWH). People are living longer with HIV due to effective highly active antiretroviral therapy (Chambers et al., 2014; High et al., 2012; Samji et al., 2013; Zapata & Shaw, 2014), which has shifted HIV from an acute “death sentence” to a chronic disease. Many are also contracting the disease later in life (High et al., 2012; Sankar, Nevedal, Neufeld, Berry, & Luborsky, 2011). The American College of Physicians identified older adults as one of the two populations (the other is adolescents) that are least aware of sexual behaviors that put them at risk for contracting HIV (Qaseem, Snow, Shekelle, Hopkins, & Owens, 2009).

There are many factors that put older adults at a high risk for contracting HIV. Adults continue to date (Brown & Shinohara, 2013; Carr, 2004; Dickson, Hughes, & Walker, 2005) and

remain sexually active well past the age of 50 (Galinsky, 2012; Lindau et al., 2007; Lindau & Gavrilova, 2010). Many older adults find themselves newly single after decades in a monogamous relationship (Grant & Ragsdale, 2008). No longer having to worry about pregnancy prevention, they may not consider the need for condom use. There are also physiological changes in both older men and older women that make them more susceptible to contracting HIV (e.g., inability to maintain an erection and thinning of the vaginal walls, respectively; CDC, 2017a). Also, the dating pool for older adults is smaller compared to their younger counterparts. Given the increasing number of OPLWH, uninfected older adults have an increased likelihood of being exposed to the virus during intimate dating relationships.

While HIV in older adults is highly problematic, it is however a very preventable disease. Unfortunately HIV prevention efforts have not been a priority in the care of this age group. Few older adults are receiving relevant patient teaching due to erroneous beliefs by health care providers that older adults are not sexually active and/or do not engage in risky sexual behaviors (Adekeye, Heiman, Onyeabor, & Hyacinth, 2012; Milaszewski, Greto, Klochkov, & Fuller-Thomson, 2012; Sankar et al., 2011). This phenomenon is supported in Lindau et al.'s (2007) examination of sexuality in a national sample of adults aged 57-85 ($N = 3005$). Findings indicated that only 38% of older men and 22% of older women had a discussion about sex with their health care provider since turning 50. Ageism, stigma, underestimation of patient risk factors by healthcare providers, and lack of HIV prevention education for older adults when taken together are considerable barriers to prevention (American Academy of HIV Medicine, 2011; CDC, 2017a).

In 2012, The National Institutes of Health (NIH) commissioned a working group of experts in the care of HIV/AIDS to report on the current state of knowledge and critical needs

areas in HIV and aging (High et al., 2012). One priority research area identified was the need for more studies on the prevention of HIV in older adults (High et al., 2012). While some studies have examined HIV prevention factors in older adults (Foster, Clark, Holstad, & Burgess, 2012; Henderson et al., 2004; Hillman, 2008; Mack & Bland, 1999; Rose, 1995; Stall & Catania, 1994; Winningham et al., 2004); none have examined HIV prevention factors in the context of online dating with this population.

Online dating is gaining momentum with the older adult population as a credible venue for finding a relationship (Adams, Oye, & Parker, 2003; Alterovitz & Mendelsohn, 2009, 2013; Bateson, Weisberg, McCaffery, & Luscombe, 2012; Jonson & Silverskog, 2012; Malta, 2007; Malta & Farquharson, 2014; McIntosh, Locker, Briley, Ryan, and Scott, 2011; McWilliams & Barrett, 2014; VandeWeerd et al., 2014; VandeWeerd, Myers, Coulter, Yalcin, & Corvin, 2016; Wion & Loeb, 2015). According to a survey conducted by the Pew Research Center, 13% of adults aged 45 to 54 in the US have used online dating (Smith, 2016). In 2015, the number of adults aged 55 to 64 who used online dating sites doubled from 6% to 12% when compared to 2013 data (Smith, 2016). It is reasonable to expect the number of older adults who use online dating to grow as the Baby Boom generation ages. Many older adults use online dating to find someone for companionship; however, a sexually intimate relationship is important as well and is often part of the relationship (Alterovitz & Mendelsohn, 2013; Bateson et al., 2012; Malta & Farquharson, 2014).

Statement of the Problem

It is unknown what older adults who use online dating sites know about preventing HIV infection. More information is needed to learn about what older adults who use these sites know regarding safe sex as well as what they know about preventing transmission of HIV or how they

negotiate safe sexual practices with their partners. Contributing factors for risky sexual behavior are also unknown in this population. Another issue is sexual risk behavior and prevention instruments have mostly been tested in adolescent and young adult populations. It is unknown whether these instruments are appropriate for older participants.

Multiple barriers to prevention and detection of HIV in adults aged 50 and older have been identified. These include: stigma; underestimation of patient risk by healthcare providers; misdiagnosis or late diagnosis; shorter interval from HIV to AIDS; physiological changes in the reproductive system related to aging; sexual risk factors; and lack of HIV knowledge by older adults (Abrass et al., 2011). Sexual risk factors and lack of HIV knowledge will be extensively covered in Chapter 2.

Stigma

The stigma associated with being diagnosed with HIV has been found to impede prevention efforts, decrease the number of people getting tested for HIV, and promote the spread of HIV infection (Pulerwitz, Michaelis, Weiss, Brown, & Mahendra, 2010). Older adults are especially vulnerable to the negative effects of stigma because they may already be isolated from society due to loss of family and friends or due to illness (CDC, 2017a). Stigma decreases quality of life and self-image (CDC, 2017a). Fear of stigma may lead to older adults not asking to be tested for HIV or hiding their risk factors for HIV from family or healthcare providers (Abrass et al., 2011).

Underestimation of Patient Risk by Healthcare Providers

As noted earlier, many healthcare providers underestimate their older adult patients' risk for contracting HIV (Abrass et al., 2011). Often older adults are not asked about their sexual health and HIV risk due to the perception that they are not at risk. Also, even though older adults

visit their primary care practitioners more frequently than a younger population, care providers are less likely to bring up the topic of sexual health (CDC, 2017a). In a study of primary care physicians' perceptions of their patients' risk factors for HIV, perceived HIV risk decreased with increasing patient age, married status, and female gender (Grant & Ragsdale, 2008).

Misdiagnosis or Late Diagnosis

When compared to younger Americans, older adults are more likely to be diagnosed with HIV at a later stage of the disease. The implications of a delayed diagnosis is a more damaged immune system, a delay to treatment, and a shorter interval from the time of HIV diagnosis to the time of AIDS diagnosis (CDC, 2017a). One factor that may contribute to this delay in treatment is misattribution of symptoms to other ailments such as the flu or normal aging (Lekas, Schrimshaw, & Siegel, 2005). A cohort study found that adults aged 50 and older were consistently diagnosed with HIV later than their younger counterparts and also had a higher mortality rate (Iwuji, Churchill, Gilleece, Weiss, & Fisher, 2013). A consequence of this is a shorter time from HIV diagnosis to AIDS diagnosis.

Physiological Changes in the Reproductive System Related to Aging

As indicated earlier, there are age-related physiological changes in both men and women that increase the risk for contracting HIV. Vaginal wall thinning and dryness in women may increase the risk of tearing during sexual intercourse which would make it easier to transmit HIV (CDC, 2017a). Older men may have problems maintaining an erection which can contribute to condom failure. Erectile dysfunction medications have made penetrative sexual intercourse possible for men who could not previously engage in anal or vaginal sex (CDC, 2017a).

Purpose of the Study

The purpose of this study was to determine the feasibility of conducting online research regarding HIV prevention factors in adults aged 50 and older who use online dating sites. HIV prevention factors included: HIV risk perception; sexual risk behavior(s) that increases the chance of contracting HIV; and self-efficacy to take action to reduce the risk of contracting HIV. The focus on self-efficacy was both in regard to older adults' confidence about condom use and their confidence in talking to a partner about safe sex. This study also aimed to modify and test instruments related to HIV prevention factors in a previously untested older adult population.

Research Questions

The research questions for the study were:

1. What is the feasibility and acceptability of conducting an online survey related to HIV prevention factors in adults aged 50 and older who use online dating websites or applications?
 1. a. What are the recruitment rates for older adults willing to participate in this type of survey?
 1. b. What sites are the most beneficial in terms of numbers of participants recruited versus cost of recruiting on the site?
 1. c. What is the degree of missing data per case using this population in an online survey?
 1. d. What are the barriers and facilitators to conducting this study?
2. What is the most effective and appropriate way to modify existing instruments related to HIV and sexual behavior for an older adult population?
 2. a. What is the factor structure of the modified scales?

2. b. What is the reliability and validity of the modified scales?
3. What risk behaviors do older adults engage in that might make them susceptible to contracting HIV?
4. What preventive measures are older adults engaging in to avoid acquiring the disease?
 4. a. What is the relationship between self-efficacy and preventive measures such as condom use and the discussion of safe sex?

Potential Challenges to Research Questions

For the research questions in this study there were potential challenges for completion. For the first research question a potential challenge was not being able to recruit participants to the study. One way to combat this would be to increase recruitment efforts at a website where survey takers receive compensation for filling out surveys. An example of this would be SurveyMonkey Audience.

A challenge to research question two was if there was not enough complete cases to conduct a factor analysis. Similar to aim one, increased recruitment from sites with compensated survey takers may be needed.

A potential challenge to the third research question was if none of the participants indicate risky sexual behaviors. This could be due to not wanting to be viewed in a negative light to the researcher. To help combat this, a disclaimer about how there is no way to link a person to the survey can be made. This can be placed in several different areas of the survey, including right before the questions regarding risky sexual behaviors. Similarly, research question four might have this challenge in that not wanting to be viewed in a negative light to the researcher and they might indicate that they use preventive measures when in fact they do not. This challenge could be addressed by using the disclaimer as well.

Conceptual Framework

The theoretical framework used to guide this study was the Health Belief Model (HBM; Figure 1.1). The HBM has been “one of the most widely used conceptual frameworks in health behavior research, both to explain change and maintenance of health-related behaviors and as a guiding framework for health behavior interventions” (Champion & Skinner, 2008, p. 45). The HBM consists of six major constructs: perceived susceptibility, perceived severity (seriousness), perceived benefits, perceived barriers, cues to action, and self-efficacy (Champion & Skinner, 2008).

Figure 1.1. Health Belief Model

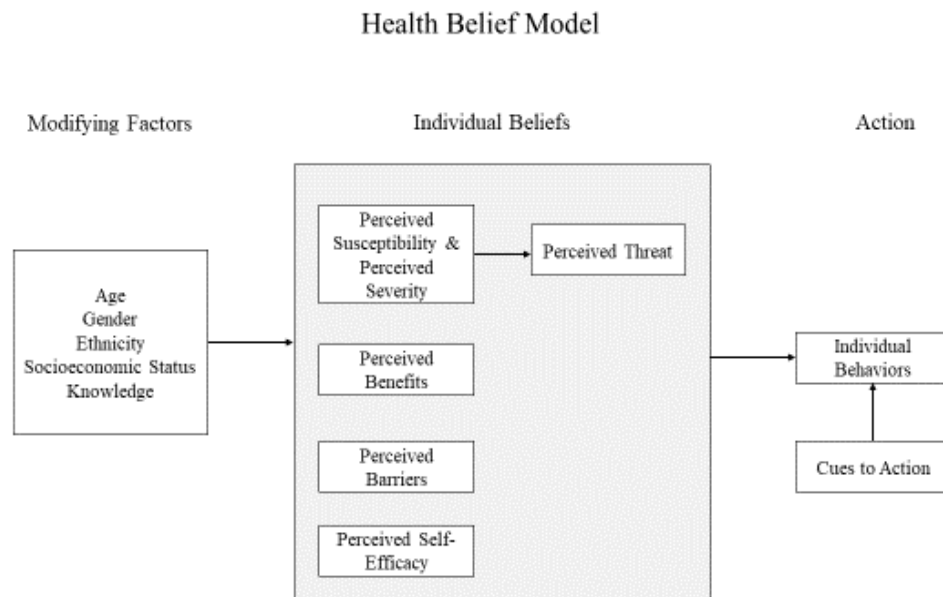


Figure 1.1. Theoretical components and linkages of Health Belief Model. Adapted from *Health Behavior and Health Education: Theory, Research, and Practice* “Health Belief Model” (p. 49), by V. L. Champion and C. S. Skinner. In K. Glanz, B. K. Rimer, and K. Viswanath (Eds.), 2008, San Francisco: Jossey-Boss. Copyright 2008 by John Wiley & Sons, Inc.

The HBM originated in the 1950s. While Godfrey M. Hochbaum, the lead researcher on the project, is often credited with originating the theory – he actually worked with fellow social psychologists on the HBM including S. Stephen Kegeles, Howard Leventhal, and Irwin M. Rosenstock (Rosenstock, 1974; Rosenstock & Hochbaum, 1961). The central question that led to the development of the HBM was “Why do people accept or reject opportunities to discover their health status?” (Hochbaum, 1958, p. iii).

Major Concepts

Perceived susceptibility is a person’s belief about how likely they are to contract a disease or condition (Champion & Skinner, 2008; Rosenstock, 1966; Rosenstock, 1974). This can be just a general health concern such as how likely someone thinks they will contract the flu while considering an influenza vaccine or it could be a person in a high risk group such as a person who has multiple sexual partners considering the use of a condom (Simons-Morton, McLeroy, & Wendel, 2012). An important point for this construct is that it is concerned with perceived susceptibility and not actual susceptibility (Simons-Morton et al., 2012). This distinction is important because if a person who engages in risky sexual behaviors does not perceive that their behavior could increase their risk of or susceptibility to contracting disease then they likely will not even consider taking steps to prevent the disease(s).

Perceived severity is a concept that is defined as how serious a disease or condition is believed to be (Champion & Skinner, 2008; Rosenstock, 1966; Rosenstock, 1974). This can include assessments of medical consequences such as death, disability, or discomfort and social concerns such as how the disease or condition could affect their family, social life, or work (Champion & Skinner, 2008). Also, factors such as reversibility of the condition influence this concept (Simons-Morton et al., 2012). Perceived severity cannot be considered unless the person

acknowledges perceived susceptibility (Simons-Morton et al., 2012). Perceived susceptibility and perceived severity combine to comprise perceived threat (Champion & Skinner, 2008).

The concept of perceived benefits is when a person considers whether the available actions for reducing or eliminating the threat of disease are actually going to help and if it's worth expending the effort required to engage in particular actions (Champion & Skinner, 2008; Rosenstock, 1966; Rosenstock, 1974). Even if a person perceives both their susceptibility and the disease severity to be high the behavior still will not change if they do not perceive that the action that they need to take will be beneficial in reducing the disease or condition (Champion & Skinner, 2008). Perceived barriers is also a major concept (Champion & Skinner, 2008; Rosenstock 1966; Rosenstock, 1974). This is when the health action can have potentially negative consequences, which can impede a person from performing the recommended health behaviors (Champion & Skinner, 2008; Rosenstock, 1966; Rosenstock, 1974). Barriers can be environmental and/or perceptual (Simons-Morton et al., 2012).

The concept of cues to action is inclusive of variables that trigger the health behavior action (Champion & Skinner, 2008; Rosenstock, 1974). Cues to action can be intentional or unintentional (Simons-Morton et al., 2011). They are often hard to pinpoint because they can be insidious and barely perceived (Champion & Skinner, 2008). An intentional cue to action would be when a person with risky sexual behaviors watches a particularly compelling public service announcement about a sexually transmitted disease (STD) and is motivated to start wearing condoms. An unintentional cue to action would be when the person hears about a friend who contracted a STD and is then motivated to start wearing condoms.

The final major concept of the HBM is self-efficacy which was added to the theoretical model in the late 1980s by Rosenstock, Strecher, and Becker (1988). Self-efficacy is when a

person has the confidence that they can perform the behavior(s) needed to produce a desired outcome (Bandura, 1997). A person who engages in risky sexual behaviors may want to use a condom because they know it will help to prevent STDs but perhaps has a partner who is reluctant to use protection. A person with high self-efficacy regarding condom use as well as high self-efficacy for talking with a partner about safe sex practices would likely stand their ground and insist on a condom being used if they were going to engage in sexual activity.

Minor Concepts

There are some minor concepts involved in the HBM (Champion & Skinner, 2008). These include demographic, sociopsychological, and structural variables such as age, gender, socioeconomic status, ethnicity, and knowledge (Champion & Skinner, 2008; Simons-Morton et al., 2012). Other concepts include readiness to act and expected utility (Simon-Morton et al., 2012). The minor concepts are considered to be modifying factors of the theory (Champion & Skinner, 2008; Simons-Morton et al., 2012).

Definitions of Key Terms

Human Immunodeficiency Virus

Many studies use the terms HIV and AIDS interchangeably or even put them together such as HIV/AIDS. In this study all instances of the terms HIV, AIDS, or HIV/AIDS will refer to the definition of human immunodeficiency virus. Older studies tend to use AIDS instead of HIV when they are describing HIV because they are not referring to the variety of syndromes that constitute AIDS. HIV is a blood-borne pathogen that is present in body fluids and causes an infection to and depletion of part of the immune system (T helper cells), subsequently making those infected very susceptible to infections and malignancies (Rote & Huether, 2010).

HIV Knowledge

HIV knowledge includes an understanding of how the disease is transmitted as well as how it can be prevented, facts versus myths and stereotypes, and condom efficacy (Carey & Schroder, 2002; Oglesby & Alemagno, 2013).

HIV Risk Perception

HIV risk perception is a person's interpretation of risk, vulnerability, or likelihood for acquiring or contracting HIV (Brown, 1998a; Brown, 1998b; Brown, 2000; Singer, Dai, Weeks, & Malave, 1998; Ward, Disch, Levy, & Schensul, 2004).

HIV Risk Behaviors

HIV risk behaviors include any actions or inactions that can increase the participants' chances of contracting HIV. Some examples of these actions/inactions include: unprotected oral, vaginal, or anal sex; multiple sexual partners; sharing needles or other drug "works" with others; having sex with commercial sex workers; or engaging in sex with a partner who has high risk factors for HIV such as non-monogamous, intravenous drug users, bisexual male, or other sexual risk behaviors already mentioned (Weinhardt, 2002).

Self-Efficacy

For the purpose of this study self-efficacy will be used in the context of HIV prevention. This includes both self-efficacy to properly use a condom or other form of barrier with every sexual encounter and self-efficacy to communicate with a sexual partner about safe sex practices. Self-efficacy is a belief in one's ability to have control over some aspect of their lives and/or environment. If people don't believe that they "can produce desired results and forestall detrimental ones by their actions, they have little incentive to act or to persevere in the face of difficulty" (Bandura, 2001, p. 10).

Older Adults

In accordance with the majority of research conducted on older adults and HIV, older adults in this study will be people aged 50 and older (Linsk, 2000).

Assumptions

The following were assumptions for this study:

1. Adults aged 50 and older use online dating sites.
2. The researcher will be able to advertise the survey online.
3. At least 155 adults who are age 50 and older who use online dating sites and encounter the advertisement will be interested in participating in this survey study.
4. Participants will answer the questions truthfully and will only complete the survey once.
5. Participants will answer the survey questions in full.

Significance

This study has strong potential to provide valuable information about the acceptability and feasibility of conducting online research related to sexual behavior, HIV risk, and HIV prevention in an older adult population. It will also help to illuminate the most viable venues for recruiting this particular population. The popularity and awareness of using online dating sites has increased and adults aged 50 and older are using this as a way to find potential dates (Alterovitz & Mendelsohn, 2009, 2013; McIntosh et al., 2011). Many of older adults who date online desire and participate in sexually intimate relationships (Bateson et al., 2012; McIntosh et al., 2011; Sassler, 2010) thus potentially increasing their risk for contracting HIV. HIV risk behaviors, risk perception, and self-efficacy to prevent HIV transmission have not been studied in the population of older online daters. The NIH Office of AIDS Research (2016) identified HIV prevention in older adults as a priority area to study. Of special interest is how HIV risk

perception changes across developmental stages due to perceived susceptibility and severity; as well as how factors such as age influence behaviors in HIV prevention (NIH Office of AIDS Research, 2016). Based upon the results of this study, a fully powered survey can be conducted to determine the aforementioned factors in an older adult population. Then a HIV prevention intervention aimed at older adults using online dating sites could be implemented. The intervention could be specifically tailored to help prevent particular factors that make older adults susceptible to contracting HIV.

The psychometric properties of instruments used in HIV prevention studies have been rarely tested in an older adult population. Modifying the instruments for an older population and conducting a factor analysis will be the first step in helping to establish valid and reliable measures for the factors involved in HIV prevention in this population.

Summary

The number OPLWH continues to grow. Many people are living longer with HIV but some do contract and/or are diagnosed with HIV after age 50. There are many factors that contribute to adults being diagnosed with HIV later in life. They may not see themselves as being at risk for contracting HIV and therefore do not take the proper precautions when having sex or using intravenous drugs. Also, their healthcare providers may not perceive them as being at risk for contracting HIV and therefore do not offer HIV testing or give educational information about the prevention of the disease. There are physiological changes that occur with advancing age in both men and women that makes them more susceptible to contract HIV. If already HIV positive, diagnosis of the disease may be delayed for months or years due to attributing the signs and symptoms to older age.

Chapter 2 provides a review of the literature as it relates to the major concepts of this study: HIV knowledge, HIV risk perception, HIV risk behavior, self-efficacy to reduce the risk of contracting HIV, HIV prevention interventions, older adult sexuality, dating, and online dating. The research literature reviewed for each of the major concepts will focus on studies with samples comprised exclusively of adults aged 50 or older as well as studies where findings on a subgroup of participants aged 50 and older are reported. Also in chapter 2 is an overview of other conceptual frameworks that could have possibly been used to guide this study as well as an explanation of why the HBM was ultimately chosen.

Chapter 2

Review of Literature

This study aimed to determine the feasibility of conducting online research regarding HIV prevention factors in adults aged 50 and older who use online dating sites while exploring the HIV risk perception, risk behaviors, and self-efficacy to take action to reduce the risk of contracting HIV in this population. An additional aim was to modify and test instruments related to HIV prevention factors in older adults. In this chapter the major concepts of the study will undergo a review of the literature, be analyzed, and then synthesized to establish the current state of the science. First, the literature related to older adult sexuality will be presented. Next, the literature related to HIV knowledge, HIV risk perception, and HIV risk behaviors in older adults will be presented. Also, the literature related to self-efficacy to take action to reduce the risk of contracting HIV in older adults will be explored. Next, the literature related to HIV prevention interventions will be examined. Additionally, an overview of other relevant theories will be presented with an explanation as to why the HBM was ultimately chosen. Finally a summary of the findings will be presented at the end.

Older Adult Sexuality

Older adults are often not at the front of providers' minds when it comes to HIV or sexually transmitted disease (STD) prevention (CDC, 2017a). This may be due to the assumption that geriatric patients are not sexually active due to their age or health status. Sexuality in older adults has been studied as early as the 1970s (Pfeiffer & Davis, 1972). Despite this, the topic did not get studied in-depth until the early to mid-1980s (Bulcroft & O'Connor, 1986; Traupmann, Eckels, & Hatfield, 1982). There was an almost 20 year gap between the aforementioned studies and studies that were conducted in the mid-2000s (Carpenter, Nathanson, & Kim, 2006;

Dickson, Hughes, & Walker, 2005; Galinsky, 2012; Hyde et al., 2012; Lindau & Gavrilova, 2010; Lindau, Schumm, Laumann, Levinson, O’Muircheartaigh, & Waite, 2007; Lodge & Umberson, 2012; McIntosh, Locker, Briley, Ryan, & Scott, 2011; Penhollow, Young, & Denny, 2009; Trompeter, Bettencourt, & Barrett-Connor, 2012; Watson, Bell, & Stelle, 2010; Watson & Stelle, 2011). The reemergence in interest in this topic could possibly be due to an increase in awareness of sexuality concerns in older adults.

Many of the studies focused on women (Clarke, 2006; Dickson et al., 2005; Traupmann et al., 1982; Trompeter et al., 2012; Watson et al., 2010; Watson & Stelle, 2011) while only one of the studies examined an exclusively male population (Hyde et al., 2012). None of the studies focused on a solely homosexual male or female geriatric population. A few of the studies were interested in single, dating older adults (Bulcroft & O’Connor, 1986; Dickson et al., 2005; McIntosh et al., 2011, Watson & Stelle, 2011). Two of these studies included the perspectives of men and women (Bulcroft & O’Connor, 1986; McIntosh et al., 2011) while the other two were from the point of view of women only.

Dating

Three qualitative studies examined dating in older adults (Bulcroft & O’Connor, 1986; Dickson et al., 2005; Watson & Stelle, 2011). Two of them focused on women while Bulcroft and O’Connor (1986) examined dating relationships and quality of life in both men and women in a descriptive qualitative study. They found that although men and women started dating for the same reasons (finding a mate, companionship) they derived different outcomes from their dating experience. Women obtained an increased social status while the men acquired an outlet for intimacy (Bulcroft & O’Connor, 1986). Similarly, in a phenomenological qualitative study of 14 women, Watson and Stelle (2011) found that their participants also started dating with the

purpose of finding a mate or for companionship but the majority of them also desired physical intimacy. As noted previously, this was shown to be true for the men in the Bulcroft and O'Connor (1986) study but not the women. Perhaps in the 25 years since the Bulcroft and O'Connor study was conducted, women have become more comfortable with their sexuality and their desire to have physical intimacy in old age. Watson and Stelle (2011) found that the lack of desire for physical intimacy in women participants was attributed to their belief that a sexual relationship outside of marriage was not aligned with their personal values. In a grounded theory study of 15 women Dickson et al. (2005) echoed the need for companionship and sexual intimacy as a reason for dating but the women also reported a need for independence as well.

Online Dating

Adults age 50 and older are adopting online dating as a means for finding an intimate partner. Older adults sometimes have trouble finding a partner through more traditional methods such as social clubs, church, or through friends (McWilliams & Barrett, 2014). Many of the people they meet through these means are already in a relationship or are not interested in dating (McWilliams & Barrett, 2014). In a qualitative study of $N = 45$ women age 50 and older, participants reported online dating to be a much more effective way of finding dates when compared to traditional methods of meeting potential partners (Vandeweerd et al., 2016). However, the participants did report some negatives of dating online such as being deceived, receiving unwanted sexual messages, or feeling unsafe during face-to-face dates.

There is little research about the sexual practices and behaviors of older adults who use online dating sites. Bateson, Weisberg, McCaffery, & Luscombe (2012) conducted a study comparing the attitudes about safe sexual practices between female online daters under the age of 40 ($n = 669$) and those 40 and older ($n = 1108$). They found that while the older women were

more likely to talk to a sexual partner about sexually transmitted infections, they were also more likely to engage in condomless sex with a new partner when compared to younger women. In a small study ($N = 7$) of adults age 60 and older, all but one of the participants reported engaging in sex after the initial meeting with the person they met online (Malta, 2007). The shortened time from meeting face-to-face to sex may be unique to online daters due to already having a feeling of intimacy through email and messaging communications for a period of time prior to meeting. Online dating sites provide a means for finding many potential dates in a short period of time when compared to dating offline. This enables relationships that are more short-term when compared to dating offline (Malta & Farquharson, 2014). Malta and Farquharson (2014) found that despite having a desire for long-term relationships many of their participants who dated online ended up in sexually intimate short-term or casual relationships instead.

McIntosh et al. (2011) explored online dating profiles in older adults. The profiles were randomly selected from a sample of 100 adults aged 65 and older and 100 profiles of younger adults aged 25 – 35 and the results were compared. The investigators found that older men and women were more selective about attributes such as age, race, religion, and income in potential partners (McIntosh et al, 2011). Similarly, Alterovitz and Mendelsohn (2009) examined personal dating advertisements in an older adult population ($N = 600$ advertisements). They found that as men age they preferred to date increasingly younger women; however, as women aged they preferred older partners until around the age of 75 when they started to prefer younger mates. Women were also more particular about specific characteristics such as the socioeconomic status of their dates (Alterovitz & Mendelsohn, 2009). In a later study, Alterovitz and Mendelsohn (2013) again examined personal dating advertisements though this time in a mixed age population ($n = 150$ age 40 – 54 year olds; $n = 150$ age 60 – 74 year olds; $n = 150$ age 75 and

older). Those in the two oldest age groups were more likely to discuss loneliness while those in the oldest age group also were more likely to mention health issues. Those in the youngest age group were more likely to report seeking a mate for sexual activities (Alterovitz & Mendelsohn, 2013). In a different study examining personal dating advertisements in older and younger online daters, Davis and Fingerman (2016) also found that older adults were more likely to mention health when compared to young adults. Jonson and Siverskog (2012) also examined online dating personal advertisements. They explored the ads of 276 lesbian, gay, bisexual, or transsexual online daters age 60 to 81. About a quarter of the daters made at least one reference to age; some self-mocking while others made mention of how young they looked or acted (Jonson & Siverskog).

Sexual Behavior

Many of the studies examined the sexual behavior of the older adult participants. Lindau et al. (2007) conducted a prospective study of older adults ($N = 3005$) aged 57 to 85 to examine sexuality and health in this population and found that sexual activity decreased with age and women were less likely to be sexually active than men of the same age. This study was named the National Social Life Health and Aging Project (NSHAP) and has been used as a database for other studies in this review (Galinsky, 2011; Lindau & Gavrilova, 2010). Other studies also found that women were less likely to be sexually active when compared to men in their cohort (Carpenter et al., 2006; Lindau & Gavrilova, 2010). Across both genders sexual activity was found to decrease with advancing age (Lindau et al., 2007; Lindau & Gavrilova, 2010; Lodge & Umberson, 2012).

In a grounded theory qualitative study of 30 married couples, Lodge and Umberson (2012) determined that even though the frequency of sexual activity decreased, the quality of

their sexual encounters increased both physically and emotionally. The majority of the men (71%) still reported a good quality of sexual life (Lindau & Gavrilova, 2010). This study also found that men were more likely than women to have an interest in sex in older age (41% versus 11%). In the NSHAP sample Lindau and Gavrilova (2010) found that only about half of women (52%) reported a good quality of sexual life. This is troubling, given that in a survey of 240 women aged 50 to 82, Traupmann et al. (1982) found that satisfaction with their intimate relationship was very important to their overall satisfaction with life.

Penhollow et al. (2009) surveyed 222 men and women who lived in retirement homes to examine their determinants of sexual satisfaction. The majority of the participants felt sex was important and beneficial for a good relationship (Penhollow et al., 2009). Sexual satisfaction in both men and women was associated with sexual self-confidence, frequency of orgasm, and relationship status. It was also associated with health status and social roles in men (Penhollow et al., 2009). This partly aligns with Trompeter et al. (2012) who found that sexual desire in women was positively associated with sexual activity and orgasm. In this survey of $N = 806$ women, those who were sexually active were more likely to be currently using hormones (Trompeter et al., 2012).

Sexual Difficulties

A few of the studies discussed the sexual difficulties associated with aging (Galinsky, 2012; Hyde et al., 2011; Lindau et al., 2007). In a longitudinal study of 3274 men aged 75-95, Hyde et al. (2012) discovered that almost half of the men had erectile problems. Using the NSHAP database, both Galinsky (2010) and Lindau et al. (2007) found this problem in about one-third of male participants. Decreased libido was also a problem for 47.7% of men in one

study (Hyde et al., 2012) and 28% of men in another (Lindau et al., 2007). Lindau et al. (2007) also found decreased libido in 43% of women.

HIV Knowledge, Risk Perception, and Risky Sexual Behaviors in Older Adults

Originally researched individually, the concepts of HIV knowledge, risk perception, and risky sexual behaviors in older adults were so intertwined that more clarity is obtained by examining them all together. The body of research literature reviewed on these three concepts included: two studies that measured knowledge alone (Henderson, Bernstein, St. George, Doyle, Paranjape & Corbie-Smith, 2004; Negin, Nemser, Cumming, Amor, & Pronyk, 2012; Philip-Ephraim, Gyuse, Udonwa, Peters, & Anyanechi, 2010); one study that measured risk perception alone (Grant & Ragsdale, 2008); one study that measured knowledge and risk perception together (Mack & Bland, 1999; Maes & Louis, 2003); two studies that measured risk behaviors alone (Lekas, Schrimshaw, & Siegel, 2005; Stall & Catania, 1994); four studies that measured risk perception and risk behaviors together (Cianelli et al., 2013; Jacobs & Thomlison, 2009; Sormanti & Shibusawa, 2007; Ward, Disch, Levy, & Schensul, 2004); and three studies that measured knowledge, risk perception, and risk behavior together (Hillman, 2008; Lindau, Leitsch, Lundberg, & Jerome, 2006; Rose, 1995).

Interestingly, even though HIV came to the forefront in the mid-1980s, none of these concepts were studied in older adults until the mid-1990s (Stall & Catania, 1994). Perhaps this is due to the disease initially being associated with young homosexual males. Five of the studies focused solely on a female population (Grant & Ragsdale, 2008; Henderson et al., 2010; Jacobs & Thomlison, 2009; Lindau et al., 2006; Sormanti & Shibusawa, 2007). Grant and Ragsdale (2008) also used the women's physicians as participants and the physicians were both male and female. None of the studies used a solely male population as participants. Only one of the

studies used an entirely single (women) population (Grant & Ragsdale, 2008). The other studies broke down participants by marital status but did not necessarily stratify results by marital status. None of the studies looked at a purely homosexual population. Only Lekas et al. (2005) stratified results for gay men (Lekas et al., 2005).

HIV Knowledge

HIV knowledge was discussed in almost half of the studies. In a survey of 514 women aged 50 and older Henderson et al. (2004) found that 65% of the women answered less than half of the questions about HIV transmission/prevention correctly. In a study of 722 adults aged 50 and older Negin et al. (2012) found the HIV knowledge score to be significantly lower in older adults when compared to younger persons ($N = 1534$). Maes and Louis (2003) reported similar results in their well-designed survey of 301 older adult participants. They found that older age was associated with a lower level of HIV knowledge (Maes & Louis, 2003) as did Rose (1995) in a study of 458 adults over the age of 60. Rose (1995) also showed that a higher level of education was significantly associated with a higher HIV knowledge score. In this study the investigators also found that the African American and Hispanic participants had significantly lower HIV knowledge scores when compared to their Caucasian counterparts (Rose, 1995) possibly due to lower education levels. Two of the studies found that 63% (Henderson et al., 2012) and 77.5% (Philip-Ephraim et al., 2010) of older adults thought that kissing was a way of transmitting the disease. In a study of 488 men and women Philip-Ephraim et al. (2010) discovered that almost all of the participants thought hand shaking could cause disease transmission while Hillman (2008) found that a significant number of participants thought that HIV could be transmitted through a mosquito bite.

Four of the studies assessed efficacy of condoms to prevent HIV transmission and the results varied widely. Philip-Ephraim et al. (2010) found that 62.3% of participants felt that condoms could prevent disease transmission and in a different study (n = 55) Lindau et al. (2006) showed that 81% of the female participants thought that condoms should be used. In contrast, Mack and Bland's (1999) study of 21,132 adults aged 50- 64 found that only 28% of older adults responded that condoms are very effective in preventing HIV and Henderson and colleagues' (2004) study similarly revealed that only 13% of participants identified condoms as being very effective. According to Henderson et al. (2004) 18% of participants said that condoms were not at all effective in preventing disease transmission while Mack and Bland (1999) found that 15% of their participants were not sure if condoms were effective.

Philip-Ephraim et al. (2010) found that 87.5% of older adults identified unprotected sex as a high risk behavior. This finding is in contrast to Hillman's (2008) finding that over half of the older adult participants did not know that HIV could be transmitted through vaginal, anal, and oral sex.

HIV Risk Perception

Most of the studies reviewed looked at risk perception of HIV in older adults. Some of the studies measured whether the participants felt they were at a risk for contracting the disease. In a large (n = 398) survey of low-income, senior-housing residents in a urban setting aged 50 - 93 Ward et al. (2004) found that 55% of participants had a perceived risk for contracting HIV. Similarly, Grant and Ragsdale (2008) identified 64% of their participants as having a perceived risk with 70.6% of women aged 45-55 considering themselves at risk versus 40% of women aged 56 and older. One limitation to the Grant and Ragsdale study is that it had a small sample size (n = 44). Rose (1995) found that only 32% of participants worried about getting HIV, 53.3% felt

they were less likely to get HIV than most people, and only 17% felt that this was a problem in older adults despite having 73.1-83.8% reporting that HIV was a serious disease. Jacobs and Thomlison (2009) echoed this in a large survey (n = 572) where 88.6% of participants did not think they were at risk for HIV infection. Interestingly, in a descriptive qualitative study of 35 participants, Lekas et al. (2005) stratified for gay and bisexual men with HIV and found that almost all of them have a perceived risk of contracting HIV before they tested positive. Perhaps this is because, by the age of 50, this cohort of older adults was old enough to have been sexually active during the initial “AIDS crisis”. Lekas et al. (2005) also found, in interviews of non-drug using HIV positive participants, none perceived themselves as being at a high risk for HIV prior to contracting the disease. Cianelli et al. (2013) studied the HIV risk perception of older Hispanic women and found that many of them had a low HIV risk perception which may have been due to them not understanding certain factors that put them at risk such as the behavior of partners in regard to infidelity, lack of using condoms, and machismo.

Some of the studies reported on whether the participants had been tested for HIV. The percentages of those tested varied widely. Rose (1995) found that 9.4% of their participants had been tested. Similarly, Stall and Catania (1994) found that less than 10% had been tested, Mack and Bland (1999) identified 26.6%, and Jacobs and Thomlison (2009) found that 33.9% had been tested. Conversely, Grant and Ragsdale (2008) showed that 59% of women with partners or in a dating relationship had been tested for HIV. This difference could perhaps be attributed to the fact that the women were in relationships and therefore more aware of their possible HIV risk. Also, the percentages seemed to increase as the years progressed so this could possibly be attributed to a greater awareness as well. In a study of HIV positive older adults, Lekas et al. (2005) found that HIV symptoms prior to diagnosis led to both drug users (injecting and non-

injecting) and heterosexual non-drug users initially getting tested for the disease. Akers, Bernstein, Henderson, Doyle, and Corbie-Smith (2007) examined a sample of (n = 514) older women who lived in an area that was geographically at high risk for HIV infections, to determine what factors made them want to or not want to get tested for HIV. In women with a low risk for contracting HIV African American race, increasing age, and low perceived risk were associated with not wanting to get an HIV test. In the women with a moderate to high risk of contracting HIV increasing age and African American race were associated with not wanting to get tested for HIV (Akers et al., 2007). Based on these studies older African Americans may be interested in HIV education but not in HIV testing.

HIV Risk Behaviors

Many of the studies explored risk behaviors for HIV in older adults. About half of the studies reported prevalence of condom use in this population. Lindau et al. (2006) found that only 28% of the women who were sexually active in the past ten years used condoms despite 81% of them reporting that condoms should be used. Similarly, Ward et al. (2004) showed that of those participants that perceive themselves as being at high risk for HIV only 12% always use a condom and 54% never use one. Hillman (2008) found that less than 1/3 of participants used condoms, Rose (1995) found that only 26.8% always use condoms, Stall and Catania (1994) found low condom use for both vaginal and anal sex, and in a large (n = 1280) survey Sormanti and Shibusawa (2007) found that only 12% of sexually active women always use a condom, 81% never use one, and 7% have inconsistent use. In their sample of older Hispanic women, Cianelli et al. (2013) found that their participants had sex without condoms due to the fear of upsetting their partner or having their partner accuse them of infidelity.

Many of the studies did not investigate risk behaviors for HIV other than condom use. While many of the studies in this literature review reported the rates of sexual activity for older adults, very few of them analyzed whether the participants had high risk behaviors such as multiple partners. Female participants in the Jacobs and Thomlison (2009) study reported 0 to 20 sexual partners in the past year and the range in number of sexual partners for the male and female participants in the Rose (1995) study was 1 to 11 over the past year.

In a national survey of 2673 adults aged 50 and older Stall and Catania (1994) compared risk behaviors for HIV in older adults between the participants living in high-risk cities for HIV and the participants living in low-risk cities. They found that the proportion of participants with at least one behavioral risk for HIV infection (e.g., multiple partners, risky partner, or transfusion recipient) was higher in the high-risk cities than in the lower-risk cities. The investigators were unable to find any significant correlations between demographic data and risk behavior in the national sample. In the sample of participants living in a high-risk city, being male, African American, and single or divorced/separated was associated with a higher likelihood of having at least one high risk behavior when compared to the other participants in the study.

Self-Efficacy in HIV Prevention in Older Adults

Self-efficacy for HIV prevention in older adults remains largely unstudied. Winningham et al. (2004) examined rural-dwelling African American women (n = 181) over the age of 50 to determine their sexual risk for contracting HIV. Self-efficacy for talking with a partner about safe sex was not investigated. Self-efficacy for using condoms was found to be significantly higher when the women reported a lower level of sexual risk behavior as compared to those who reported a higher level of sexual risk behavior (Winningham et al., 2004). Foster et al. (2012) examined factors involved in risky sexual behaviors in older adults (n = 106). One aspect

explored was self-efficacy in regard to both condom use having a discussion about safe sex.

Foster et al. found that those with a higher motivation to have safe sex and higher levels of HIV knowledge, had greater self-efficacy for practicing safe sex.

HIV Prevention Interventions

There is a paucity of HIV prevention intervention studies conducted on older adults. Despite a thorough search of the literature only four empiric intervention studies were found. A paper describing a HIV prevention program aimed at older adults will be discussed as well.

Empiric Studies

Four empiric studies were identified through a thorough review of the literature (Table 2.1). All of the articles used a pretest, posttest design (Falvo & Norman, 2004; Orel, Stelle, Watson & Bunner, 2010; Rose, 1996; Small, 2009). Approaches to the pretest/posttest design varied across studies. One of the intervention studies had a pretest, HIV intervention program, and then a posttest (Rose, 1996). Another study did the same, but added a focus group discussion as well (Small, 2009). Falvo and Norman (2004) did a pretest-, an educational program, a posttest directly after the intervention, and then a final posttest three months after the educational program. Finally Orel et al. (2010) had a pretest, educational workshop, optional HIV testing, and then a posttest.

The length of time for the prevention intervention varied by study and lasted anywhere from 20 minutes (Rose, 1996) to six hours (Orel et al., 2004). One of the studies implemented the HIV prevention intervention at multiple sites (Rose, 1996) while the others were only offered one time. Two of the studies used the HBM as a theoretical framework (Orel et al., 2010; Rose, 1996) while the two other studies did not specify a framework. All four of the studies measured HIV/AIDS knowledge both pre- and post-intervention. Rose (1996) used an abbreviated version

of the AIDS Information Survey. Similarly, Falvo and Norman (2004) used their own AIDS Knowledge Survey that they adapted from the AIDS Information Survey. Orel et al. (2010) tested knowledge with the HIV/AIDS questionnaire while Small (2009) tested HIV/AIDS knowledge but did not specify the questionnaire that was used. Both Rose (1996) and Falvo and Norman (2004) measured perceived susceptibility to and seriousness of HIV. Falvo and Norman (2004) used the Bobowicz Sex Inventory (BSI) which focuses on risky sex practices. Finally, Small (2009) also measured participants' interest in HIV/AIDS programs and whether their health care providers had discussed HIV/AIDS prevention with them.

Table 2.1.

HIV Prevention Intervention Characteristics by Study

Prevention Intervention Characteristics	Rose, 1996	Falvo & Norman, 2004	Small, 2009	Orel et al., 2010
Number of Participants	<i>N</i> = 458 prior to intervention; <i>n</i> = 318 post-intervention	<i>N</i> = 40	<i>N</i> = 50	<i>N</i> = 89
Length of Intervention	20 to 30 minutes	45 minutes	3 hours	6 hours
Location(s) of Intervention	24 different sites that offer meals for senior citizens	1 site	1 site	1 site
Theoretical Framework	HBM	None, but based a couple of questions on the HBM	None	HBM
Relevant Measure(s) Pre-Intervention	General knowledge of HIV/AIDS, perceived susceptibility to AIDS, and perceived	AKS, specific question about AIDS in older adults vs. younger adults, specific questions about how AIDS is spread, question	Questions about interest in HIV/AIDS prevention, questions about HIV/AIDS knowledge, have they	HIV-KQ-45

Prevention Intervention Characteristics	Rose, 1996	Falvo & Norman, 2004	Small, 2009	Orel et al., 2010
	seriousness of AIDS	about perceived seriousness, question about vulnerability to contracting HIV, Bobowicz Sex Inventory (risky sexual practices)	received HIV/AIDS prevention information from healthcare provider?	
Relevant Measures(s) Post-Intervention	Same as pre-intervention	AKS	Questions about interest in HIV/AIDS prevention, questions about HIV/AIDS knowledge, focus group questions related to HIV prevention programs for older adults	HIV-KQ-45
Length of Time Between Intervention and Post-Intervention Measures	Immediately post-intervention	AKS measured twice- once immediately post-intervention and then again 3 months post-intervention ($n = 6$ did not do the final AKS)	Immediately post-intervention	Immediately post-intervention (only $n = 11$ participants completed this)

Note. HBM = Health Belief Model; HIV = human immunodeficiency virus; AIDS = acquired immune deficiency syndrome; AKS = AIDS Knowledge Survey; HIV-KQ-45 = 45-item human immunodeficiency virus questionnaire.

The aspects of the education intervention program that was used varied among the studies. One of the studies did not specify what they covered in their educational program other than reporting that they distributed a pamphlet titled “What Everyone over 50 Needs to Know

About AIDS” (Rose, 1996). The other three studies all provided information about HIV/AIDS knowledge, while the Small (2009) and the Falvo and Norman (2004) studies also covered myths about the disease. Both the Orel et al. (2010) and Falvo and Norman intervention programs emphasized the importance of getting tested for HIV. Other aspects of the intervention programs that were specifically mentioned were education on risk behaviors (Small, 2009) and safe sex practices (Falvo & Norman). The Orel et al. (2010) intervention was a little different in that it was very long (6 hours) and did not only focus on HIV prevention but on sexuality in middle life and sexuality and medication as well. The authors’ reasoning behind this was that they were worried that the stigma associated with attending a program only aimed at HIV/AIDS prevention would lead to a low turn-out of participants (Orel et al., 2010).

Results from the studies varied as well. Both Falvo and Norman’s (2004) and Rose’s (1996) interventions resulted in statistically significant increases in HIV knowledge immediately following the intervention. Falvo and Norman also measured this construct three months after the intervention and HIV knowledge was still significantly increased from the pretest scores. However, there were no significant differences between the scores from immediately following the intervention and the three month follow-up (Falvo & Norman). Conversely, Small (2009) did not find a significant difference in pre- and posttest HIV knowledge scores. Orel et al. (2010) also measured HIV knowledge but they were unable to compute a meaningful statistical analysis due to a poor return for the posttest but did report that some of the percentages increased. Only 11 out of 89 participants returned their posttests. According to the authors this was due to the test being too long and taking too much time (Orel et al., 2010). However, the entire program lasted six hours so perhaps the length of the program had some bearing on the poor participation in the posttest. Rose (1996) found that both perceived susceptibility and perceived seriousness

significantly increased after the intervention program whereas Falvo and Norman (2004) did not find a significant increase in these two areas. Small's findings (2009) indicated that the participants' interest in receiving and participating in HIV/AIDS prevention programs significantly increased after their intervention. Finally, the Falvo and Norman (2004) study was the only one to measure risky behaviors prior to and after the intervention with the BSI. Unfortunately they did not find any statistically significant change, which they suggest is likely due to participants either refusing to answer the questions and answering "no" for every question (Falvo & Norman, 2004).

Only one of the studies used qualitative methods and this was done through a mixed methods study (Small, 2009). Focus groups were used to discuss HIV/AIDS prevention. Three themes emerged from the focus groups: acknowledgment of sexual risk behaviors, barriers to education on HIV/AIDS, and participants' suggestions for how to implement HIV/AIDS education programs. The first theme, acknowledgement of risk factors, was the most prominent and had three subthemes which include: prostitution, drug use, and ageism. Some of the people in the study engaged in the services of prostitutes or acknowledged that their peers participated in these services. Others pointed to the use of illegal drugs as a problem due to drug use by older adults that is perpetuated by senior citizen drug dealers in housing areas for seniors. Others pointed to ageism and the lack of HIV prevention programs targeted at older adults as contributing to the lack of awareness of HIV risk. The next theme, barriers to HIV/AIDS education, had three subthemes: interpersonal barriers, availability of HIV/AIDS information, and mixed perception of infection risk. Finally the last theme, suggestions for improving HIV/AIDS education, had two subthemes: easily accessible training that included peer educators and slogans that are age-specific (Small, 2009).

Prevention Program

One of the articles found through the review of literature was not an empiric study but did describe a HIV prevention program aimed at older adults (Agate, Mullins, Prudent, & Liberti, 2003). There were various iterations of the program over a span of ten years. The program is called the Senior HIV Intervention Project (SHIP). This is offered through the Florida Department of Health in Broward, Miami-Dade, and Palm Beach counties and has expanded to the west coast of Florida. There are many older adults, both permanent and seasonal, living in South Florida. One phenomenon is the “condo Casanova” where an older adult male has many older adult female sexual partners. In adult communities the estimated women to male ratio is 7:1 (Agate et al., 2003). The SHIP program was started to help increase awareness of and decrease transmission of HIV.

While not a description of the actual program, this article compiles a list of elements that should go into a HIV prevention program aimed at older adults (Agate et al., 2003). These elements were based upon the consensus of experts in the field. One recommendation is to know the values and beliefs of the target audience, especially being aware of the cultural and social circumstances. With adults aged 50 and older, there are generational aspects to take into consideration. Adults in their 50s have different experiences, beliefs, and values regarding sex than adults in their 80s. Another recommendation was to use labeling for the educational program that will be acceptable for the older adults. They may not feel comfortable attending an educational program with HIV or AIDS in the title so having another title such as “Safe Sex After 50” may be more appropriate. An issue that has been identified as being problematic when implementing these programs is having the older adults actually attend the programs because

they may not feel it pertains to them. To increase attendance Agate et al. (2003) suggest including a HIV prevention program within another health promotion program. An example that was given was to do a combination program such as bone density and HIV prevention. The final recommendation was to make sure the HIV prevention program meets the physical needs of the audience. The program should be short (15 to 20 minutes) with varying speakers (Agate et al., 2003).

Potential Conceptual Frameworks

Expectancy value theories help to explain how behavior is influenced by attitudes and beliefs about objects and/or actions (Simons-Morton et al., 2012). These types of theories are especially helpful in describing which attitudes and beliefs are important to an individual's health-related behavior. Expectancy value theories "suggest that behavior is likely when the advantages of a particular action outweigh the costs" (Simons-Morton et al., 2012, p. 100). By knowing what attitudes and beliefs predict a certain behavior, interventions can be developed based on this information. New information can change or alter the attitudes and beliefs. Examples of expectancy value theories include the HBM, the theory of reasoned action (TRA), the theory of planned behavior (TPB), and the information-motivation-behavioral skills (IMB) model (Simons-Morton et al., 2012).

The HBM is the guiding framework for this study and has been described extensively in chapter 1. This section will provide an overview of the TRA, TPB, and IMB theories. Finally, the reasons for choosing the HBM over the other expectancy value theories will be explicated.

Theory of Reasoned Action

The TRA was developed by Martin Fishbein and Icek Ajzen in the 1970s (Ajzen & Fishbein, 1980). They developed this theory because of their observations in the lack of

correlation between certain attitudes (i.e. racial and religious) and the actual behavior (Ajzen & Cote, 2008). This theory helps to determine the relationships among attitudes, beliefs, intentions, and behavior (Ajzen & Fishbein, 2005) with the ultimate outcome being behavior (Simons-Morton et al., 2012). According to Ajzen and Fishbein (2005), behavior is influenced by a person's attitude about the specific behavior as well as their perception of if the behavior would be approved by others. These influences determine whether or not the person will engage in the behavior. Behavioral intention is the most important determinant of behavior (Montano & Kasprzyk, 2008). Behavioral intention is influenced by a person's attitude about the specific behavior as well as their normative beliefs (Ajzen & Fishbein, 1980, 2005; Montano & Kasprzyk, 2008; Simons-Morton et al., 2012). Attitude is determined by both behavioral beliefs (a person's belief about the consequences of a specific behavior) and the expected outcome of performing the behavior (Ajzen & Fishbein, 1980; Montano & Kasprzyk, 2008; Simons-Morton et al., 2012). Subjective norm is determined by both normative beliefs (their perception of whether the behavior would be approved by others) and motivation to comply which means how much the approval by others had an effect on performing the behavior (Ajzen & Fishbein, 2005; Montano & Kasprzyk, 2008). Other factors have influences on this as well such as environmental circumstances (Ajzen & Fishbein, 2005).

The concepts of the TRA are: beliefs about object or action, normative beliefs, motivation to comply, attitude toward the object or action, subjective norms, behavioral intent, behavior, and environment (Ajzen & Fishbein, 1980). Beliefs about object or action refer to the person's beliefs about the outcome of the behavior. Normative beliefs are the beliefs about the acceptability of the behavior by others (Simons-Morton et al., 2012). Motivation to comply is how important the person places the influence of others in determining whether or not to do the

behavior. Attitudes toward the subject or action are whether a person has a positive or negative connotation about the performance of a behavior. Behavioral intent is the likelihood of doing the behavior (Simons-Morton et al., 2012).

The model for the TRA is linear. According to the model, beliefs about an object or action influence attitude toward the object or action (Ajzen & Fishbein, 1980). Together, the concepts of normative beliefs and motivation to comply influence the concept of subjective norms. Attitude toward the object or action also influences subjective norms as well as behavioral intent. Subjective norms have an influence on behavioral intent as well. Finally, behavioral intent influences the behavior. The environmental circumstances may or may not have an influence on the final behavior outcome (Ajzen & Fishbein, 1980).

Theory of Planned Behavior

The TPB adds another major concept to the TRA, perceived behavioral control (Simons-Morton et al., 2012). One limitation of the TRA is that the behaviors it predicts are ones that people have control over (Ajzen, 2012). Ajzen (2012) developed the TPB so that behaviors where people had no or limited control over, could be taken into account. The concepts in the TPB are the same as the TRA with the exception of the concept of perceived behavioral control which was added due to the limitations of the TRA.

According to the TPB a person's actions are influenced by three factors: attitudes toward the behavior, subjective norms, and perceived behavioral control (Ajzen & Cote, 2008). Perceived behavioral control is a person's perceived capability to perform the behavior (Ajzen & Cote, 2008). This is another way of describing the concept of self-efficacy. All three of these concepts influence behavioral intention. Higher levels of any of the aforementioned concepts lead to stronger intentions to perform the behavior. Perceived behavioral control and the actual

control that a person has over their behavior are usually different. Some aspects of actual control can be measured but as a whole the concept is not conducive to measurement. If a person is realistic in their perceived behavioral control then this concept can be an approximation for actual control (Ajzen & Cote, 2008).

The model used in the TPB is a continuation of the TRA model. Beliefs about control influence perceived behavioral control (Ajzen & Cote, 2008). Perceived behavioral control then influences behavioral intent. Actual control moderates both perceived behavioral control and intention to perform a behavior (Ajzen & Cote, 2008).

Information-Motivation-Behavioral Skills Model

The IMB model was developed by Fisher and Fisher (2002) in the early 1990s to better understand HIV risk and prevention. Since its inception, it has been used as a framework for other skills-dependent preventative behaviors beyond HIV such as wearing a helmet when driving a motorcycle and breast self-examination (Simons-Morton et al., 2012). As originally conceptualized, the main concepts of this model are the informational, motivational, and behavioral skills associated with HIV prevention (Fisher & Fisher, 2002). Based upon the outcomes of studies using this theory, targeted HIV prevention interventions can be developed and implemented (Fisher & Fisher, 2002).

The fundamental assumption of the IMB model is that HIV prevention information, HIV prevention motivation, and HIV prevention behavioral skills determine HIV preventative behavior (Fisher & Fisher, 2002). A requirement for HIV preventative behavior is that HIV prevention information is relevant to preventative behavior and can be easily implemented by the individual. HIV prevention information includes facts about the transmission of HIV and how to prevent contracting the disease. HIV prevention motivation also determines HIV prevention

behavior and can influence HIV prevention behavior even if the person has a high level of HIV prevention information. HIV prevention motivation includes personal motivation, social motivation, and perceived personal vulnerability to HIV. HIV prevention skills are the final component needed for HIV prevention behavior. Even if a person is well informed and has a high level of motivation, HIV prevention skills will determine whether or not the HIV prevention behavior is effective. HIV prevention skills are a person's perceived self-efficacy and objective ability to implement the HIV prevention behavior (Fisher & Fisher, 2002).

According to the IMB model, HIV prevention information and HIV prevention motivation primarily influence HIV prevention skills, which then has an influence on HIV prevention behavior (Fisher & Fisher, 2002). HIV prevention information and HIV prevention motivation may also influence HIV prevention behavior directly but have less of an effect on prevention behavior when compared to prevention skills (Fisher & Fisher, 2002).

HBM as the Guiding Framework

As noted earlier, the HBM has been described in detail in chapter 1. This section will explicate the reasons for using the HBM as a conceptual framework for the current study over the other expectancy value theories.

While the TRA has been used as a conceptual framework when studying HIV prevention behavior, a review of the literature shows that it has not been used with an older adult population. Many concepts of the TRA are relevant to the current study. However, the TRA does not allow for the influence of self-efficacy in the model. Self-efficacy is an integral concept in the current study. The HBM allows for the influence of self-efficacy and would therefore be a more appropriate conceptual framework to use than the TRA.

The TPB has been used as a conceptual framework to study HIV prevention behavior, especially in adolescents. It has not been used in an older adult population. All of the concepts of the TPB are relevant to the current study but the HBM still provides a more inclusive integration of the concepts to serve the purpose of the study. This model is more relevant to the current study than the TRA due to the inclusion of self-efficacy but it is lacking in other areas. Although the attitudes toward object or action concept of the TPB helps to determine whether a person has a negative or positive association of the behavior, the HBM teases this out further with the benefits and barriers concepts. This aspect of the HBM is beneficial for the current study, because people usually have both positive and negative associations of a behavior. Ultimately the final behavior will either be positive or negative but when using the TPB there is no way to determine what aspects of the behavior were positive or negative to the participant. By knowing the actual barriers and benefits to taking action to prevent HIV transmission, targeted interventions could be implemented to increase the chances of the final behavior being positive.

The IMB model was developed as a guiding framework for HIV prevention behaviors. It has been used extensively in studying HIV prevention in adolescents and young adults but has only been used in one study with an older adult population (Foster et al., 2012). This study also used Bandura's self-efficacy theory as a theoretical framework (Foster et al., 2012).

While the IMB model has concepts of relevance to the current study, the HBM remains the more appropriate choice as a guiding framework. One concept that the IMB model lacks but the HBM has is perceived severity of the disease. Examining perceived severity of HIV is important to the current study. HIV has become more of a chronic disease rather than an acute illness which may lead some people to be more lax in their prevention behaviors. Conversely, others may remember when HIV was more of an acute illness and also may not be aware that it

is now considered a chronic disease. These people may have a very high perceived severity of HIV and have more rigorous prevention behaviors. Knowing the perceived severity of HIV for the population in the current study will be important in not only increasing knowledge about the perceived risk in this group but will also be imperative when determining future targeted prevention interventions. Also, the IMB model lacks an awareness of environmental influences on prevention behavior. The HBM examines this through the cues to action concept.

Expectancy value theories are useful as guiding theoretical frameworks when determining health behavior. All of the expectancy value theories that were presented in this section have some relevance to the current study. The HBM is the most appropriate model to utilize because it more fully examines the concepts that are most relevant to the purpose and research questions of this study.

Summary

The state of the science regarding older adult sexuality, HIV knowledge, HIV risk perception, HIV risk behaviors, and self-efficacy to take action to reduce the risk of contracting the disease in older adults has been closely examined through a comprehensive review of the literature. Despite their lower frequency of sexual activity, many older adults are still sexually active well into old age. Some studies even found that participants' levels of intimacy improved with age. Despite this many older adults have sexual difficulty as well. HIV knowledge varies for older adults, the majority of studies showed a low level of knowledge. HIV risk perception is low for many older adults and even if it is high, the rate of condom use to prevent HIV infection is very low. Some older adults do have a high level of risk behavior for contracting HIV but, like those with a high risk perception for the disease, there is a very low level of consistent condom use.

Very few HIV prevention intervention studies have been done on an older adult population. The results for the studies are mixed and are measured inconsistently. There is too small of an amount of data to confidently make any clinical recommendations from the results.

There are numerous theoretical frameworks available to help guide behavioral based research. Expectancy value theories are especially efficacious when conducting research that tries to determine why a person behaves in a certain or how they make decisions. There are many different expectancy value theories. The theoretical framework that is most appropriate for this study is the HBM because it provides the most comprehensive approach for addressing the variables being used.

A few gaps in the literature have been identified through this review. First, no studies have explored HIV knowledge, HIV risk perception, risk behaviors, or self-efficacy to reduce HIV risk behaviors in older adults in the setting of online dating websites and applications. Also, very few studies have focused solely on a dating population. A final gap is that only two studies have measured self-efficacy to reduce the risk of contracting HIV in this population.

Chapter 3

Methods

This study investigated the feasibility of conducting HIV prevention research in an online environment with an older population. Also, established instruments were revised to suit older adults and then were tested. The following chapter describes the research design, setting, sample, and measures. The instruments used in the study will be presented. Data collection measures and processes as well as data analysis software and techniques will be discussed.

Research Design

The proposed feasibility study employed a cross-sectional, descriptive correlational design using online survey methodology. A descriptive correlational design was chosen because of its utility in describing relationships among variables (Polit & Beck, 2008). Another strength of correlational studies is that they are an effective way of collecting a large volume of data (Polit & Beck, 2008). A weakness of a correlational study is that this design is limited in the ability to determine causal relationships (Polit & Beck, 2008). In the current study, the variables of interest included: HIV risk perception, HIV risk behavior, and HIV prevention self-efficacy.

An online survey was chosen due to the desired population of adults age 50 and older who use dating websites and applications. Surveys have a long history of being an effective tool for measuring the opinions and behaviors of people (Dillman, Smyth, & Christian, 2009). Some advantages of web-based surveys include: lower cost when compared to other survey collecting methods (Dillman et al., 2009); more design options; shorter time to transmit the survey; less time needed for data entry (Fan & Yan, 2010); and a higher possibility of obtaining a larger sample (Pequegnat et al., 2007). In addition, an online survey design is particularly well suited to those who are inclined to use online dating sites and are computer savvy. Limitations to web-

based surveys include: lack of internet access or computer skills by some participants (Dillman et al., 2009); nonresponse error; coverage error (Couper, 2008); possibility of multiple responses by the same participant (Pequegnat et al., 2007); security issues with an online platform; and lack of an interviewer to clarify and answer questions about potentially confusing questions.

The two major concerns about validity in survey research relate to nonobservation errors and measurement error (Groves, Fowler, & Couper, 2009). Nonobservation error refers to when the characteristics of the participants do not match the intended population. Measurement error is when the answer on the survey is different from the actual construct being measured (Groves et al., 2009). If there is measurement error then the measurement question or tool will not be a valid measure of the construct. One aspect to consider with online surveys is that if a survey has been validated offline the assumption cannot be made that it will be valid or reliable online (Pequegnat et al., 2007). To help increase the validity of the survey, an expert panel was employed to evaluate study instruments.

Setting

Original Plan

The original plan for this study was to recruit participants through dating websites, dating applications, and social media sites. Inquiries to the online dating websites found that active facilitation by accessing client email by the sites was not feasible due to site administrator concern for the best interest of their customers (i.e., concern that customers will view study inquiry emails as “spam” and be upset). Instead the plan was to purchase advertisement space for the survey on the online dating sites. At the time of preliminary inquiry into online dating services (early 2016) – the online dating sites Match.com, OkCupid.com, OurTime.com, Chemistry.com, and SeniorPeopleMeet.com all used the same advertising company. Self-

serviced tailored advertisements could be made for varying amounts of money. The least expensive of these was \$250.00 for 125,000 advertisement views. The advertisements could be tailored to only be shown on the pages of adults age 50 and older. Part of the feasibility study was to determine how adequate this type of recruiting is for obtaining participants from online dating sites. Another site that was targeted was PlentyOfFish.com. At the time of initial inquiry, self-service advertisements could be made using their advertisement platform. The price varied depending on who was targeted by the advertisement and where the advertisement was placed. Advertisements for PlentyOfFish.com started at \$25.00. The plan was to also use Facebook and Twitter for advertising and they had similar advertisement practices as the previously mentioned websites. Other venues that were pursued are dating applications (e.g., Grindr and Tinder), Craigslist, and The Pennsylvania State University's StudyFinder. At the time of initial inquiry, examples of costs to advertise on these sites ranged from free (Craigslist) to \$7- \$25 cost per thousand impressions (CPM) via a banner advertisement (Grindr application).

The previously mentioned online dating websites and applications provided a mix of types of websites such as those aimed at adults age 50 and older and popular dating sites that are open to all ages (frequently advertised). Both free sites and those requiring a fee were included. A mix of different dating sites would help to make the sample more generalizable to the overall population of interest; as well as provide valuable information about the various venues in which this sample can be recruited. There was concern that some of the dating sites may not be able to be accessed even with paying for advertising due to the sites' focus on promoting risk behaviors such as casual encounter sites (Pequegnat et al., 2007). The administrators of these types of sites may feel that the survey would decrease business to the site (Pequegnat et al., 2007). This worry

did not come to light as advertisement on online dating sites and applications was not able to be attained as described below.

Revised Plan

Several changes to the settings needed to be made due to changes in the online dating sites.

Online dating sites and applications. In the time of pre-proposal (early 2016) to time of first attempting data collection (summer 2017) there were some changes in the price points and structure of the online dating sites. Match.com bought PlentyOfFish and Tinder among many other online dating sites. Subsequently the price to advertise on all of the sites increased exponentially. From starting at \$250 in early 2016 to advertisement campaigns requiring a minimum of \$25,000 as of summer 2017. Since Match.com bought up several online dating sites there were very few to choose from to try to advertise. The advertising teams for the following non-Match.com dating sites and applications were emailed regarding purchasing advertisement space on their sites: Zoosk, Elite Singles, Grindr, and Bumble. There was no current information on the cost of advertising for these sites and none of the advertising teams responded to the emails. Another online dating site, eHarmony, was pursued but they do not sell advertising space. Due to being unable to advertise on any online dating sites, other avenues for study setting were pursued in August 2017.

Facebook, Twitter, Craigslist, and The Pennsylvania State University StudyFinder.

A study specific Facebook page was made and titled “Safe Sex Survey”. The only post to the page was The Pennsylvania State University Institutional Review Board (IRB) approved study recruitment wording. The advertisement that was used for Facebook was a boosted post. This means that Facebook was paid to boost the post that advertised the study. The advertisement was

tailored to a targeted audience of men and women in the US who were age 50 and older and had visited online dating service sites. The post was placed in the Desktop and Mobile news feeds of people who fit the targeted audience requirements. Money spent on the advertisement was \$10 per day for a total of 30 days. The advertisement had to be reviewed and approved by Facebook prior to implementation.

A Twitter account was also created for the study. The Twitter account was called “Safe Sex Study”. Similar to Facebook, advertising space on Twitter can be purchased to promote tweets with a targeted audience. A daily budget can be set as well as a total budget. The advertisement also has to be approved by Twitter prior to implementation. A first attempt to advertise with Twitter did not work as the account was brand new, had few tweets, and was not following any other Twitter users. Changes were made to the Safe Sex Survey Twitter account to make it more desirable for advertising. A second attempt to advertise with Twitter was met with an “ineligible to participate determination” due to the assumption that adult sexual products and services were being advertised. An appeal for further review was done by the researcher. The appeal was not overturned and the account was then deemed ineligible for advertising due to violating Twitter’s Quality policy.

A Pennsylvania State University Study Finder advertisement was created for the study. This was done during the IRB approval process. There was no charge to advertise the study via Study Finder.

Finally, the study was advertised through Craigslist. Advertisements were placed in the Volunteers section within the Community section of Craigslist. Placing these advertisements was free and the advertisement postings expired in 45 days. One downfall of advertising in this manner is that the postings drop down further on the page as more content is posted. The study

advertisements were placed in the following cities: Atlanta, GA; Baltimore, MD; Charlotte, NC; Chicago, IL; Dallas, TX; Houston, TX; Indianapolis, IN; Jacksonville, FL; Los Angeles, CA; Miami, FL; Nashville, TN; New York, NY; Philadelphia, PA; Phoenix, AZ; Pittsburgh, PA; San Francisco, CA; and Seattle, WA. The cities were chosen due to both large size and also some had high rates of older adults with HIV so therefore may have had citizens more at risk for contracting the disease.

SurveyMonkey Audience. SurveyMonkey Audience was used as a study setting due to both the need for a large number of participants for the factor analysis and also the need for more study sites since advertising on online dating sites was not feasible. With Audience, potential participants can be purchased through SurveyMonkey. The cost of the audience varies by number of responses, number of survey items, and targeting options. The current survey was targeted for adults age 50 and older who use technology to access online dating sites. Based on all of these specifications, the survey audience cost \$1550 for a targeted goal of $N = 200$ participants. The high cost was mainly due to having a large number of survey items and very specific targeting options. One caveat for using SurveyMonkey is that the survey has to go out through their own survey platform and not via Research Electronic Data Capture (REDCap). A second caveat is that the survey is limited to no more than 50 items. This limitation does not include items that SurveyMonkey already gathers on participants such as gender, zip code, and income.

Sample

This feasibility study used nonprobability convenience sampling. The inclusion criteria for participants was: able to read English; age 50 or older; and having used online dating sites

currently or within the past year. Given that this was a feasibility study, no participants were excluded based upon their sexual orientation.

Incentives

Incentives were used in this study and differed based on whether the participant completed a survey via SurveyMonkey versus REDCap. The use of incentives has been found to draw in a sample more representative of the larger population when compared to surveys that do not use incentives (Groves et al., 2009). The reason for this may be that not using incentives will just draw in participants who have an interest in the topic and therefore are not necessarily representative of the larger population (Groves et al., 2009). The use of incentives in HIV prevention research is considered to be standard practice in the US (Pequegnat et al., 2007).

One way to combat the confidentiality concerns for incentives is to send the incentive to an email address rather than a home address. With the plethora of free web-based sites that offer email management, many people have an account that they use for online shopping, etc. and is not linked to their real name. Despite the possibility of obtaining an anonymous email account, some participants still may not feel comfortable providing an email address. Other limitations to using incentives include that it could add bias to the survey such as increasing the chances of the same person completing multiple surveys in the hopes of obtaining the incentive award (Pequegnat et al., 2007).

The participants who completed the survey in REDCap were given the option of being placed in a drawing for one of three \$100 Amazon eGift Cards. A raffle for a larger amount of money was chosen over giving each participant a small amount of money due to the uncertainty of the number of participants needed to obtain complete cases. Participants who opted to be entered into the drawing were directed to a Qualtrics site separate from the REDCap platform

where they could enter their email address. SurveyMonkey Audience does not allow researchers to offer incentives to their participants. However, SurveyMonkey Audience has their own incentive program which is fairly similar to the incentive for REDCap participants. For every survey that a SurveyMonkey Audience member completes, SurveyMonkey donates \$0.50 to a charity of the participant's choice and enters the participant into a lottery to win a \$100 Amazon eGift Card. One eGift Card winner is picked each month.

Measures

The survey consisted of screening questions, questions related to HIV prevention and sexual risks, demographics, questions about dating, and sexual health history. The questions related to HIV prevention and sexual risks consisted of both original and modified items from the Condom Use Self-Efficacy Scale (CUSES) and Sexual Risks Scale (SRS), as well as new items based on expert panel review feedback.

Screening Questions

Prior to consenting for the survey, potential participants answered questions to screen in or out of the survey. These were researcher generated questions. The questions required yes or no answers. If at any point the participant answered a question that screened them out of the survey, the survey rerouted them to a page with a message thanking them for their interest and time and the potential participant was no longer able to access the survey. The screening questions included, in this order: 1) Are you age 50 or older? and 2) Are you a current user of online dating sites and/or applications or have used them in the past year? A "yes" answer to both questions will screen someone into the study. After passing the screening questions the potential participant was then taken to the study consent page.

Condom Use Self-Efficacy Scale

Self-efficacy for both condom use and talking to a partner about safe sex was measured using both original and modified (based on expert panel review feedback) items from the CUSES (Brafford & Beck, 1991). The CUSES is a 28-item scale that measures a person's self-efficacy for using condoms and talking about safe sex with a partner (Brafford & Beck, 1991). CUSES uses a Likert-type scale with participants rating their responses from 1 to 5 for each question: 1) strongly agree; 2) agree; 3) undecided; 4) disagree; and 5) strongly disagree. Some of the questions are reverse coded and scores can range from 28 to 140 with a lower score indicating higher self-efficacy. Overall, internal reliability was high (Cronbach's alpha = .91) and the test-retest correlation was adequate ($r = .81$) and it was found to have adequate correlation with other self-efficacy scales. It was originally tested in college students (Brafford & Beck, 1991).

Brien, Thombs, Mahoney, and Wallnau (1994) tested the CUSES on a population of 18 to 23 year old college students ($n = 339$). After administering the original 28-item CUSES instrument, the researchers then subjected the 28-items to factor analysis using a varimax rotation. Varimax (i.e., orthogonal) rotations are used to increase interpretability of extracted factors (Brown, 2015). The resulting factors each had eigenvalues greater than 1.00 and together accounted for 51.7% of the variance in the CUSES items. A total of 13 items did not meet the criteria to be assigned to the four resulting factors and were dropped from the scale and one other item was later dropped as well. The four subscales (factors) include: Mechanics, Partner's Disapproval, Assertive, and Intoxicants (Brien et al., 1994). Three items loaded on the Mechanics scale (Cronbach's alpha = .78). Five items loaded on the Partner's Disapproval scale (Cronbach's alpha = .81). Three items loaded onto the Assertive scale (Cronbach's alpha = .80) as well as the Intoxicants scale (Cronbach's alpha = .82). Brien et al. addressed validity by

checking for social desirability bias. The subscales of the CUSES were correlated with the short-form Marlow-Crowne Social Desirability Scale (Strahan & Gerbasi, 1972). All of the correlations were negligible except for Intoxicants ($r = .18$) which indicated that social desirability and intoxicants share 3% of common variance, thus the CUSES was deemed free of social desirability bias (Brien et al., 1994).

There is a paucity of studies that have used the Brien et al. (1994) CUSES. Many have used a few items, have drastically changed items, or have only used a couple of items in conjunction with items from other instruments. Only one study (Rosenthal et al., 2014) has used it appropriately in its entirety. Rosenthal and colleagues (2014) studied sexual risk among young urban pregnant women of color. The Cronbach's alpha was 0.88 for the entire 14-item scale. They did not report reliability for individual scales (Rosenthal, 2014). The majority of studies using the CUSES, pieced together investigator created questions related to condom use self-efficacy. As previously mentioned, a couple of studies did use full subscales of the Brien et al. CUSES. Abbey, Parkhill, Buck, and Saenz (2007) used the partner's disapproval (Cronbach's alpha = .74) and assertiveness (Cronbach's alpha = .74) subscales in a study of college students' condom use with a casual partner while intoxicated. Winningham et al. (2004) used the mechanics and assertive CUSES subscales when studying sexual risk in older rural African American women. The two subscales had a combined Cronbach's alpha of .84 (Winningham et al., 2004).

This research study used the Brien et al. (1994) version of the CUSES due to concerns about redundancy and time with the larger scale (Appendix A). The items from the CUSES underwent two rounds of expert panel review as described later in this chapter.

Sexual Risks Scale

HIV risk behaviors and risk perception were measured using original and modified (post expert panel review) items from the SRS (Appendix B; DeHart & Birkimer, 1997). Originally a 40-item instrument, the SRS underwent principal components factor analysis with a varimax rotation after an initial survey had been done (DeHart & Birkimer, 1997). Twenty-six items that had previously been identified in the following categories were entered into a single analysis: Attitudes, Normative Beliefs, Perceived Susceptibility, and Substance Use. This resulted in four distinct components with none of the items having loadings of greater than .35 on more than one subscale. Attitude accounted for around 24% of the variance, Normative Beliefs 13%, Perceived Susceptibility 10%, and Substance Use 6%. The items concerning expectation and intention were subjected to a principal components analysis with oblique direct oblimin rotation. Three factor loadings were extracted: Expectations which accounted for 38% of the variance and the other two factor loadings dealt with Intention with 14% and 9% of the total variance. The Intention groups were correlated ($r = .52, p < .01$) and the subscale had a high internal consistency, therefore the investigators combined the two groups into one subscale. The final scale had a total of 38-items and 6 subscales including: Attitudes (Cronbach's alpha = .88), Normative Beliefs (Cronbach's alpha = .80), Intention (Cronbach's alpha = .80), Expectation (Cronbach's alpha = .80), Perceived Susceptibility (Cronbach's alpha = .84), and Substance Use (Cronbach's alpha = .76). Overall internal reliability had a Cronbach's alpha of .86. Predictive validity was assessed by using regression analysis on the scale to predict HIV risk behavior. When taken as a whole, the scale predicted HIV risk behavior for both those with and without a steady partner (DeHart & Birkimer, 1997). The questions are assessed on a Likert-type scale from 1-5 with: 1) strongly disagree; 2) disagree; 3) undecided/neutral; 4) agree; and 5) strongly agree. The scores range

from 38 to 190 with higher scores indicating higher risk behavior. The initial study utilized samples of college students and was theoretically derived from numerous health behavior models including the TRA, I-M-B Skills Model and the HBM.

Similar to the other instruments, parts of the SRS have been utilized in many studies but often it was done in a piecemeal fashion. Table 3.1 provides a comparison of the internal consistency of SRS subscales used by different investigators. Younge, Salem, and Bybee (2010) studied HIV risk perception in low-income African American women and used the perceived susceptibility subscale of the SRS. The attitudes subscale of the SRS was used in a study involving sexual decision-making in multiethnic college women (Kennedy & Roberts, 2009), a study about sexual pressure on young urban women's use of condoms (Gakumo, Moneyham, Enah, & Childs, 2012), a study about a workplace HIV risk reduction training program (Chimbetete & Gwandure, 2011), and an Internet-based STD intervention study with young Chilean women (Villegas et al., 2015). Kennedy and Roberts (2009) did not report on subscale reliability. Maliszewski and Brown (2014) used the Intentions subscale in their study that examined factors including sexual risks among foster care alumni. The normative beliefs subscale was used in a study of sexual risk behaviors in substance-using Latino adolescents (Kapadia et al., 2012). Walcott, Chenneville, and Tarquini (2011) used all six SRS subscales in their study of the relationship between previous sex education and sexual attitudes and behavior of college students and found the SRS to have adequate internal reliability with Cronbach's alpha ranging from .71 for the intentions subscale to .91 for the attitudes subscale. All subscales of the SRS were used in a study that researched risky sexual behavior in older adults but only the overall internal reliability was reported (Foster et al., 2012). The SRS has been used extensively in college-aged populations. This calls into question the results of the Foster et al. (2012) study

Table 3.1

Comparison of Internal Consistency of Subscales of Studies Using the SRS

Study	Attitudes subscale	Normative Beliefs subscale	Intentions subscale	Expectations subscale	Perceived Susceptibility subscale	Substance Abuse subscale	Overall SRS
DeHart & Birkimer, 1997	Cronbach's alpha = .88	Cronbach's alpha = .80	Cronbach's alpha = .80	Cronbach's alpha = .80	Cronbach's alpha = .84	Cronbach's alpha = .76	Cronbach's alpha = .86
Younge et al., 2010	X	X	X	X	Cronbach's Alpha = .67	X	X
Kennedy & Roberts, 2009	Not reported	X	X	X	X	X	X
Gakumo et al., 2012	Cronbach's alpha = .86	X	X	X	X	X	X
Chimbetete & Gwandure, 2011	Cronbach's alpha = .91	X	X	X	X	X	X
Kapadia et al., 2012	X	Cronbach's alpha = .84	X	X	X	X	X
Walcott et al., 2011	Cronbach's alpha = .91	Not reported	Cronbach's alpha = .71	Not reported	Not reported	Not reported	Not reported
Foster et al., 2012	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Cronbach's alpha = .86
Corbin et al., 2009	Not reported	Not reported	Not reported	Not reported	Not reported	Not reported	Cronbach's alpha = .88
Maliszewski & Brown, 2014	X	X	Cronbach's alpha = .85	X	X	X	X
Villegas et al., 2015	Cronbach's alpha = .87	X	X	X	X	X	X

which used an older adult population. The scale should have undergone psychometric testing, otherwise there is little confidence in the reliability and especially the content validity (Bannigan & Watson, 2009). Corbin, Voisin, and Snell (2009) used all six SRS subscales in their study on the relationship between spirituality and HIV risk among young black college students but only reported on overall internal consistency as well.

Other Questions

Participants were asked demographic questions related to age, marital status, gender, ethnicity, geographic location, education level, and income level. Specific questions related to dating were asked. Some examples included: specific dating sites and applications used, length of time using online dating sites, and number of different dating partners obtained by using the sites. Questions related to sexual health history were also asked. Some examples of these included: any health problems that interfere with having sex such as physiological changes associated with aging and frequency of condom use.

Instrument Changes

All of the instruments being used in this study have rarely, if at all, been used in an older adult population or an online setting. Changes were made to the scales to accommodate the needs and values of an older adult population.

Pretesting

Due to myriad factors such as changing the psychometric properties of the instruments, using the survey in an older adult population and using an online setting, pretesting of the survey was attempted to ascertain whether it was appropriate for the study (Crocker & Algina, 1986). Pretesting provides information about any problems with content, administration, or scoring (Waltz, Strickland, & Lenz, 2010). The plan for pretesting was that it would be implemented

through the use of both expert panel review and field pretests (Groves et al., 2009). However, an adequate sample of participants for the field pretesting was unable to be obtained therefore only expert panel review was conducted. Experts in the topical content of the survey can help to improve the content validity of the survey (Waltz et al., 2010). For this study, a panel of experts in HIV prevention, older adult sexuality, and gerontology were assembled to determine if the questions from the CUSES and SRS were measuring what they purport to measure as well as whether the items were appropriate for an older population. Once adequate evidence of content validity was obtained from expert panel review (Waltz et al., 2010), the survey was distributed via the larger feasibility study.

Expert panel review. The items from the SRS and CUSES underwent two rounds of expert panel review. For the first round 17 interdisciplinary experts in HIV and aging research, older adult sexuality, and gerontology were queried regarding their interest in taking part in the expert panel review. Ten experts agreed to take part and provided feedback. For the first round of review, the experts were presented with all 38 items from the SRS and 14 items from the CUSES. They were then to rate each item on Likert scale from 1 to 7 (1 = not at all likely, 7 = extremely likely) on how likely each item applied to the sex life of older adults. For any item rated ≤ 4 , the experts were to state what modifications could be made to make the item better or whether the item should be eliminated entirely. Items with content validity at the item level (I-CVI) < 0.78 were determined not relevant (Polit & Beck, 2008). At the end of round one, three of the 14 CUSES items and fourteen of the 38 SRS items had an I-CVI < 0.78 . Items were found to be problematic due to content and/or question structure. Two of the problematic items (both in SRS) were deleted and the rest were modified as appropriate. Nine new questions were added based on expert feedback.

For the second round, three experts rated the modified scales using round one criteria. Two of the 14 CUSES items, two of the 36 SRS items, and none of the nine newly added items had an I-CVI < 0.78. The low scoring items were modified and two new items were added based on feedback.

Due to the constraints of SurveyMonkey Audience limiting their survey to no more than 50 total items, the final instrument regarding HIV prevention and sexual risks was reduced to 31 items (Table 3.2) based on duplication of concepts. This 31 item scale will now be referred to as the HIV prevention scale. The HIV prevention scale included original and modified items from the CUSES and SRS as well as some new questions that came from the expert panel review. The items from the SRS were originally coded from strongly disagree = 1 to strongly agree =5, while the items from the CUSES were coded in a reverse manner (e.g., strongly disagree =5 to strongly agree = 1). To avoid confusion when taking the combined survey, the responses to the CUSES items were recoded to match those of the SRS and reverse coded as appropriate.

Table 3.2.

SRS, CUSES, and New Items Pre- and Post- Expert Panel Review

Scale	Original Item	Modified Item
SRS	It is a hassle to use condoms.	Not modified.
SRS	People can get the same pleasure from “safer” sex as from unprotected sex.	People can get the same pleasure from safer sex (sex with a condom) as from unprotected sex.
SRS	“Safer” sex reduces the mental pleasure of sex.	Safer sex reduces the mental pleasure of sex.
SRS	Generally, I am in favor of using condoms.	Not modified.
SRS	The sensory aspects (smell, touch, etc.) of condoms make them unpleasant.	Not modified.
SRS	If I had sex and I told my friends that I did not use condoms, they would be angry or disappointed.	Not modified.

Scale	Original Item	Modified Item
SRS	My friends talk a lot about "safer" sex.	My friends talk a lot about safer sex (sex with a condom).
SRS	My sexual experiences do not put me at risk for HIV/AIDS.	My sexual experiences do not put me at risk for HIV.
SRS	I may have had sex with someone who was at risk for HIV/AIDS.	I may have had sex with someone who was at risk for HIV.
SRS	I am at risk for HIV/AIDS.	I am at risk for HIV.
SRS	If I had a date, I would probably not drink alcohol or use drugs.	If I had a date where I thought there was the possibility of having sex, I would probably not drink alcohol or use drugs (e.g., illicit drugs or medications that may impair judgment).
SRS	If I were going to have sex, I would take precautions to reduce my risk of HIV/AIDS.	If I were going to have sex, I would take precautions to reduce my risk for HIV.
SRS	"Safer" sex is a habit for me.	Safer sex is a habit for me.
SRS	I intend to follow "safer sex" guidelines within the next year.	I intend to follow safer sex guidelines within the next year.
SRS	I am determined to practice "safer" sex.	I am determined to practice safer sex.
SRS	If my partner wanted me to have unprotected sex, I would probably "give in".	If a partner wanted me to have unprotected sex, I would probably give in.
SRS	If my partner wanted me to participate in "risky" sex and I suggested a lower-risk alternative, we would have the "safer" sex instead.	If a partner wanted me to participate in risky sex and I suggested a lower-risk alternative, we would have the safer sex instead.
CUSES	I feel confident in my ability to put a condom on myself or my partner.	I feel confident in my ability to use a condom correctly.
CUSES	I feel confident I could gracefully remove and dispose of a condom when we have intercourse.	I feel confident I could effectively remove and dispose of a condom when I have intercourse.
CUSES	If I were to suggest using a condom to a partner, I would feel afraid that he or she would reject me.	Not modified.
CUSES	If I were unsure of my partner's feelings about using condoms, I would not suggest using one.	Not modified.
CUSES	I feel confident in my ability to discuss condom usage with any partner I might have.	Not modified.

Scale	Original Item	Modified Item
CUSES	I feel confident that I would remember to use a condom even after I have been drinking.	Not modified.
CUSES	I feel confident that I would remember to use a condom even if I were high.	I feel confident that I would remember to use a condom even if I were high due to drugs or medications.
New Item	Not applicable.	I have a medical condition (e.g., erectile dysfunction, vaginal dryness, arthritis, low libido, etc.) that interferes with condom use.
New Item	Not applicable.	My physical health interferes with my ability to have sex.
New Item	Not applicable.	I would reject a partner if they suggested that we use a condom during sex.
New Item	Not applicable.	I feel confident in my ability to advocate for condom use with a partner who did not want to use condoms.
New Item	Not applicable.	I am concerned that if I insist on using condoms, potential partners will not want to be in a relationship with me.
New Item	Not applicable.	My desire to have sex without a condom is greater than my worry about contracting HIV.
New Item	Not applicable.	I do not need to use a condom because pregnancy is not possible for me or my partner.

Note. AIDS = Acquired Immunodeficiency Syndrome; CUSES = Condom Use Self Efficacy Scale; HIV = Human Immunodeficiency Virus; SRS = Sexual Risks Scale

Data Collection

The study underwent Pennsylvania State University IRB approval prior to recruitment of participants (see Appendix C for IRB approval letter). Participants were recruited from sites as described in the Settings section above. Once participants saw the advertisements for the study, they could choose to click on the survey link if they were interested (see Appendix D for IRB approved study advertisements and email invitation). They were then consented online via informed consent and could proceed to take the survey (see Appendix E for IRB approved

consents). Consent was obtained by having them click “yes” on whether they agreed to take part in the survey. Participant data were directly entered into the REDCap database or SurveyMonkey.

As previously mentioned, the potential participants who were not recruited through SurveyMonkey Audience were informed of the survey through advertisements online. If interested in the study, the potential participants clicked on a link in the advertisement which then took them to the survey. The survey was built into REDCap which is a secure, web-based application that allows for data capture and streamlines and securely manages data. It is maintained by the REDCap Consortium. REDCap is Health Insurance Portability and Accountability Act of 1996 compliant. All data in REDCap are encrypted and stored on a secure server, user authentication and password is required for database access, access permissions is controlled by the primary investigator, and log-in and audit trails for all data interactions is also provided. Data are stored in REDCap. The participants had one chance to complete the survey and were not be able to save and come back to it. There was only one time of measurement for the participants. After the survey was completed, the participants’ involvement in the study came to an end. If the participants wanted to be entered into the Amazon eGift Card drawing, they had the option of entering their email into a separate Qualtrics survey that was linked at the end of the REDCap survey.

The SurveyMonkey Audience participants were recruited by SurveyMonkey. They were sent an email from SurveyMonkey with a link to the survey. After clicking on the link and consenting to the study, they were then directed to the survey which had the same content as the REDCap survey. All data are stored on the secured SurveyMonkey servers.

The proposed study posed minimal risks to participants. One risk involved was psychological as some of the questions deal with personal information that may be considered embarrassing or intrusive (i.e., number of sexual partners in the past year or condom use). Participants were informed that they could skip items or stop taking the survey if they were uncomfortable with the content. Potentially uncomfortable questions were identified through expert panel review and revised as needed. Also, participants were assured that their data would be held in the strictest of confidence. The use of the REDCap interface and SurveyMonkey greatly minimizes the risk of data breaches of sensitive health information.

The proposed study offers insight into an area that may benefit older online daters in the future. However, current participants will not directly benefit from the proposed study beyond gaining an increased awareness of their current sexual practices and attitudes related to HIV prevention. Given the minimal risks involved with the study and the benefit of gleaning information that can be used to conduct intervention studies tailored toward older adults—the benefits outweigh any potential risks. There is the potential that the survey items may increase HIV risk awareness for the current participants.

Data Analysis

Statistical Analysis

Descriptive and correlational statistical analyses were employed. Using this type of analysis provides a description of the relationships among the variables (Polit & Beck, 2008). The data were analyzed using the SPSS (version 25) analytical package as well as the AMOS add-on for SPSS.

The surveys were examined for missing data. Descriptive statistics such as measures of central tendency and standard deviation was computed on HIV prevention scale items as well as

participant demographics. A Pearson correlation matrix for the HIV prevention scale items was performed to assess associations.

Factor Analysis

The CUSES and the SRS underwent changes to make them more appropriate for an older adult population. Due to these changes both exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were used to the factor structure of the HIV prevention scale items. EFA was used to aid in determining factor structure and helping to inform the specification of the CFA. EFA is a descriptive technique that helps to determine the correct number of common factors and interrelationships among factors (Brown, 2015). When making changes to the instruments, the factors may not load on the same subscale as in previous research using the instruments which is what makes EFA important (Brown, 2015). Principal-axis factor analysis was used for factor extraction. The extracted factors then underwent rotation using a varimax rotation.

After EFA was completed, CFA was employed. All components of the factor model (e.g., the number of factors, pattern of factor loadings, etc.) were determined *a priori* (Brown, 2015) CFA is used to predict factors that account for variation and covariation. Maximum likelihood methods were used for factor extraction. *A priori* factor selection was based on previously published psychometric work using the SRS and CUSES. This step allowed for the detection of any deviations in the factor structure from what is hypothesized in the scale development literature (Brown, 2015). Results from the correlational analysis and EFA were also used to aid in model specification.

According to Bryant and Arnold (1995), when doing a factor analysis, there should be at least five subjects for every item in the instrument that will undergo CFA with a minimum of

100 participants regardless of instrument size. After expert panel review, there were 31 items remaining for factor analysis. Therefore, a sample of 155 complete cases were needed for this study. Approximately 400 participants were recruited to reach the targeted number of complete cases.

The values for model fit in CFA were estimated using maximum likelihood and estimates for the factor loadings are reported as standardized estimates which typically range from -1 to 1. Cases where there was incomplete data for the 31 HIV prevention scale items were discarded so that modification indices could be used to aid in model fit, leaving $n = 252$ cases for the CFA. Ultimately the most parsimonious model, or simplest explanation of the data was chosen for the final model. Model fit was evaluated using the following: chi-square goodness of fit test which should preferably be non-significant; relative fit indices – the comparative fit index (CFI) and Tucker-Lewis index (TLI) both which should be greater than .90; and the root mean square error of approximation (RMSEA) which should be $\leq .08$ (Bentler, 1990; Bentler & Bonnet, 1980). A RMSEA that is less than .05 indicates an excellent model fit (Browne & Cudeck, 1993). Chi-square in larger samples is sensitive to minor deviations in model fit which is why relative fit is used in addition to global fit (Brown, 2015).

Summary

This feasibility study employed a cross-sectional, descriptive, correlational design. The survey was administered via social media sites and SurveyMonkey. Participants in the study were adults age 50 and older who had used online dating sites or applications in the past year. The survey consisted of items regarding sexual health, dating preferences, and the 31 HIV prevention scale items. The HIV prevention scale items had been modified to better suit an older adult sample after undergoing two rounds of expert panel review. Data analysis was done via

descriptive, correlational methods. Due to the modification of instruments, EFA and CFA were also completed.

Chapter 4

Results

The data for this study were collected between November 2017 and December 2017. The study results are organized into sections based on analysis type and then by research question. The analysis types are: descriptive statistics of the sample and HIV prevention scale items; correlation analysis of the HIV prevention scale items; EFA; and CFA. Finally, the research questions and results related to the questions are presented in numerical order.

Sample Description

The demographic details of the sample are reported in Table 4.1. A total of 280 participants consented to and completed the surveys. Most of the study subjects ($n = 199$; 71%) were recruited from SurveyMonkey Audience. Eighty-one participants completed the study via REDCap and the majority of them were recruited from Facebook (18.2% of total study, 63% of REDCap participants). While all nine geographical regions recognized by the United States Census Bureau (United States Census Bureau, n.d.) were sampled, the majority of participants lived in one of three regions – Pacific (21.1%), South Atlantic (18.6%), or Mid-Atlantic (17.9%). The mean age of the participants was 60.96 ($SD = 7.72$) with an age range of 50 to 85 years old. Participants were split almost equally between genders (men = 49.3%; women = 50.3%) and were mostly white (89.3%), non-Hispanic (92.1%), and heterosexual (83.9%). A little over half of the sample had a bachelor's degree (25.4%) or graduate/professional degree (25.8%). The majority of the participants (61%) had an annual household income of less than \$75,000.

Table 4.1.

Demographic Characteristics of the Study Sample

Characteristics	Frequency N = 280	Percent
Age^a		
50 – 54 years old	68	24.3
55 – 59 years old	60	21.4
60 – 64 years old	60	21.4
65 – 69 years old	47	16.8
70 – 79 years old	38	13.6
80 + years old	4	1.4
Did not answer	3	1.1
Gender		
Female	141	50.3
Male	138	49.3
Did not answer	1	0.4
Race^b		
White	250	89.3
Black or African American	22	7.9
Native Hawaiian or Other Pacific Islander	4	1.4
Other	4	1.4
American Indian or Alaskan Native	3	1.1
Asian	2	0.7
Prefer not to answer	2	0.7
Did not answer	1	0.4
Hispanic or Latino		
No	258	92.1
Yes	15	5.4
Did not answer	3	1.1
Don't know/Not sure	2	0.7
Prefer not to answer	2	0.7
Education		
Bachelor's degree	71	25.4
Some college but no degree	57	20.4
Master's degree	49	17.5
High school diploma or GED	38	13.6
Associate's degree	27	9.6
Professional degree (e.g., MD, DDS, DNP, JD)	15	5.4
Vocational or technical school degree	10	3.6
Doctoral degree (e.g., Ph.D., Ed.D.)	8	2.9
Less than high school	3	1.1
Other	1	0.4
Did not answer	1	0.4

Characteristics	Frequency <i>N</i> = 280	Percent
Annual household income		
\$0 to 9,999	13	4.6
\$10,000 to 24,999	41	14.6
\$25,000 to 49,999	67	23.9
\$50,000 to 74,999	50	17.9
\$75,000 to 99,999	26	9.3
\$100,000 to 124,999	21	7.5
\$125,000 to 149,999	13	4.6
\$150,000 to 174,999	10	3.6
\$175,000 to 199,999	5	1.8
\$200,000 or more	10	3.6
Prefer not to answer	24	8.6
Geographic region^c		
Pacific	59	21.1
South Atlantic	52	18.6
Mid-Atlantic	50	17.9
East North Central	32	11.4
West South Central	29	10.4
New England	20	7.1
West North Central	16	5.7
East South Central	13	4.6
Mountain	2	0.7
Other	1	0.4
Did not answer	6	2.1
Marital status		
Separated/Divorced	152	54.3
Single, never married	64	22.9
Widowed	34	12.1
Married/Partnered	28	10
Did not answer	2	0.7
Sexual Orientation		
Heterosexual or straight	235	83.9
Gay or lesbian	29	10.4
Bisexual	15	5.4
Prefer not to answer	1	0.4
Recruitment Site		
SurveyMonkey	199	71
Facebook advertisement	51	18.2
Craigslist advertisement	19	6.9
Other	9	3.2

Characteristics	Frequency <i>N</i> = 280	Percent
Penn State StudyFinder	2	0.7

^a*M* = 60.96; *SD* = 7.72; *Mdn* = 60; Minimum = 50; Maximum = 85. ^bPercentages will not sum up to 100 due to ability to choose multiple options. ^cWebsite for map and text breakdown of states by geographic region https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf.

The health difficulties and dating characteristics of the sample are outlined in Table 4.2. A little over half of the participants reported problems with sex. Erectile dysfunction (19.3%), low libido (19.3%), and vaginal dryness (12.1%) were the most frequently reported causes of problems with sex. The most frequently used online dating sites or applications were Match.com (39%), Plenty of Fish (36.8%), and eHarmony (19.3%). Almost a quarter (24.6%) of the participants used dating sites that were not listed in the survey, representing 54 unique sites from both dating websites and dating applications. The most frequently used sites were Craigslist (*n* = 9), Adam4Adam (*n* = 7), and Growlr (*n* = 6). The unique sites represented various preferences such as race, gender, religion, age (sites geared toward older adults), education level, and lifestyle pursuits. Interestingly one person used a language learning application to find dates. Participants were also queried on the number of people they have dated in person over the past year after meeting through an online dating site or application. The mean was 3.47 (*SD* = 6.11; *Mdn* = 2; *n* = 265; minimum = 0; maximum = 63) with the majority (55.3%) having dated one to five different people. Most of the participants (63.9%) were looking for a relationship that combined both companionship and sex.

Table 4.2.

Health Difficulties and Dating Characteristics of the Study Sample

Characteristics	Frequency	Percent
Sexual health difficulties^a		
None	130	46.4
Erectile dysfunction	54	19.3
Low libido	54	19.3
Vaginal dryness	34	12.1
Premature ejaculation	25	8.9
Inability to reach orgasm	25	8.9
Pain with sex	18	6.4
Inability to become aroused	17	6.1
Delayed ejaculation	15	5.4
Other	15	5.4
Did not answer	3	1.1
Online dating sites/applications^a		
Match.com	111	39.6
Plenty of Fish	103	36.8
Other	69	24.6
eHarmony	55	19.6
OurTime.com	53	18.9
OkCupid	53	18.9
Zoosk	46	16.4
Tinder	34	12.1
SeniorPeopleMeet	26	9.3
Grindr	14	5
ChristianMingle	17	6.1
BlackPeopleMeet	15	5.4
Did not answer	9	3.2
Chemistry.com	8	2.9
Bumble	8	2.9
Length of time online dating		
Less than one year	64	22.9
1 – 3 years	85	30.4
4 – 6 years	48	17.1
7 – 9 years	25	8.9
10 or more years	48	17.1
Did not answer	10	3.6
Desired relationship		
Both	179	63.9
Companionship	66	23.6
Sex	25	8.9
Did not answer	10	3.6

Characteristics	Frequency	Percent
Number of people dated in-person in past year		
None	74	26.5
1 – 5	155	55.3
6 – 10	19	6.8
More than 10	17	6
Did not answer	15	5.4
Condom use with sex in past year		
No sexual relationship in past year	97	34.6
Never	82	29.3
Every time	53	18.9
Some of the time	19	6.8
Most of the time	15	5.4
Very few times	12	4.3
Did not answer	2	0.7

^aPercentage will not add evenly to 100 due to ability to choose multiple options

Table 4.3 shows the descriptive statistics for the 31 items in the HIV prevention scale which include number of responses, mean, standard deviation, skew, and kurtosis. All of the items were scored on a Likert scale from one to five (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). The skewness of the items was within an acceptable range as was the kurtosis. Skew values greater than 3 and kurtosis values greater than 8 are considered out of range (Klein, 2004). The HIV prevention scale items are listed from number 14 – 44 because that is how they were numbered in the survey as well as in the analyses.

Table 4.3.

HIV Prevention Scale Item Descriptive Statistics

Item	N	M	SD	Skew	Kurtosis
14. It is a hassle to use condoms. ^a	279	3.00	1.25	-0.10	-0.95
15. People can get the same pleasure from safer sex (sex with a condom) as from unprotected sex. ^b	280	3.00	1.23	-0.03	-1.04

Item	N	M	SD	Skew	Kurtosis
16. Safer sex reduces the mental pleasure of sex. ^{a, b}	278	2.74	1.23	0.21	-0.95
17. Generally, I am in favor of using condoms.	278	3.66	1.16	-0.67	-0.30
18. The sensory aspects (smell, touch, etc.) of condoms make them unpleasant. ^a	278	3.18	1.15	-0.21	-0.78
19. If I had sex and I told my friends that I did not use condoms, they would be angry or disappointed.	278	3.17	1.16	-0.13	-0.70
20. My friends talk a lot about safer sex (sex with a condom). ^b	279	2.40	1.21	0.70	-0.28
21. My sexual experiences do not put me at risk for HIV. ^{a, b}	278	3.64	1.24	-0.69	-0.54
22. I may have had sex with someone who was at risk for HIV. ^b	279	2.11	1.26	0.86	-0.51
23. I am at risk for HIV. ^b	279	1.69	0.99	1.48	1.65
24. If I were going to have sex, I would take precautions to reduce my risk of HIV.	279	4.24	0.99	-1.49	2.00
25. If I had a date where I thought there was the possibility of having sex, I would probably not drink alcohol or use drugs (e.g., illicit drugs or medications that may impair judgment). ^{a, b}	278	3.29	1.39	-0.07	-1.39
26. Safer sex (sex with a condom) is a habit for me. ^b	280	3.22	1.25	-0.12	-0.98
27. I intend to follow safer sex guidelines within the next year. ^b	277	3.60	1.13	-0.46	-0.43
28. I am determined to practice safer sex. ^b	278	3.67	1.14	-0.57	-0.34

Item	N	M	SD	Skew	Kurtosis
29. If a partner wanted me to have unprotected sex, I would probably give in. ^{a, b}	278	2.80	1.33	-0.01	-1.25
30. If a partner wanted me to participate in risky sex and I suggested a lower-risk alternative, we would have the safer sex instead. ^b	279	3.78	1.06	-0.83	0.41
31. I have a medical condition (e.g., erectile dysfunction, vaginal dryness, arthritis, low libido, etc.) that interferes with condom use.	277	2.28	1.33	0.68	-0.82
32. My physical health interferes with my ability to have sex.	279	2.18	1.22	0.85	-0.33
33. I would reject a partner if they suggested that we use a condom during sex. ^a	278	1.82	1.08	1.50	1.78
34. I feel confident in my ability to advocate for condom use with a partner who did not want to use condoms.	278	3.73	1.04	-0.76	0.33
35. I am concerned that if I insist on using condoms, potential partners will not want to be in a relationship with me. ^a	278	2.15	1.05	0.78	0.10
36. My desire to have sex without a condom is greater than my worry about contracting HIV. ^a	277	2.14	1.26	0.88	-0.39
37. I do not need to use a condom because pregnancy is not possible for me or my partner. ^a	279	2.78	1.48	0.23	-1.39
38. I feel confident in my ability to use a condom correctly. ^b	277	4.18	0.94	-1.39	2.07
39. I feel confident I could effectively remove and dispose of a condom when we have intercourse. ^b	277	4.20	0.88	-1.34	2.21

Item	N	M	SD	Skew	Kurtosis
40. If I were to suggest using a condom to a partner, I would feel afraid that he or she would reject me. ^a	278	2.10	0.96	0.82	0.56
41. If I were unsure of my partner's feelings about using condoms, I would not suggest using one. ^a	278	2.10	1.08	0.89	0.10
42. I feel confident in my ability to discuss condom usage with any partner I might have.	277	4.00	1.03	-1.20	1.14
43. I feel confident that I would remember to use a condom even after I have been drinking.	278	3.84	1.07	-0.76	-0.07
44. I feel confident that I would remember to use a condom even if I were high due to drugs or medications. ^b	274	3.48	1.17	-0.37	-0.70

Note. Items 14 – 30 are from the Sexual Risks Scale, items 31 – 37 are new items, and items 38 – 44 are from the Condom Use Self-Efficacy Scale. HIV = Human immunodeficiency virus.

^a Reverse coded in instrument, not reflected in this analysis. ^b Modified from original instrument.

Correlational Analysis of HIV Prevention Scale Items

Tables 4.4 and 4.5 show the Pearson's *r* correlation coefficients for the 31 HIV prevention scale items (reflects items 14 – 44 on the study survey). Correlation effect size interpretation for this study is based on that of Cohen (1988) and is widely used in psychological and health research. Effect size of .10 is weak, .30 is moderate, and .50 is strong. Many of the items have at least moderate correlations with other items that were within their own subscale in either the SRS or the CUSES as well as with similar items throughout the HIV prevention scale. The new HIV prevention scale items tended to correlate with each other or similar items in the CUSES and SRS subscales.

Table 4.4.

Correlation Table for HIV Prevention Scale Items 14 – 29

Item	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
14	-															
15	.45**	-														
16	.44**	.23**	-													
17	.43**	.47**	.32**	-												
18	.48**	.37 ^b	.32**	.28**	-											
19	.17**	.24**	.14*	.33**	-.05	-										
20	.20**	.21**	.03	.21**	.10	.34**	-									
21	-.06	-.04	.03	-.03	-.12	.02	.02	-								
22	-.09	-.08	-.11	-.03	-.04	-.00	-.07	.29**	-							
23	-.10	-.09	-.07	-.09	-.05	-.05	.02	.40**	.48**	-						
24	.41*	.28**	.31**	.46**	.21**	.28**	.20**	-.20**	-.15*	-.26**	-					
25	-.14*	-.21**	-.05	-.09	-.12	-.20**	-.27**	.06	.21**	.06	-.22**	-				
26	.42**	.38**	.27	.55**	.23**	.38**	.41**	-.10	-.11	-.14*	.50**	-.26**	-			
27	.38**	.32**	.29**	.50**	.19**	.38**	.36**	-.04	-.03	-.03	.53**	-.30**	.69**	-		
28	.40**	.36**	.30**	.52**	.25**	.33**	.33**	-.08	-.08	-.09	.64**	-.30**	.69**	.87**	-	
29	.49**	.35**	.39**	.44**	.33**	.30**	.23**	-.14*	-.18**	-.20**	.46**	-.26**	.50**	.47**	.51**	-
30	.22**	.37**	.21**	.27**	.14**	.16**	.12*	-.21**	-.08	-.12*	.29**	-.20**	.30**	.38**	.37**	.24**
31	-.23**	-.07	-.17	-.16**	-.09	-.08	-.01	.10	.11	.10	-.13*	-.03	-.16**	-.09	-.07	-.25**
32	-.04	.06	.07	.07	.02	-.02	.09	-.02	.03	-.05	.04	-.10	.00	.07	.12*	-.05
33	.36**	.21**	.35**	.39**	.25**	.18**	.06	-.08	-.11	-.20*	.45**	-.16**	.30**	.33**	.32**	.31**
34	.34**	.34**	.32**	.40**	.18**	.27**	.20**	-.15*	-.08	-.12	.37**	-.17**	.49**	.50**	.48**	.40**
35	.27**	.11	.24**	.14*	.12*	.12*	-.01	-.18**	-.08	-.13*	.20**	-.03	.06	.08	.06	.21**
36	.39**	.24**	.33**	.46**	.28**	.19**	.06	-.13*	-.12*	-.20**	.50**	-.23**	.40**	.48**	.48**	.51**
37	.29**	.16**	.24**	.38**	.16**	.24**	.17**	-.02	.03	-.07	.32**	-.08	.37**	.36**	.39**	.46**
38	.29**	.12	.09	.21**	.20**	.09	.10	-.14*	.03	.01	.28**	-.06	.31**	.30**	.30**	.18**
39	.23**	.10	.08	.17**	.15*	.10	.03	-.16**	.05	-.05	.22**	-.06	.23**	.21**	.22**	.09
40	.27**	.09	.28**	.17**	.15*	.14*	.01	-.07	-.05	-.20**	.26**	-.03	.14*	.18**	.15*	.23**
41	.39**	.27**	.38*	.42**	.29**	.22**	.07	-.05	-.12*	-.25**	.45**	-.10	.38**	.37**	.38**	.52**
42	.19**	.17**	.17**	.22**	.15*	.21**	.08	-.08	.00	-.18**	.22**	-.07	.19**	.24**	.21**	.18**
43	.23**	.29**	.24**	.27**	.29**	.07	.03	-.17**	-.04	-.60**	.25**	-.08	.26**	.24**	.28**	.25**
44	.14*	.24**	.10	.24**	.13*	.09	-.00	-.08	-.02	-.11	.16**	-.02	.21**	.20**	.21**	.13*

Note. Items 14 – 30 are from the Sexual Risks Scale, items 31- 37 are new items, and items 38 – 44 are from the Condom Use Self-Efficacy Scale. Sample size ranged from 271 – 280 due to missing items.

^aCorrelation is significant at the 0.05 level (2-tailed). ^bCorrelation is significant at the 0.01 level (2-tailed)

Table 4.5.

Correlation Table for HIV Prevention Scale Items 30 – 44

Item	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
30	-														
31	-.03	-													
32	.08	.41**	-												
33	.31**	-.20**	.01	-											
34	.42**	-.10	-.04	.35**	-										
35	.10	-.26**	-.11	.29**	.25**	-									
36	.34**	-.22**	.00	.51**	.44**	.30**	-								
37	.14*	-.19**	-.08	.22**	.24**	.13*	.39**	-							
38	.24**	-.11	-.07	.22**	.40**	.07	.27**	.10	-						
39	.24**	-.07	-.06	.19**	.36**	.10	.18**	.07	.74**	-					
40	.14*	-.23**	-.01	.29**	.21**	.56**	.29**	.13*	.16**	.21**	-				
41	.33**	-.22**	-.01	.41**	.41**	.31**	.47**	.27**	.25**	.19**	.45**	-			
42	.16**	-.10	-.07	.14*	.41**	.14*	.22**	.11	.40**	.37**	.23**	.29**	-		
43	.32**	-.13*	.01	.21**	.42**	.24**	.31**	.14*	.32**	.27**	.19**	.30**	.35**	-	
44	.20**	-.05	-.01	.16**	.35**	.21**	.20**	.06	.24**	.19**	.11	.16**	.29**	.72**	-

Note. Item 30 is from the Sexual Risks Scale, items 31- 37 are new items, and items 38 – 44 are from the Condom Use Self-Efficacy Scale. Sample size ranged from 271 – 280 due to missing items.

^aCorrelation is significant at the 0.05 level (2-tailed). ^bCorrelation is significant at the 0.01 level (2-tailed).

Some items did have weak correlations within the same subscale. For instance, item 15 and 16 are both in the SRS Attitudes subscale and had a weak positive correlation, $r = .23, p = .01$. Other items fared better with items located outside of the same subscale or instrument. Item 17 which is also in the SRS Attitudes subscale had stronger positive correlations with three items from the SRS Intentions subscale (items 26 – 28; r ranged from .50 to .55, $p = .01$ for all) than the Attitudes subscale. Similarly, the two items (items 19 and 20) in the SRS Normative Beliefs subscale were moderately positively correlated, $r = .34, p = .01$ but both items 19 and 20 had stronger positive correlations with two items in the SRS Intentions subscale (item 26 $r = .38, p = .01$ and $r = .41, p = .01$ respectively; item 27 $r = .38, p = .01$ and $r = .36, p = .01$ respectively).

Some of the items were strongly correlated. A strong negative correlation was found between item 23 (SRS Perceived Susceptibility subscale) and item 43 (CUSES Intoxicants subscale), $r = -.60, p = .01$ which suggests a greater risk perception for HIV is associated with less confidence for remembering to use a condom after drinking. Items 24, 26, 27, and 28 which were all from the SRS Intentions subscale were all strongly to very strongly positively correlated, r ranged .50 - .87. The items from the SRS Intentions subscale that were very strongly correlated were items 27 and 28, $r = .87, p = .01$. Item 27 involves intention to follow safer sex guidelines, while item 28 refers to being determined to practice safer sex. Items 38 and 39 (both from CUSES Mechanics subscale) were also strongly positively correlated, $r = .74, p = .01$. Item 38 focuses on confidence in ability to correctly use a condom while item 39 concentrates on being able to efficiently remove and dispose of a condom. Items 43 and 44 were from the CUSES Intoxicants subscale and had a strong positive correlation, $r = .72, p = .01$ which is to be expected as both focus on intoxicants – alcohol and drugs respectively.

Items 29 and 30 were both from the SRS Expectations subscale but were weakly correlated, $r = .24, p = .01$. However item 29 was strongly positively correlated with items 36 (new item; $r = .51, p = .01$) and 41 (CUSES Partner's Disapproval subscale; $r = .52, p = .01$) while item 30 has a moderate positive correlation with item 34 (new item; $r = .42, p = .01$).

Exploratory Factor Analysis

An EFA was conducted on all 31 HIV prevention scale items using principal-axis factor analysis and varimax rotation via the SPSS analytical software. SPSS automatically discards any incomplete cases for EFA, therefore the sample size for this analysis was $n = 252$. A Kaiser-Meyer Olkin Measure (KMO) of Sampling Adequacy was obtained and was 0.86 which is considered meritorious (George & Mallery, 2011). A value < 0.5 is considered unacceptable. The KMO measures whether the distribution of variables is adequate for performing an EFA (George & Mallery, 2011).

Table 4.6 displays the total variance of the factors. Eigenvalues represent the proportion of variance that is explained by each factor. An eigenvalue of 1 or greater is desired and the factors with eigenvalues in the desirable range should make up at least 60% of the total variance (George & Mallery, 2011; Polit & Beck, 2008). As can be seen in Table 4.6, eight factors had an eigenvalue of 1 or greater and these factors accounted for 62.9% of the cumulative variance.

Table 4.6.

Total Variance of the HIV Prevention Scale Factors Explained

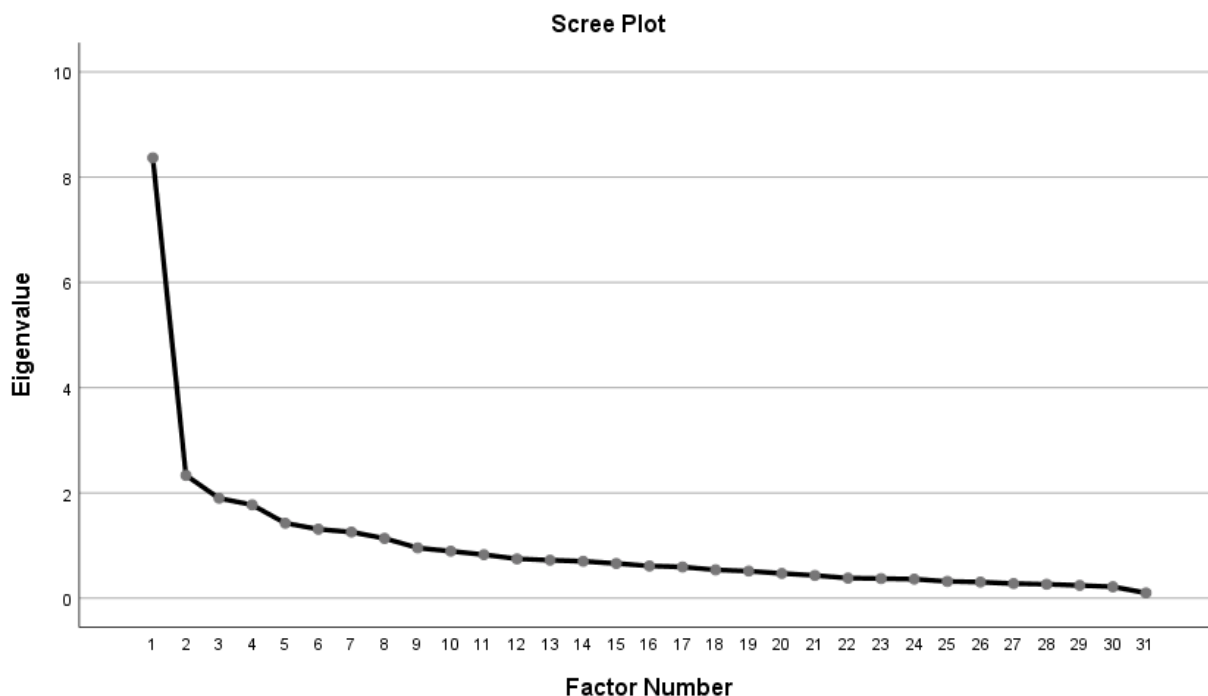
Factor	Eigenvalue Total	% of Variance	Cumulative %
1	8.37	26.992	26.992
2	2.33	7.529	34.521
3	1.90	6.125	40.646
4	1.77	5.717	46.363
5	1.42	4.595	50.957
6	1.31	4.225	55.183
7	1.26	4.052	59.235

8	1.14	3.665	62.900
9	0.96	3.081	65.981
10	0.89	2.879	68.860
11	0.83	2.665	71.525
12	0.75	2.409	73.935
13	0.72	2.329	76.264
14	0.70	2.258	78.522
15	0.66	2.127	80.649
16	0.61	1.974	82.622
17	0.59	1.913	84.535
18	0.54	1.737	86.273
19	0.51	1.659	87.932
20	0.47	1.515	89.446
21	0.43	1.395	90.841
22	0.38	1.228	92.069
23	0.37	1.202	93.271
24	0.36	1.166	94.437
25	0.32	1.027	95.464
26	0.31	0.988	96.452
27	0.28	0.893	97.345
28	0.26	0.853	98.198
29	0.24	0.781	98.979
30	0.22	0.700	99.679
31	0.10	0.321	100.000

A scree plot was obtained (Figure 4.1). There are three to four factors for the steepest part of the graph which may suggest that only three to four factors are needed in the final model for CFA versus the eight factors as displayed in Table 4.6.

The rotated factor matrix with the eight factors that had eigenvalues 1 or greater is shown in Table 4.7. According to Brown (2015) factor loadings are salient at either .30 to .40 and greater; however, there is no consensus and these starting points are conventionally accepted. For the purpose of this study, items were considered salient at $> .35$. Items 16, 17, 24, 26, 27, 28, 29, 30, 33, 34, 36, 37, and 41 had salient loadings on factor 1. Item 14 also had a salient loading on factor one but had a stronger cross-loading on factor 5. Items 38, 39, and 42 had salient loadings

Figure 4.1. Scree Plot of the Factors for the HIV Prevention Scale Items



on factor 2. Items 19 and 20 had salient loadings on factor 3. Items 15, 26, 27, and 28 also had salient loadings on factor 3; however, these items had stronger cross-loadings on other factors. Items 35 and 40 had salient loadings onto factor 4. Item 41 also had a salient loading on factor 4 (.41) and was cross-loaded on factor 1 (.46). The cross-loadings for item 41 were taken into account when determining model fit in CFA. Items 14, 15, and 18 were loaded on factor 5. Items 43 and 44 had salient loadings on factor 6. Items 21, 22, and 23 had salient loadings on factor 7. Finally, items 31 and 32 were loaded on factor 8. Based on the results in Table 4.7, item 25 was eliminated for use in CFA due to no salient loadings with any of the factors.

Table 4.7.

Rotated Factor Matrix of the Eight Factors Extracted from the HIV Prevention Scale Items

Item	Factor							
	1	2	3	4	5	6	7	8
28	.77	.17	.37	-.06	.09	.11	-.03	.07
27	.72	.17	.43	-.04	.05	.13	.07	.06
36	.66	.10	-.01	.22	.16	.15	-.16	-.02
24	.64	.17	.12	.15	.15	.03	-.21	.02
26	.62	.18	.47	-.08	.15	.11	-.06	-.11
17	.55	.08	.24	.09	.30	.13	.00	-.02
29	.52	-.01	.31	.14	.34	.04	-.17	-.18
33	.51	.10	-.06	.27	.17	.05	-.07	.06
37	.48	-.01	.13	.05	.13	-.00	.02	-.20
41	.46	.11	.12	.41	.23	.09	-.12	-.07
34	.44	.25	.28	.24	.09	.31	-.10	-.06
16	.38	-.01	.03	.31	.35	.07	-.02	-.02
30	.36	.09	.18	.14	.11	.22	-.21	.12
38	.23	.85	.06	.01	.12	.14	.01	-.08
39	.14	.79	.05	.12	.07	.09	-.03	-.02
42	.14	.38	.21	.28	.01	.21	-.09	-.10
20	.12	.04	.54	-.07	.13	-.04	.01	.06
19	.25	.05	.52	.13	-.05	.04	.07	-.04
25	-.17	-.04	-.33	.04	-.04	-.00	.19	-.14
40	.14	.17	.03	.74	.07	.02	-.05	-.04
35	.11	.00	-.07	.65	.09	.16	-.06	-.13
18	.20	.12	-.02	.06	.65	.08	-.05	-.02
14	.37	.13	.12	.16	.64	.01	-.03	-.11
15	.24	-.03	.36	.05	.49	.19	-.07	.03
44	.11	.10	.01	.08	.03	.81	-.02	-.03
43	.19	.18	.01	.14	.17	.77	-.10	-.03
23	-.09	-.02	.00	-.13	.00	-.06	.74	-.01
22	-.03	.08	-.11	.02	-.04	.03	.64	.04
21	-.08	-.11	.06	-.04	-.05	-.08	.51	-.00
32	.04	-.06	.04	-.00	.04	-.03	-.05	.69
31	-.12	-.05	.05	-.17	-.13	-.02	.08	.58

Note. Factor loadings > .35 are in boldface. *Note.* Items 14 – 30 are from the Sexual Risks Scale,

items 31- 37 are new items, and items 38 – 44 are from the Condom Use Self-Efficacy Scale.

Confirmatory Factory Analysis

A CFA was undertaken to determine the relationships between the indicators (e.g., HIV prevention scale items) and latent variables (also known as factors; Brown, 2015). This was important to do as the HIV prevention scale items have not been previously tested in an older

adult population. Additionally, some of the items were new or modified. The components of the model were informed *a priori* based on previous psychometric work in the SRS and CUSES. The EFA was also used to help define and refine the CFA model (Brown, 2015). Model placement of the new HIV prevention scale items was initially determined based on what made the most sense conceptually.

Model specification was done using the AMOS graphical interface. Latent variables, also known as factors, are represented in ovals while the HIV prevention scale items, also known as indicators, are depicted in rectangles (Brown, 2015). The number in the rectangle corresponds with the number in the HIV prevention scale (e.g., q0014 = item 14). Error variances are shown in the circles. The unidirectional arrows from the latent variables to the indicators represent factor loadings which are the regression slopes that predict the indicators from the latent variables. The unidirectional arrows from the error variance to the indicators is the variance in the indicators not accounted for by the latent variables. The curved bidirectional arrows depict covariances (correlations) such as those between factors or between errors. Factor covariance estimates the relationship between the latent dimensions while error covariance suggests that the two indicators covary for reasons unrelated to the shared influence of the factor (Brown, 2015). Modification indices were examined to identify additional parameters that would improve model fit. Those that were conceptually appropriate were retained in the final model.

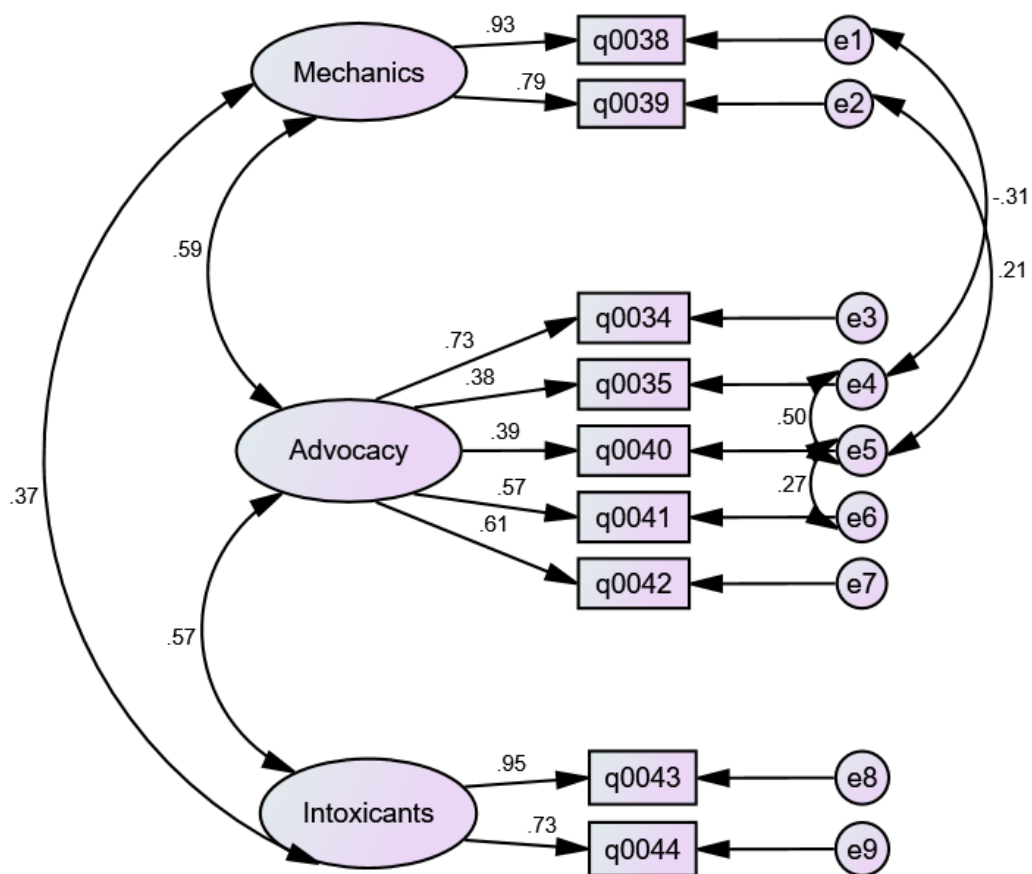
Initial attempts at model fit included 30 of the HIV prevention scale items into four factors as supported by the scree plot in Figure 4.1 as well as the conceptual literature. Item 25 was not used in the CFA as noted in the EFA section. An adequate model fit was not able to be obtained with the 30 items in four factors. The next attempts included dividing the items into two models based on whether the items originated with the SRS or CUSES instrument. New items

were placed in the most appropriate factor within the respective model based on which construct made the most sense conceptually. Two of the new items ended up being dropped from the models as they did not covary with any of the factors and did not fit a model on their own. The two items dropped were item 31 “I have a medical condition [e.g., erectile dysfunction, vaginal dryness, arthritis, low libido, etc.] that interferes with condom use” and item 32 “My physical health interferes with my ability to have sex.” Ultimately the now 28-item HIV prevention scale fit into three models as described below.

Model 1

Figure 4.2 displays Model 1. The three-factor model fit was excellent, $\chi^2(20) = 24.31, p = .23, CFI = .99, TLI = .99, RMSEA = .03$. All of the factor loadings were salient ($> .35$), the correlations between latent factors were moderate to strong, and all of the covariances for latent factors and error variances were significant. All of the items that were from the CUSES are represented. In the 29-item HIV prevention scale there were seven items from the four subscales of the CUSES: Items 38 and 39 from the Mechanics subscale; Items 40 and 41 from the Partner’s Disapproval subscale; Item 42 from the Assertive subscale; and Items 43 and 44 from the Intoxicants subscale (Brien et al., 1994). The items from the Partner’s Disapproval subscale and Assertive subscale were able to be collapsed into the same latent variable (now named Advocacy). Additionally, two new items, items 34 and 35 loaded on the Advocacy factor. When Brien et al. (1994) tested the CUSES in an EFA, they found that none of the items cross-loaded onto other factors at $> .35$. However, conceptually, the items from the Partner’s Disapproval and Assertive subscales (items 40 – 42) are similar in that they can be construed as relating to confidence in advocating for condom use with a partner. Empirically, none of the three items loaded onto the same factors in the EFA for this study; however, items 40 and 41 were

Figure 4.2. Factors and Factor Loadings for Model 1



moderately correlated $r = .45, p = .01$. For the new item 34, it was conceptually-related to other items on the Advocacy factor and its loading was .73. This is consistent with the EFA and this item was moderately correlated with items 41 and 42 (both $r = .41, p = .01$). The other new item, item 35, conceptually dealt with advocating for condom use and was loaded on the Advocacy factor (loading = .38). Empirically, it loaded onto the same factor as item 40 in the EFA and was strongly correlated with item 40 ($r = .56, p = .01$) and moderately correlated with item 41 ($r = .41, p = .01$).

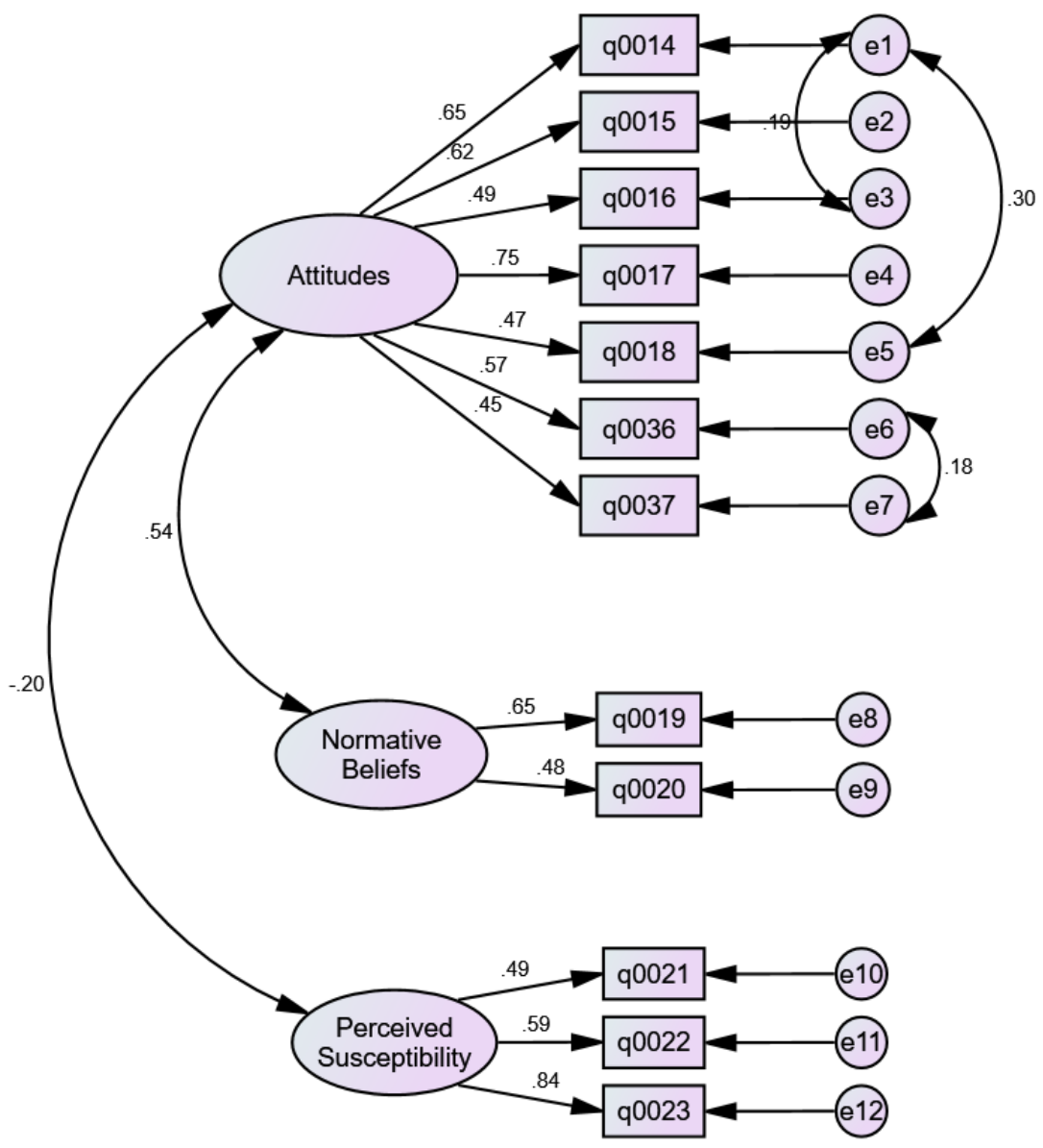
Four of the error variances were correlated (Figure 4.2), which means that the items covary for reasons other than the latent variables. Item 35 and 38 may covary because both items relate to using condoms. Conceptually, item 35 is a new item and even though it is not about the mechanics for using condoms (like item 38) empirical evidence demonstrates a covariance. The two items did not load on the same factor in EFA and were not significantly correlated. Items 35 and 40 also had correlated error variances based on their related potential for being rejected by a partner. These items (35 and 40) were the only items to load on factor 4 in EFA and items 35 and 40 were strongly correlated. Items 40 and 41 also had correlated error variances. This was surprising as they were originally part of the same subscale in the CUSES. The combination of the two subscales from the CUSES was appropriate but there was still shared covariance among the original items. The partner's disapproval aspect may be accounting for the correlated error variances. Finally, the error variances for items 39 and 40 were correlated. They are loaded on the Mechanics and Advocacy factors respectively. Conceptually, they both relate to the use of condoms.

Model 2

Figure 4.3 displays Model 2. The three-factor model fit was adequate, $\chi^2(49) = 82.13$, $p = .002$, CFI = .95, TLI = .93, RMSEA = .05. All of the factor loadings were salient ($> .35$) and all of the covariances for latent factors and error variances were significant. This model includes items from the SRS Attitudes subscale (items 14 – 18), the SRS Normative Beliefs subscale (items 19 and 20), the SRS Perceived Susceptibility subscale (items 21 – 23; DeHart & Birkhimer, 1997), and two new items (item 36 and 37). Two other factors in the SRS – Intention and Expectation did not significantly correlate with the other factors in Model 2 and will be presented in Model 3. Item 36 and 37 were loaded onto the Attitudes factor because the content was most similar to the other items and in EFA both item 36 and 37 loaded onto the same factor as two other of the Attitudes items (items 16 and 17). The loading in CFA for item 36 was .57 and the loading for item 37 was .44. The correlation between the Attitudes and Perceived Susceptibility factors was weak ($r = -.21$, $p = .02$) while the correlation between the Attitudes and Normative Beliefs factors was strong ($r = .56$, $p = 0$). The correlation between Normative Beliefs and Perceived Susceptibility was dropped from the model because it was effectively zero.

Three of the error variances were correlated (Figure 4.3). The error variances for items 14 and 16 covaried. In the DeHart and Birkhimer (1997) investigation both of these items loaded onto the same factor in EFA without any cross-loadings. In the current study's EFA, items 14 and 16 both loaded on the same factor (factor 1); however, item 14 had a more salient cross-loadings onto factor 5 (.37 vs. .64, see Table 4.7). Both items were moderately correlated $r = .44$, $p = .01$. The cause for covariance outside of the Attitudes factor may have been due to both items being reverse coded and close together in the survey. Similarly items 14 and 18 covaried and were loaded onto the same factor in DeHart and Birkhimer's (1997) investigation without any

Figure 4.3. Factors and Factor Loadings for Model 2



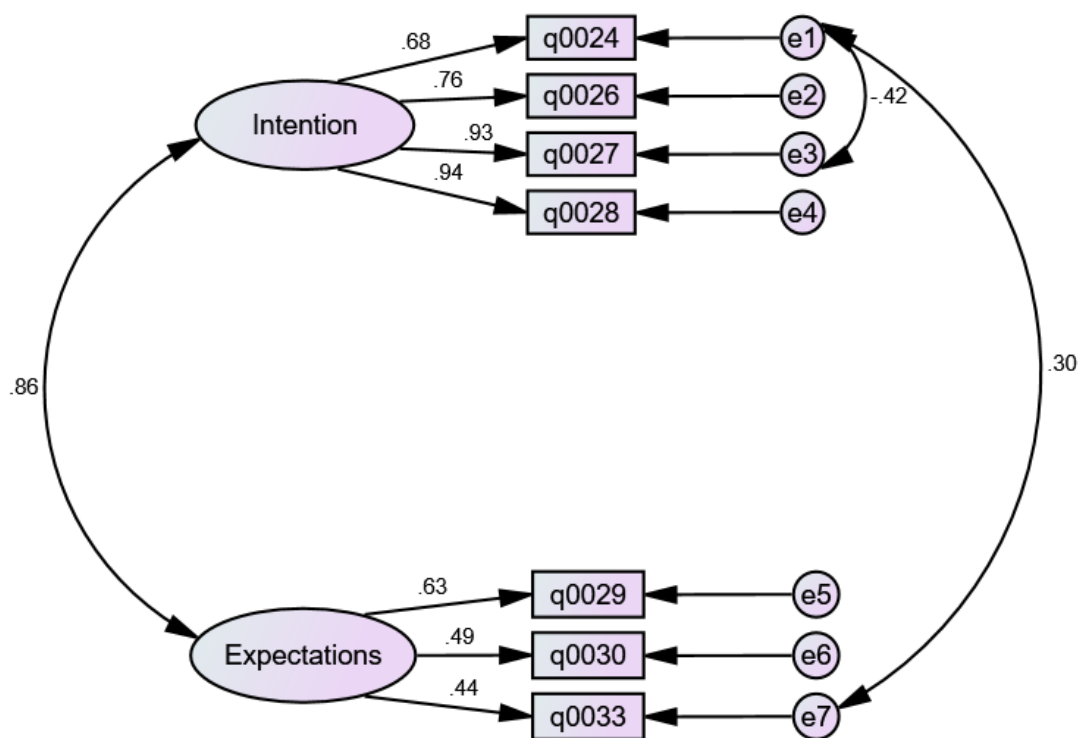
salient cross-loadings. Both were loaded onto factor 5 in EFA in the current study and had a moderate correlation $r = .48, p = .01$. The cause for covariance outside of the Attitudes factor may be that both items relate to problems with condoms. Two other items that covaried were items 36 and 37. Both of these items were new items and were loaded onto the same factor (factor 1) in EFA and had a moderate correlation $r = .39, p = .01$. One conceptual aspect that may account for the covariance to the latent variable is that both items are related to low concern about needing to use condoms.

Model 3

Model 3 is displayed below in Figure 4.4. The two factor model fit was adequate, $\chi^2 (11) = 27.89, p = .003, CFI = .98, TLI = .96, RMSEA = .078$. All of the factor loadings were salient ($> .35$) and all of the covariances for latent factors and error variances were significant. This model includes items from the SRS Intentions subscale (items 24, 26 – 28), the SRS Expectations subscale (items 29 and 30), and one new item (item 33). Item 33 was loaded onto the Expectation factor because the construct being measured in item 33 was most similar to an expectation. Also, in EFA it loaded onto the same factor as both of the items from the SRS Expectations subscale. The regression weight in CFA for item 33 was .44. The correlation between the Intention and Expectations factors was strong $r = .87, p = 0$.

Two of the error variances were correlated (Figure 4.4). The error variances for items 24 and 27 covaried. In the DeHart and Birkhimer (1997) study both of these items loaded onto the same factor in EFA without any cross-loadings. In the EFA for the current study items 24 and 27 had the most salient loadings on the same factor (factor 1); however, item 27 did cross-load onto factor 3 (.72 for factor 1 and .43 for factor 3). The two items were also strongly correlated $r = .53, p = .01$. A reason outside of the Intention factor that could account for the covariance could

Figure 4.4. Factors and Factor Loadings for Model 3



be that they both involve things that the person is going to have to do to have safer sex. The error variances for items 24 and 33 also covaried. In EFA both items had salient loadings on factor 1 with no cross-loadings and were moderately correlated $r = .45, p = .01$. There may be a covariance due to the “I would” action of the wording – taking action to do something which is different than intending or expecting.

Results Related to Research Questions

Research Question 1

Research question 1 asks: What is the feasibility and acceptability of conducting an online survey related to HIV prevention factors in adults aged 50 and older who use online dating websites or applications? This question is mostly answered through the sub-questions below. Some ways in which feasibility related to study recruitment can be assessed are examining recruitment time as well as exploring how effective the recruitment strategies were (Mailhot et al., 2014). Recruitment acceptability can be determined through the consent rate. In their 2014 study, Mailhot and colleagues used a 75% consent rate as an indicator of acceptability. Acceptability of data collection is assessed by examining the completion rate of the survey (see Research Question 1c below; Mailhot et al., 2014).

The amount of time that it took to recruit the participants was short and feasible. As indicated in Chapter 3, at least 155 complete cases were needed to perform factor analysis. Over a one month period (November to December 2017), 252 complete cases were recruited. As explained in Chapter 3, recruiting study participants via online dating sites was no longer an option due to the high cost of advertising on the sites. Therefore, a purchased audience through SurveyMonkey Audience had to be implemented as a recruitment site due to the need to obtain an adequate sample. Using SurveyMonkey Audience was an effective recruitment strategy and

was instrumental in providing the majority of study participants (71% of the sample). Given that the study sample was recruited online, there is no way to determine how many potential participants were approached. Consent rate instead was determined by the number of people who clicked on the survey and then either did or did not consent. For the eligible SurveyMonkey and REDCap participants combined, 280 out of 290 people consented giving a consent rate of 96.6%.

Since the SurveyMonkey Audience participants ($n = 199$) were a purchased sample and the participants who took the survey in REDCap ($n = 81$) were not, comparisons of means were completed to determine whether there was any differences between the two sample types in regard to selected variables. The selected variables were age, sexual orientation, and gender. An independent samples t -test was used for age and chi-square was used for both sexual orientation and gender. For sexual orientation, only three REDCap participants responded that they were bisexual. Due to this low count the chi-square assumption was violated, therefore a Fisher's exact test would need to be done. However, the Fisher's exact test can only be done on a 2×2 table in SPSS so homosexual/gay/lesbian and bisexual responses were combined and sexual orientation was dichotomized into heterosexual and lesbian/gay/bisexual (LGB) responses for analysis. Once sexual orientation was dichotomized, none of the cell responses were less than 5 therefore a chi-square was able to be run on the data. No significant interactions were found between sexual orientation and sample type $\chi^2(1) = 2.99, p = .08$ or gender and sample type $\chi^2(1) = 2.90, p = .09$. The independent samples t -test results indicate that there is a significant difference between SurveyMonkey group mean age ($M = 62.74, SD = 7.38$) and the REDCap group ($M = 56.42, SD = 6.68$), $t(275) = -6.58, p = .00$. The differences between the two sample types may be due to age and not to chance.

Research question 1a. Research question 1a asks: What are the recruitment rates for older adults willing to participate in this type of survey? For the SurveyMonkey sample, a link to the survey was sent to 264 potential participants and 199 of those completed the survey (75%). Of those who did not complete the survey, six clicked “no” to consent, one did not meet the age requirement, and 57 people chose not to finish the survey. For the REDCap sample, 127 responded to the study advertisement and 81 completed the survey (64%). For the potential participants who didn’t complete the survey – 32 did not meet the online dating requirement, four clicked “no” to consent, and 10 did not meet the age requirement.

Research question 1b. Research question 1b asks: What sites are the most beneficial in terms of numbers of participants recruited versus cost of recruiting on the site? Ultimately participants were recruited from four different sites – Penn State StudyFinder, SurveyMonkey, Facebook, and Craigslist. Table 4.8 outlines the costs and recruitment numbers of the study settings. The number of participants only encompasses those who completed the survey. Both Penn State StudyFinder and Craigslist did not cost any money to advertise; however, they only accounted for 0.7% and 6.8% of the respondents respectively. Facebook cost \$5.88 per participant in comparison to SurveyMonkey’s \$7.66 per participant but there were almost four times as many SurveyMonkey participants. Also, the SurveyMonkey participant data were collected over three days versus one month for the Facebook participants. There were nine participants who reported “other” as their recruitment site. Not all of those participants indicated how they heard about the study. Those that did, reported that “a friend” told them about the survey.

The SurveyMonkey and REDCap surveys were virtually identical. The SurveyMonkey participants did have four fewer items as their gender, geographic location, and annual household

income were already provided via baseline demographics that SurveyMonkey collects on all participants. Also, the SurveyMonkey participants were not asked how they heard about the study.

Table 4.8.

Costs Related to Recruitment Sites and Number of Participants Recruited

Study Site	Final Cost	Number of Participants	Percent of Participants in Final Study	Cost per Participant
Penn State StudyFinder	Free	2	0.7	\$0
Facebook	\$300	51	18.2	\$5.88
Craigslist	Free	19	6.8	\$0
SurveyMonkey	\$1525	199	71.1	\$7.66
Other	Unsure	9	3.3	Unsure

Research question 1c. Research question 1c asks: What is the degree of missing data per case using this population in an online survey? First a comparison of means were calculated for those who completed all 31 HIV prevention scale items ($n = 252$) and those who did not complete all items ($n = 28$) against the sample variables – age, sexual orientation, and gender. For sexual orientation, only one of the participants who had missing data reported being homosexual/lesbian/gay and one reported being bisexual. Similar to research question 1, due to the low cell counts, a Fisher’s exact test was done. Again, the homosexual/lesbian/gay and bisexual responses were combined and sexual orientation was dichotomized into heterosexual and LGB responses for analysis. Sexual orientation and item completer status (Fisher’s exact test $p = .28$) were found to be independent of one another as were gender and item completer status $\chi^2(1) = .004, p = .95$. There was not a significant difference between item completer mean age ($M = 60.8, SD = 7.71$) and item non-completer mean age ($M = 62.5, SD = 7.78$), $t(275) = -1.07, p = .29$.

A total of 28 participants (10%) did not answer all 31 HIV prevention scale items. The majority of respondents who did not answer every HIV prevention scale item, only missed one item ($n = 17$, 61%). Six participants skipped two items, two skipped three items, one skipped four items, one skipped eight items, and one skipped 13 items. Table 4.9 outlines which items were skipped and the number of times they were not answered. No patterns were identified where participants were systematically skipping particular questions. Three items were answered by all of the participants. All but one of the items were skipped three or fewer times. Item 44, “I feel confident that I would remember to use a condom even if I were high due to drugs or medications” was not answered by six respondents.

Table 4.9.

Number of Times Each HIV Prevention Scale Item was Skipped

Number of Times Each Item was Skipped	Specific Items
None	15, 26, 37
One	14, 20, 22, 23, 24, 30, 32
Two	16, 17, 18, 19, 21, 25, 28, 29, 33, 34, 35, 40, 41, 43
Three	27, 31, 36, 38, 39, 42
Six	44

Research question 1d. Research question 1d asks: What are the barriers and facilitators to conducting this study? The major barrier to conducting the study was not being able to advertise on online dating sites due to the high cost. Details of this barrier were discussed at length in Chapter 3. Also, being unable to obtain a large enough sample for pretesting by doing cognitive interviewing of the CUSES and SRS was a barrier. Another barrier to conducting the study may have been the length of the survey. Several potential participants started but did not complete the survey. A final barrier to conducting the study may have been that some of the participants were uncomfortable answering the HIV prevention scale items due to content. As

reported in research question 1c, 10% of the survey completers skipped at least one of the HIV prevention scale items.

The greatest facilitator to conducting this study was being able to purchase potential participants through SurveyMonkey Audience. Details of this facilitator are also thoroughly outlined in Chapter 3. Another aspect that may have helped facilitate the study was the offering of the incentive of being placed in a drawing for one of three \$100 Amazon eGift Cards. A final facilitator may have been the anonymity of an online survey as well as the ease of use of completing an online survey at the setting of the participant's choice and according to their own timeline.

Research Question 2

Research question 2 asks: What is the most effective and appropriate way to modify existing instruments related to HIV and sexual behavior for an older adult population? Modification of the existing instruments (CUSES and SRS) is discussed in length in Chapter 3. An expert panel review was undertaken to determine the content validity of the items for an older adult population. Items either stayed the same, were modified, or were deleted based upon expert panel feedback and I-CVI ratings $< .78$. New items were added per panel feedback. Model fit for the new HIV prevention scale was explored via both EFA and CFA as reported earlier in the results section. Ultimately one of the modified items (item 25) and two of the new items (items 31 and 32) had to be dropped from the final models in CFA.

Research question 2a. Research question 2a asks: What is the factor structure of the modified scales? There were three final models and eight factors for CFA. Please see Figures 4.2, 4.3, and 4.4 for the factor structure and the CFA section for a write-up of the results. Model 1 was comprised of three factors – Mechanics, Advocacy, and Intoxicants. The model fit was

excellent, $\chi^2(20) = 24.31, p = .23, CFI = .99, TLI = .99, RMSEA = .03$. The second model contained the Attitudes, Normative Beliefs, and Perceived Susceptibility factors. The model fit was adequate, $\chi^2(49) = 82.13, p = .002, CFI = .95, TLI = .93, RMSEA = .05$. The final model included the Intention and Expectations factors. The model fit was adequate, $\chi^2(11) = 27.89, p = .003, CFI = .98, TLI = .96, RMSEA = .078$.

Research question 2b. Research question 2b asks: What is the reliability and validity of the modified scales? Content validity of the scale items for an older adult population was completed with two rounds of an expert panel review and is discussed in-depth in Chapter 3. To ensure strong content validity, any items with an I-CVI $< .78$ were either modified or eliminated. Table 3.2 in Chapter 3 displays the final items from the SRS and CUSES as well as the new items after undergoing two rounds of expert panel review for content validity.

Internal consistency of the modified HIV prevention scale was evaluated using Cronbach's alpha. Each of the eight factors was assessed (Table 4.10). Most of the factors were either acceptable (Cronbach's alpha $> .7$) or good (Cronbach's alpha $> .8$; George & Mallery, 2011). The Perceived Susceptibility factor was questionable (Cronbach's alpha = .65). The Expectation factor was rated poor (Cronbach's alpha = .54) and the Normative Beliefs factor unacceptable (Cronbach's alpha = .47).

Table 4.10.

Internal Consistency of the HIV Prevention Scale Items by Subscale

Factor	Number of Items	Cronbach's alpha
Mechanics	2	.85
Advocacy	5	.73
Intoxicants	2	.82
Attitudes	7	.79
Normative Beliefs	2	.47
Perceived Susceptibility	3	.65
Intention	4	.88

Factor	Number of Items	Cronbach's alpha
Expectation	3	.54

Research Question 3

Research question 3 asks: What risk behaviors do older adults engage in that might make them susceptible to contracting HIV? This question is answered by examining if participants were sexually active in the past year ($n = 181$). Gender and sexual orientation characteristics between those who did and did not have sex in the past year are displayed in Table 4.11.

Approximately $\frac{3}{4}$ of the male participants (75.9%) were sexually active as were a little over half of the female participants (54.3%). The majority of the LGB participants had sex in the past year (88.7%) while 60.9% of the heterosexual participants were sexually active. The mean age for the sexually active participants was 59.63 ($SD = 7.36$) and the mean age for the non-sexually active participants was 63.65 ($SD = 7.69$). A comparison of means was undertaken to determine whether there was any differences between older adults who had been sexually active in the past year and those who had not. The means were compared in relation to age, sexual orientation, and gender. An independent samples t -test was used for age and chi-square was used for both sexual orientation and gender. Sexual orientation was dichotomized into heterosexual and LGB responses for analysis. Significant interactions were found between sexual orientation and being sexually active in the past year $\chi^2(1) = 12.53, p = 0$ as well as gender and being sexually active in the past year $\chi^2(1) = 14.23, p = 0$. The independent samples t -test results indicate that there was a significant difference between mean age between participants who were sexually active in the past year ($M = 59.63, SD = 7.36, n = 179$) and those who were not ($M = 63.65, SD = 7.69, n = 96$), $t(273) = -4.24, p = 0$.

Table 4.11.

Descriptive Statistics for Sexually Activity Comparison

Characteristics	Sexually Active in the Past Year (<i>N</i> = 277)	
	Yes <i>n</i> (%)	No <i>n</i> (%)
Gender ^a		
Male	104 (75.9)	33 (24.1)
Female	76 (54.3)	64 (45.7)
Sexual Orientation		
Heterosexual	142 (60.9)	91 (39.1)
Gay, Lesbian, Bisexual	39 (88.7)	5 (11.3)

^a*N* = 277

Table 4.12 has the means for the HIV prevention scale items related to risk behaviors and preventive measures as well as HIV risk perception items for the participants who had been sexually active in the past year. Table 4.12 will be used for reporting HIV prevention scale item descriptive statistics for research questions 3 and 4.

Risk perception for HIV was examined and the sexually active participants had a low perceived susceptibility to HIV. Participants responded close to agreement ($M = 3.59$, $SD = 1.26$) when asked if their sexual experiences do not put them at risk for HIV. Also, they disagreed that they may have had sex with someone who was at risk for HIV ($M = 2.21$, $SD = 1.29$) and disagreed to strongly disagreed that they are currently at risk for HIV ($M = 1.83$, $SD = 1.03$). Further, when examining the response frequency to item 23 which states “I am at risk for HIV”, 8.3% ($n = 15$) agreed or strongly agreed, 15.6% ($n = 28$) were neutral, and 76.1% ($n = 137$) disagreed or strongly disagreed.

Participants were queried regarding whether they used a condom with every sexual encounter (Table 4.2). Of the participants who reported a sexual relationship in the past year, almost half of them (45%, $n=82$) never used a condom when they had sex and 26% ($n = 46$) used

condoms inconsistently. This is rather contradictory to item 24 (Table 4.12; $M = 4.08$, $SD = 1.11$), which was answered quite favorably that if participants were going to have sex, they would take precautions to reduce their risk of HIV. However, it is also concerning that several items related to attitudes about practicing safe sex (e.g., items 25-28) had means that were categorized as neutral. Despite their risky sexual behavior of infrequently using a condom with every sexual encounter, participants had a low risk susceptibility for HIV.

Table 4.12.

Selected HIV Prevention Scale Item Description for the Sexually Active Participants

Item	<i>N</i>	<i>M</i>	<i>SD</i>	Skew	Kurtosis
21. My sexual experiences do not put me at risk for HIV. ^a	180	3.59	1.26	-.59	-.68
22. I may have had sex with someone who was at risk for HIV.	181	2.21	1.29	.79	-.61
23. I am at risk for HIV.	180	1.83	1.03	1.10	.38
24. If I were going to have sex, I would take precautions to reduce my risk of HIV.	180	4.08	1.11	-1.26	1.00
25. If I had a date where I thought there was the possibility of having sex, I would probably not drink alcohol or use drugs (e.g., illicit drugs or medications that may impair judgment). ^a	180	3.31	1.39	-0.12	-1.39
26. Safer sex (sex with a condom) is a habit for me.	181	3.18	1.34	-0.16	-1.17
27. I intend to follow safer sex guidelines within the next year.	179	3.57	1.20	-0.54	-0.54
28. I am determined to practice safer sex.	179	3.53	1.20	-0.47	-0.54

Item	<i>N</i>	<i>M</i>	<i>SD</i>	Skew	Kurtosis
29. If a partner wanted me to have unprotected sex, I would probably give in. ^a	180	2.98	1.36	-0.17	-1.24
30. If a partner wanted me to participate in risky sex and I suggested a lower-risk alternative, we would have the safer sex instead.	181	3.69	1.14	-0.76	0.03
34. I feel confident in my ability to advocate for condom use with a partner who did not want to use condoms.	180	3.68	1.13	-0.70	-0.12
41. If I were unsure of my partner's feelings about using condoms, I would not suggest using one. ^a	180	2.19	1.17	0.80	-0.31
42. I feel confident in my ability to discuss condom usage with any partner I might have.	179	3.97	1.10	-1.19	0.82

Note. Items in this table were not analyzed while reverse coded. HIV = Human immunodeficiency virus.

^a Reverse coded in instrument, not reflected in this analysis.

Research Question 4

Research question 4 asks: What preventive measures are older adults engaging in to avoid acquiring the disease? Of the $n = 181$ participants who were sexually active in the past year, only 29% ($n = 53$) used a condom with each sexual encounter (Table 4.2). As mentioned in research question 3, several items related to practicing safe sex had neutral means. When presented with being pressured into having unprotected sex and giving in to the pressure (Table 4.12; item 29) the mean was essentially neutral ($M = 2.98$, $SD = 1.36$). Conversely, item 30 which states “If a partner wanted me to participate in risky sex and I suggested a lower-risk alternative we would have the safer sex instead” had a mean of 3.69 ($SD = 1.14$) which is close

to the “agree” response indicating that the majority of sexually active participants agreed with the statement. Similarly, items 34 ($M = 3.68$, $SD = 1.13$) and 42 ($M = 3.97$; $SD = 1.10$) deal with advocating for and discussing condom use with partners and the majority of participants agreed with these items. Finally, item 41 states “If I were unsure of my partner’s feelings about condoms, I would not suggest using one”. The majority of participants disagreed with this item ($M = 2.19$; $SD = 1.17$). Taken together the findings for research question 4 indicate that the participants were neutral to actively agreeing with taking preventive measures such as using condoms or discussing safe sex with partners; however, in practice only a little over a quarter of sexually active participants used condoms every time they had sex.

Research question 4a. Research question 4a asks: What is the relationship between self-efficacy and preventive measures such as condom use and the discussion of safe sex? This research question is answered in relation to the whole sample ($N = 280$). All correlations presented here are from Tables 4.4 and 4.5 and all of the significance levels are .01. Intention to follow safe sex guidelines (item 27) was strongly associated with feeling confident about advocating for condom use with a partner who did not want to use condoms (item 34), $r = .50$. There was also a high moderate positive association with feeling confident about advocating for condom use with a partner who did not want to use condoms and considering safer sex to be a habit for them (item 26), $r = .49$. Another preventive measure with a high moderate positive association with item 34 was being determined to practice safer sex (item 28), $r = .48$. Item 34 was moderately positively associated with having safer sex after suggesting a lower-risk alternative to a partner who wanted to have risky sex (item 30), $r = .42$. Moderate positive associations were also found between item 34 and the following items: suggesting using condoms, if unsure of a partner’s feelings (item 41, reverse coded) $r = .41$; being in favor of

using condoms (item 17) $r = .40$; and taking precautions to reduce their risk of HIV (item 24) $r = .37$.

A low moderate association was found between feeling confident to remember to use a condom even after they had been drinking (item 43) and having safer sex after suggesting a lower-risk alternative to a partner who wanted to have risky sex (item 30) $r = .32$. Low moderate associations were also found between feeling confident to use a condom correctly (item 38) and the following items: safer sex being a habit for the participant (item 26) $r = .31$; intention to follow safe sex guidelines (item 27) $r = .30$; and being determined to practice safe sex (item 28) $r = .30$.

One of the items that was originally from the CUSES examined self-efficacy and the discussion of safe sex (preventive measure) within the actual item. Item 42 presents, "I feel confident in my ability to discuss condom usage with any partner I might have." The response to the question was similar for both the whole sample ($M = 4$, $SD = 1.03$) and the subsample of those who had been sexually active in the past year ($M = 3.97$, $SD = 1.10$). Their responses agreed with the statement.

Chapter 5

Discussion

The purpose of this study was to determine the feasibility of conducting online research related to HIV prevention factors in adults aged 50 and older who use online dating sites. A second study purpose was to modify and test instruments related to HIV prevention factors in a previously untested older adult population. Relevant findings include the inability to purchase advertising space on online dating sites. A purchased sample through SurveyMonkey Audience along with Facebook advertising were the most advantageous recruitment sites. Older adults in this sample had low risk perception for contracting HIV despite almost $\frac{3}{4}$ of the sexually active subsample (71%) never using or inconsistently using condoms. Study participants largely agreed on the importance of using preventive measures such as condoms and discussing safe sex prior to having intercourse. However, there were inconsistencies between participants' perceived susceptibility for HIV and actual risk behavior. Finally, the HIV prevention scale items adequately fit into three models, suggesting that the items were appropriate for an older adult population of online daters.

Feasibility of Conducting HIV Prevention Research Aimed at Older Online Daters

The initial plan for this study was to primarily recruit participants by advertising the research on online dating sites. However, while initially feasible at time of study proposal, by the time of recruitment the cost of advertising on these sites had exponentially increased and became cost prohibitive. Fortunately, the potential challenge of recruiting participants was foreseen and a back-up plan included the use of a compensated study sample via SurveyMonkey Audience. The other portion of the sample was comprised of those who completed the REDCap survey and were recruited via Facebook, Penn State StudyFinder, and Craigslist. The purchased Facebook

advertisement was the most effective for recruiting participants outside of the SurveyMonkey Audience participants. The study sample recruited from Facebook accounted for 18.2% of the overall study participants (SurveyMonkey Audience and REDCap survey) and 63% of the REDCap participants. Facebook is becoming recognized as potentially being a viable study recruitment site for older adults (Thornton et al., 2016) and older adults are using Facebook. In fact, 72% of adult internet users age 50 to 64 and 62% of adult internet users age 65 or older use Facebook (Greenwood, Perrin, & Duggan, 2016). The recruitment rates for the current study were fairly high, especially for SurveyMonkey participants (75%). This high rate could possibly be attributed to them being SurveyMonkey Audience members and therefore more familiar with and willing to being recruited to take part in online surveys. One encouraging result related to recruitment of participants was that the sample was almost evenly split between men (49.3%) and women (50.3%). Often, older men are underrepresented in studies when compared to older women (Anderson, Seff, Batra, Bhatt, & Palmer, 2016). Further, in the literature review for the current research, numerous studies involving older adult sexuality and HIV prevention factors in older adults focused exclusively on women (Bateson et al., 2012; Clarke, 2006; Dickson et al., 2005; Grant & Ragsdale, 2008; Henderson et al., 2010; Jacobs & Thomlison, 2009; Lindau et al., 2006; Sormanti & Shibusawa, 2007; Traupmann et al., 1982; Trompeter et al., 2012; Watson et al., 2010; Watson & Stelle, 2011; Winningham et al., 2004).

A potential concern when conducting survey research online is missing data. This is especially true for research involving older adults (Hardy, Allore, & Studenski, 2009). Identifying missing data in the current study was critical for the analyses of the EFA and CFA because no cases that had missing data for any of the 31 HIV prevention scale items could be included in the analysis. The degree of missing data was only 10% for the current study. There

were no patterns to the missing data; however, the very last item (item 44) in the HIV prevention scale was skipped at least twice as many times as all of the other items. The item states, “I feel confident that I would remember to use a condom even if I were high due to drugs or medications.” Interestingly the other two items that dealt with drug use and/or drinking (items 25 and 43) were only skipped twice. Given the similarities among the items and the fact that item 44 was the last item in that part of the survey, it may have been missed due to respondent fatigue rather than item content. This is an important consideration given that survey response fatigue can lead to measurement error (Egleston, Miller, & Meropol, 2011).

Modification of Existing HIV Prevention and Sexual Risks Instruments

Prior to distribution of the survey, items from the SRS and CUSES underwent two rounds of expert panel review to determine how likely each item pertained to the sex life of an older adult. The SRS collects data on items related to HIV risk behavior, attitudes, and risk perception (DeHart & Birkhimer, 1997). The CUSES explores self-efficacy for condom use and talking with a partner about safe sex (Brien et al., 1994). Expert panel review was done because both instruments were conceptualized and psychometrically tested with young adults (Brafford & Beck, 1991; Brien et al., 1994; DeHart & Birkhimer, 1997). Items either stayed the same, were removed, or were modified. New items were added to the survey as well based on the feedback received from the expert panel. The final modified survey which was inclusive of the HIV prevention scale items (refer to Table 4.3 for item content) was then administered to the participants in the current study.

While model fit of the HIV prevention scale items ultimately determined appropriateness of the items for an older adult population, item correlations and EFA were explored to aid in the determination of placement of the HIV prevention scale items among the latent variables prior to

model specification for the CFA. In correlational analysis, items 27 “I intend to follow safer sex guidelines within the next year” and 28 “I am determined to practice safer sex” were very strongly correlated $r = .87, p = .01$ suggesting that these items could be combined in future studies using the HIV prevention scale items. Both of these items were from the SRS Intentions subscale. Correlations between items were not reported in the DeHart & Birkhimer (1997) SRS instrument development study or the other studies that used the SRS (see Table 3.1 in Chapter 3 for a listing of the studies).

An unexpected finding in the correlational analysis was that item 25 (SRS Substance Use subscale) did not significantly correlate with items 43 or 44 (CUSES Intoxicants subscale) nor did item 25 load on the same factor in EFA. Even though the items were from different subscales, the content was similar in that they all involved the use of substances that can alter perception. Perhaps the lack of a significant correlation was due to that item 25 dealt with intention not to use substances (illicit drugs and medications; Brien et al., 1994) prior to going on a date where there might be sex involved while items 43 and 44 involved self-efficacy to use a condom if they had been using substances (drugs, alcohol, and medications; DeHart & Birkhimer, 1997). Additionally, in EFA, item 25 was the only item in the HIV prevention scale to not have a salient loading ($> .35$) on any of the factors and was dropped from CFA analysis. Even though item 25 was originally from the SRS, it was modified after expert panel review. Originally the item stated, “If I had a date, I would probably not drink alcohol or use drugs” and was heavily modified to now present “If I had a date where I thought there was the possibility of having sex, I would probably not drink alcohol or use drugs (e.g., illicit drugs or medications that may impair judgment).” Item 25 may have performed poorly because participants perceived it as asking more than one question which could lead to confusion and the participant answering only

one component of what is being asked (Dillman et al., 2009). The respondents may perceive illicit drug use and medications that impair judgment as two very different things even though the outcome is often the same (potential for impaired judgement and decreased inhibition). Separating out item 25 into two different items, one for drugs/alcohol and one for prescription drugs that impair judgment, may provide clarity and result in salient loadings for both new items.

After EFA was completed, eight factors were extracted from the HIV Prevention Scale items with a cumulative variance of 62.9% and all but one item (item 25) had salient loadings on the factors. Several iterations were made to attempt to fit the CFA models based on the *a priori* information of correlations, EFA, and the theoretical literature (Brown, 2015). Ultimately, the HIV prevention scale items fit into eight factors among three models and had a factor structure that was parsimonious. The existing items from the CUSES and SRS fit best with items within their own subscales. This made sense conceptually and also due to the content of the items (Brien et al., 1994; DeHart & Birkhimer, 1997). The new items were able to be fit into latent variables based on conceptual similarities between existing items and the new items. There were three models because the CUSES factors all correlated together into Model 1 but did not correlate with other factors in the SRS. The items that came from the SRS Attitudes, Normative Beliefs, and Perceived Susceptibility subscales fit into Model 2 while the SRS items from the Intention and Expectations subscales fit into Model 3. The SRS Substance Use subscale was not included as the only item from it in the current study was item 25, which was excluded from CFA.

An attempt was made to fit the items from all the SRS subscales into one model with five factors but adequate model fit was unable to be attained. The separation of the SRS into two different models aligns with how DeHart and Birkhimer (1997) analyzed the SRS subscales

when performing their EFA – the first analysis included the Attitudes, Normative Beliefs, Perceived Susceptibility, and Substance Use subscales together and the second analysis consisted of the Intention and Expectation subscales. They separated the analyses into two groups because they were better able to interpret the results when performed separately (DeHart & Birkhimer, 1997).

Two of the new items (items 31 and 32) were unable to fit within any of the factors and when put into their own factor, did not correlate with any of the other factors in the three models. Empirically, the items moderately correlated with each other ($r = .41, p = .01$) and only weakly correlated with some of the other items in the HIV Prevention Scale ($r = -.29 - -.13, p = .01$). Also, items 31 and 32 were the only items that loaded on factor 8 in EFA and did not cross-load on any other. Conceptually, these items pertain to the concept of physical health issues interfering with sex which does not align with any of the factors in the CFA. While ascertaining information related to the items is both relevant (CDC, 2017a; Roberson, 2018) to older adults and important, the items may be better suited in another area of the survey and not within the HIV prevention scale. For the current study items 31 and 32 were dropped from the CFA.

The fit for Model 1 was excellent and represented the factors of Mechanics, Advocacy, and Intoxicants. The items in Model 1 mostly performed as expected based on the Brien et al. (1997) investigation. However, item 42, which was originally in the CUSES Assertive subscale, was combined with items from the CUSES Partner's Disapproval subscale (items 40 and 41) along with two new items (items 34 and 35) due to content similarities. This new factor was labeled Advocacy because all of the items related to whether participants had the self-efficacy to advocate for condom use. There is no explanation in the original Brien et al. (1994) EFA that accounts for why these two subscales could be combined in the current study. They found that

the correlations among their four factors (Assertive, Mechanics, Partner's Disapproval, and Intoxicants) ranged from $r = .32$ to $.59$. However, the investigators did not report the specific factor correlations so it is undetermined what the correlation between the Assertive and Partner's Disapproval factors was. Nevertheless this range only showed a moderate relationship between factors (Brien et al., 1994). For the other items in Model 1, the factor structure was the same as that of Brien and colleagues (1994). Items 38 and 39 loaded on the Mechanics factor and items 43 and 44 loaded on Intoxicants factor.

Barkley and Burns (2000) examined the CUSES in an EFA using a multicultural sample of $N = 447$ undergraduate college students in the United States. Three factors were extracted from EFA (Appropriation, STDs, and Partner's Reaction). Similar to the current study, items 40 and 41 loaded onto the Partner's Reaction factor. Per Barkley and Burns (2000), the Partner's Reaction factor was similar to Partner's Disapproval in the Brien et al. (1994) study which in turn is equivalent to the Partner's Disapproval factor in the current study. Again, akin to the current study, the items (38 and 39) for the Mechanics factor loaded on what Barkley and Burns named the Appropriation factor but stated is equivalent to the Mechanics factor. In the Barkley and Burns study, items from the Assertive and Intoxicants subscale (items 42 – 44) did not load onto factors in their analysis which they attributed to cultural differences. Likewise, Shaweno and Tekletsadik (2013) also sought to validate the CUSES from a cultural perspective. They performed an EFA on the CUSES items in a sample of $N = 492$ undergraduate college students in Ethiopia and extracted three factors with salient loadings (Assertiveness, Fear for Partner Rejection, Intoxicant Control). None of the items from the Mechanics factor (items 38 and 39) nor two items from the Advocacy factor (items 40 and 41 in the current study) had salient loadings in the Shaweno and Tekletsadik EFA which they attributed to cultural differences.

Similar to the current study, items 43 and 44 loaded on the factor related to Intoxicants (Intoxicant Control) in the Shaweno and Tekletsadik study. Item 42 loaded on the Assertiveness factor in the Shaweno and Tekletsadik investigation but instead was loaded on the Advocacy factor in the current study. Cultural differences appeared to be the reason for factor structure dissimilarities from Brien et al. (1994) in both the Barkley and Burns (2000) and Shaweno and Tekletsadik (2013) studies. Perhaps a reason such as the older age of the participants in the current study accounts for why the Partner's Disapproval and Assertive factors did not fit the model when loaded these respective factors but did adequately fit the model once combined into the Advocacy factor.

The fit for Model 2 was adequate and represented the factors of Attitudes, Normative Beliefs, and Perceived Susceptibility. The items in Model 2 performed as expected when compared to the first EFA analysis (comprised of the Attitudes, Normative Beliefs, Perceived Susceptibility, and Substance Use factors) in DeHart and Birkhimer (1997). As described, in Chapter 3, is it acceptable for chi-square to be significant as long as the model adequately fits in the other components (CFI, TLI, and RMSEA). Items 14 – 18 loaded on the Attitudes factor along with two new items (items 36 and 37), items 19 and 20 loaded on the Normative Beliefs factor, and Items 21 – 23 loaded on the Perceived Susceptibility factor. As previously mentioned, there are no items in the current study that loaded on a Substance Use factor. Unfortunately, despite an exhaustive search of the literature, no other peer reviewed factor analyses on the SRS have been found so factor structure of the current study can only be compared to the original SRS EFA by DeHart and Birkhimer (1997). For the current study, no correlations were found between the Normative Beliefs and Perceived Susceptibility factors. When comparing this finding to DeHart and Birkhimer (1997), the Perceived Susceptibility factor only correlated with

the Substance Use factor ($r = .16, p < .003$) and not with the Attitudes factor like in the current study which may help to explain the weak correlation between Attitudes and Perceived Susceptibility ($r = -.20, p = .02$).

The fit for Model 3 was adequate and represented the factors of Intention and Expectations (Figure 4.4). Again the items in Model 3 structurally performed as expected when compared to DeHart and Birkhimer (1997). In the DeHart and Birkhimer EFA the Intention items loaded onto two different factors that were combined in the Intention subscale. The Intention items in the current study all came from the same Intention factor (factor 2) from DeHart and Birkhimer. In the current study, items 24, 26 - 28 loaded on the Intention factor and items 29 and 30, along with new item 33, loaded on the Expectations factor. Also, in the current study there was a very strong correlation between the Intention and Expectations factor $r = .86, p = 0$. Due to the strong correlation, an attempt was made to fit Intentions and Expectations onto the same factor; however, adequate model fit was unable to be obtained. However, this very strong correlation was not found between the two factors in the DeHart and Birkhimer study ($r = .49, p < .003$). Again, this may have been due to the age differences between the two study populations.

HIV Risk Behavior and Prevention Measures

Adults age 50 and older continue to date and have sex well into old age. The majority of the participants (72.8%, $n = 204$) in this study desired a relationship that included sex, an outcome which has also been found throughout the literature examining sexuality in older adults (Alterovitz & Mendelsohn, 2013; Bateson et al., 2012; Galinsky, 2012; Lindau et al., 2007; Lindau & Gavrilova, 2010; Malta & Farquharson, 2014). Most of the participants in the current study (64.6%, $n = 181$) had a sexual relationship in the past year. Men (75.8%, $n = 104$) were more likely than women (54.3%, $n = 76$) to be sexually active. Similarly, in a nationally

representative sample of $N = 3005$ older adults, Lindau et al. (2007) found that women were less likely to be sexually active when compared to men of the same age. This finding was also supported in other studies (Galinsky, 2011; Lindau & Gavrilova, 2010).

Many older adults who date online are unaware of the factors involved in preventing HIV. In this study, of the sexually active participants, 45% ($n = 82$) of participants never used a condom with sex, 26% ($n = 46$) used condoms inconsistently, and only 29% ($n = 53$) used a condom with every sexual encounter. These findings are consistent with a similar study of $N = 106$ sexually active single men and women (not online daters) ages 50 – 74 (Foster et al., 2012). Foster et al. (2012) found that 32.1% of participants always used condoms and 67.9% never or inconsistently used them. Further, relevant literature supports older adults' lack of and inconsistency in using condoms (Cianelli et al., 2013; Hillman, 2008; Lindau et al., 2007; Sormanti & Shibusawa, 2007; Ward et al., 2004).

The finding of high risk sexual behavior in the current study is in sharp contrast to the participants answering favorably that if they were going to have sex, then they would take precautions to reduce their risk of contracting HIV. Interestingly, the four other items related to intention to have safe sex had essentially neutral responses from the participants (an average of 23.9% over the four items answered the items with a neutral response); however, none of these items were posed in relation to the possibility of contracting HIV. This finding alone implies that the participants perceive themselves as not being susceptible to contracting HIV but if faced with the suggestion that they could contract HIV, then they would use protection during sex. Another possibility is social desirability bias (Dillman et al., 2009). Confirmation of participants' low HIV risk perception was obtained as their answers to items related to perceived susceptibility to contracting HIV showed a low risk perception. Only 8.3% ($n = 15$) of participants agreed or

strongly agreed that they were at risk for HIV. This rather low risk perception is supported by the Jacob and Thomlison (2009) study ($N = 572$) that found 88.6% of their participants did not have a perceived susceptibility for contracting HIV. However, in a study of $N = 398$ older adults, Ward and colleagues (2004) found that 55% of their participants perceived themselves to be at risk for HIV. Similarly, in a study with a small sample ($N = 44$), Grant and Ragsdale (2008) determined that 70.6% of women aged 45 – 55 and 40% of women aged 56 and older perceived they were susceptible to contracting HIV.

The relationship between self-efficacy and preventive measures such as using condoms and talking with a partner about safe sex was also examined. Generally, self-efficacy had moderate to strong associations with taking action or intending to take action to reduce the risk of contracting HIV. Similarly, Foster et al. (2012) found that those with a higher motivation to have safe sex, had greater self-efficacy for practicing safe sex. Additionally, in the current study, the finding of the intention items having a relationship with the self-efficacy items is in contrast to what was found in the CFA. The Intention factor did not correlate with any of the self-efficacy factors in Model 1. Perhaps, the Intentions factor (from the SRS) in Model 3 and the CUSES factors in Model 1 are measuring something distinct about their own factors that does not allow for a significant relationship/model fit between other factors outside of the CUSES and SRS scales. Reasons for this could possibly be the new HIV prevention scale items, how the items are worded as they were constructed by different research teams, or some other unknown variable such as sexual orientation, gender, age, or even sample size.

Strengths and Limitations of the Study

A strength of this study is that it provides important first steps in furthering our understanding of HIV prevention factors in a previously unstudied population – older online

daters. Also, this study has started the process of modifying, determining, and testing HIV prevention scales for an older adult population. Other studies have previously used the SRS (Foster et al., 2012) and CUSES (Winningham et al., 2004) with an older adult population but did not tailor the instrument items for this age group. Both the CUSES and SRS have only undergone psychometric testing with a young adult population (Barkley & Burns, 2000; Brafford & Beck, Brien et al., 1994; DeHart & Birkhimer, 1997; Shaweno & Tekletsadik, 2013). The *a priori* work that went into the modification of the HIV prevention scales was also a strength of this study. Two rounds of expert panel review by interdisciplinary top researchers with expertise in HIV prevention, older adult sexuality, and gerontology provided a strong foundation upon which to base the scale modifications.

Another strength of this study relates to the feasibility aspect. For example, a determination was able to be made as to what sites are the most beneficial for recruiting this particular type of population. Also, the sample was essentially split evenly between men and women. Studies involving older adults with mixed genders tend to have more women than men participate (Andersen et al., 2016).

This study was not without limitations. One limitation was due to the constraints on maximum number of survey items (no more than 50) for the SurveyMonkey participants, some items had to be eliminated. This restriction was minimized by excluding conceptually duplicate or very similar items from the CUSES, SRS, and new items from the expert panel review. Also, having fewer survey items may have made a positive contribution to increasing the sample size for this study. Unfortunately, due to survey item limitations the HIV knowledge instrument did have to be dropped from the study. While HIV knowledge is important to study in this population, it was not a purpose or research question for this study.

A limitation to the study was the inability to obtain accurate measures on the length of time it took to complete the surveys. The REDCap surveys were not programmed to obtain study start and stop time. The completion time for the SurveyMonkey surveys ranged anywhere from approximately 10 minutes to over nine hours therefore the mean is not informative. The disparity in length of time to finish the survey was probably due survey respondents stepping away from their computers for long periods of time prior to completion. Future studies should program survey start and stop measures *a priori* as well as include a question regarding whether the survey was completed in one sitting without interruptions.

Another limitation to the study relates to the homogeneity of some aspects of the sample. The sample was mostly white (89.3%), non-Hispanic (92.1%), and heterosexual (83.9%). This decreases generalizability of the results to the population of older online daters at large. Also, though not unexpected, the mean age for the sample was fairly young ($M = 60.96$, $SD = 772$). Another limitation is related to the sensitive nature of the content in this study. Participants may be reluctant to honestly answer questions related to sexual activity (Dillman et al., 2009). To combat the potential for answering questions incorrectly, the survey was constructed so that participants could choose to skip any question they did not want to answer, rather than answering inaccurately. However, even with the choice to skip there is still the possibility of social desirability bias in the current survey. The use of a convenience sample was also a limitation.

The final limitation of this study relates to the CFA. Though all three models had adequate model fit, they did have multiple correlations of error variances. This suggests that while the HIV scale items are appropriate for an older adults population, the HIV prevention scale will need minor adaptations prior to being used again for data collection.

Study Implications and Future Research

Due to this being a feasibility study, no conclusions were able to be drawn that could impact current practice related to HIV prevention factors in older online daters. However, this study has provided a foundation upon which to further explore the variables of interest as well as determining which HIV prevention scale items are most appropriate for an older adult population. The feasibility aspect of the study has provided a guide for what sites work well for recruiting older adults who are online daters as well as the demographic characteristics of those who are interested in taking part in this type of study.

Prior to the current study, no instruments that measure HIV prevention factors have been tailored toward an older adult population. This study was a critical first step in determining the most appropriate items to use when determining the HIV risks of older adults. The rigorous approach of using the assistance of an expert panel review when modifying the SRS and CUSES for an older population provided valuable insight into what items are important to use for this population. The multiple correlated error variances in the CFA suggest that a different approach to the HIV prevention items may be needed beyond the modification of the SRS and CUSES. There may be a need to create a HIV prevention instrument from scratch rather than relying on adapting ones that were initially created for a young adult population. This is especially relevant given that HIV prevention studies aimed at older adults have used instruments that have not been adapted or created for older adults.

The overwhelming majority of the older online daters in this study had the high risk behavior of not using condoms consistently. Despite this risky behavior, they reported a low perceived susceptibility for contracting HIV. This incongruity supports the need to further develop appropriate HIV prevention scales aimed at an older adult population. Also, qualitative

interviews or focus groups may be helpful to gain greater depth of information and clarity on what factors contribute to a low HIV risk perception in this population despite high levels of risk behavior.

Future research should continue the work that was started in this study. While model fit of the HIV prevention scale items was adequate, further refinement of the items is needed as evidenced by multiple correlated error variances within the models. The items have overlap due to factors outside of the latent factors within the models. This may be due to the age of the participants or other factors but a solution should be explored further. CFAs perform better with larger numbers of participants so a study with a much larger sample size would be helpful. Also, input from older online daters about the items was not able to be obtained *a priori*. Conducting focus groups on the most appropriate HIV prevention scale items for older adults may be helpful prior to data collection using the current HIV prevention scale.

Despite the fact that people are living longer with HIV, research on HIV and aging continues to consider those age 50 and older as older adults. In the current study, 67.1% of the participants are age 50 – 64 which would not be considered an aged population in non-HIV research. It is important to consider the differences between those who fall in different categories among the age cohorts when conducting HIV and aging research (Cahill & Valadez, 2013). Future studies should focus on both recruiting more participants over the age of 64 and also stratifying analyses by age cohort group. There may be significant differences between these groups that need to be considered when developing a HIV prevention instrument for older adults. Additionally, separate instruments or specific subscales relevant to specific age groups may be needed.

There was a paucity of minority participants in this study. Future studies should focus on recruiting more people of color. Some recommendations for recruiting African-American participants include having someone who is African-American be trained to recruit study participants and using institutions such as churches as recruitment facilitators (Watson, Robinson, Harker, & Arriola, 2016). One interesting finding from this study was that the majority of people who identified as LGB, reported being in a sexual relationship in the past year. Also, many of the online dating sites and applications that the participants reported using were geared toward men who have sex with men. Several of these sites were those associated as being “hook-up” sites. Given the small number of LGB participants, conclusions were unable to be drawn as to whether this population had high levels of risk behavior. Future studies should also consider focusing on LGB older adults and perhaps developing a separate instrument aimed at this population. Also, since a lot of the online sites and applications that the LGB participants frequented in this study are not “mainstream” dating sites, perhaps the cost to advertise on them is more feasible when compared to the more popular sites.

As indicated earlier, the limitation of the multiple correlated error variances in CFA suggest that, at the least, adaptations are needed to the HIV prevention scale and at the most a new HIV prevention instrument aimed at older adults will need to be constructed. Further strengthening the need for a new HIV prevention instrument is the finding of the factors not being able to fit in one cohesive model but rather fit into three different models. Given that the CUSES and SRS were originally intended for a young adult audience, developing a new HIV prevention instrument will be the focus of the next study. The insights gleaned from the current feasibility study will help to guide the process. First steps will be to examine the literature

related to HIV risk and older adults, conduct focus groups with older online daters to determine important items to include, and conduct expert panel review using the Delphi technique.

Conclusion

There is a common misconception that older adults do not have sex while in fact many desire to date and remain sexually active well into old age. Increasingly, this population is turning to online dating as a means of finding potential romantic and/or sexual partners. Despite the increase in online dating, no studies have focused on determining the HIV prevention factors in older online daters. Also, no instruments that measure HIV prevention factors have been created or adapted for an older adult population. The current study found that conducting an online survey examining HIV prevention factors in older online daters is both feasible and acceptable for this population. The finding of participants with high levels of sexual risk behavior but low levels of condom use and low HIV risk perception suggests the critical need to target older online daters for HIV prevention interventions. The HIV prevention items were found to be appropriate for an older adult population. However, the correlation of error variances in the CFA models as well as the need for three models instead of one model suggests the need for adaptations to the items or even the construction of a new HIV prevention instrument aimed at older adults.

References

- Abbey, A., Parkhill, M. R., Buck, P. O., & Saenz, C. (2007). Condom use with a casual partner: What distinguishes college students' use when intoxicated? *Psychology of Addictive Behaviors, 21*(1), 76-83. doi: 10.1037/0893-164X.21.1.76
- Abrass, C. K., Appelbaum, J. S., Boyd, C. M., Braithwaite, R. S., Broudy, V. C., Covinsky, K.,...Valcour, V. (2011). *The HIV and Aging Consensus Project: Recommended treatment strategies for clinicians managing older patients with HIV*. Retrieved from http://aahivm.org/Upload_Module/upload/HIV%20and%20Aging/Aging%20report%20working%20document%20FINAL%2012.1.pdf
- Adams, M. S., Oye, J., & Parker, T. S. (2003). Sexuality of older adults and the Internet: From sex education to cybersex. *Sexual and Relationship Therapy, 18*(3), 405-415. doi: 10.1080/1468199031000153991
- Adekeye, O. A., Heiman, H. J., Onyeabor, O. S., & Hyacinth, H. I. (2012). The new invincibles: HIV screening among older adults in the U.S. *PLoS One, 7*(8). doi: 10.1371/journal.pone.0043618
- Agate, L. L., Mullins, J. M., Prudent, E. S., & Liberti, T. M. (2003). Strategies for reaching retirement communities and aging social networks: HIV/AIDS prevention activities among senior in South Florida. *Journal of Acquired Immune Deficiency Syndromes, 33*(Supplement 2), S238-S242.
- Ajzen, I. (2012). Martin Fishbein's legacy: The Reasoned Action Approach. *The ANNALS of the American Academy of Political and Social Science, 640*(1), 11-27. doi: 10.1177/0002716211423363

- Ajzen, I. & Cote, N. G. (2008). Attitudes and the prediction of behavior. In W. D. Crano & R. Prislin (Eds.), *Attitudes and attitude change: Frontiers of social psychology* (pp. 289-311). New York, NY: Psychology Press.
- Ajzen, I. & Fishbein, M. (2005). The influence of attitudes on behavior. In D. Albarracin, B. T. Johnson, & M. P. Zanna (Eds.), *Handbook of attitudes and attitude change: Basic principles* (pp. 173-221). Mahwah, NJ: Lawrence Erlbaum Associates.
- Ajzen, I. & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior*. Englewood Cliffs, NJ: Prentice Hall.
- Akers, A., Bernstein, L., Henderson, S., Doyle, J., & Corbie-Smith, G. (2007). Factors associated with lack of interest in HIV testing in older at-risk women. *Journal of Women's Health, 16*(6), 842-858. doi: 10.1089/jwh.2006.0028
- Alterovitz, S. S. R. & Mendelsohn, G. A. (2009). Partner preference across the lifespan: Online dating by older adults. *Psychology and Aging, 24*(2), 513-517. doi: 10.1037/a0015897
- Alterovitz, S. S. R. & Mendelsohn, G. A. (2013). Relationship goals of middle-aged, young-old, and old-old Internet daters: An analysis of online personal ads. *Journal of Aging Studies, 27*(2), 159-165. doi: 10.1016/j.jaging.2012.12.006
- American Academy of HIV Medicine. (2011). *The HIV and Aging Consensus Project: Recommended treatment and strategies for clinicians managing older patients with HIV*. Retrieved from http://aahivm.org/Upload_Module/upload/HIV%20and%20Aging/Aging%20report%20working%20document%20FINAL%202012.1.pdf
- Anderson, C., Seff, L. R., Batra, A., Bhatt, C., & Palmer, R. C. (2016). Recruiting and engaging older men in evidence-based health promotion programs: Perspectives on barriers and

strengths. *Journal of Aging Research*, 2016, 8981435.

<http://doi.org/10.1155/2016/8981435>

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W. H. Freeman.

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, 52, 1-26. doi: 10.1146/aanurev.psych.52.1.1

Bannigan, K. & Watson, R. Reliability and validity in a nutshell. *Journal of Clinical Nursing*, 18, 3237-3243. doi: 10.1111/j.2702.2009.02939.x

Barkley Jr., T. W. & Burns, J. L. (2000). Factor analysis of the Condom Use Self-Efficacy Scale among multicultural college students. *Health Education Research*, 15(4), 485-489

Bateson, D. J., Weisberg, E., McCaffery, K. J., & Luscombe, G. M. (2012). When online becomes offline: Attitudes to safer sex practices in older and younger women using an Australian Internet dating site. *Sexual Health*, 9(2), 152-159. doi: 10.1071/SH10164

Bentler, P. (1990). Comparative fit indexes in structural models. *Psychological Bulletin*, 107, 238 – 246.

Bentler, P. & Bonnet, D. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin*, 88, 588 – 606.

Brafford, L. J. & Beck, K. H. (1991). Development and validation of a condom self-efficacy scale for college students. *Journal of American College Health*, 39(5), 219-225. doi: 10.1080/07448481.1991.9936238

Brien, T. M., Thombs, D. L., Mahoney, C. A., & Wallnau, L. (1994). Dimensions of self-efficacy among three distinct groups of condom users. *Journal of American College Health*, 42(4), 167-174. doi: 10.1080/07448481.1994.9939665

- Brown, E. J. (1998a). College students' AIDS risk perception. *Journal of Psychosocial Nursing & Mental Health Services*, 36(9), 25-30.
- Brown, E. J. (1998b). Female injecting drug users: Human immunodeficiency virus risk behavior and intervention needs. *Journal of Professional Nursing*, 14(6), 361-369. doi: 10.1016/S8755-7223(98)80078-1
- Brown, E. J. (2000). AIDS-related risk behavior of young college students. *Association of Black Nursing Faculty in Higher Education Journal*, 11(2), 37-43.
- Brown, S. L. & Shinohara, S. K. (2013). Dating relationships in older adulthood: A national portrait. *Journal of Marriage and Family*, 75(5), 1194-1202. doi: 10.1111/jomf.12065
- Brown, T. A. (2015). *Confirmatory factor analysis for applied research* (2nd ed.). New York, NY: The Guilford Press.
- Browne, M. & Cudek, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.) *Testing structural equation models* (pp. 136 – 162). Newbury Park, CA: Sage.
- Bulcroft, K. & O'Connor, M. (1986). The importance of dating relationships on quality of life for older persons. *Family Relations*, 35(3), 397-401.
- Bryant, F. B. & Yarnold, P. R. (1995). Principal components analysis and exploratory and confirmatory factor analysis. In L. G. Grimm & R. R. Yarnold (Eds.), *Reading and understanding multivariate statistics* (pp. 99-136). Washington, DC: American Psychological Association.
- Cahill, S. & Valadez, R. (2013). Growing older with HIV/AIDS: New public health challenges. *American Journal of Public Health*, 103(3), e7 – e15. doi: 10.2015/AJPH.2012.301161

- Carey, M. P., Morrison-Beedy, D., & Johnson, B. T. (1997). The HIV Knowledge Questionnaire: Development and evaluation of a reliable, valid, and practical self-administered questionnaire. *AIDS and Behavior, 1*, 61-74. doi: 10.1023/A:10262180059433
- Carey, M. P. & Schroder, K. E. E. (2002). Development and psychometric evaluation of the brief HIV Knowledge Questionnaire. *AIDS Education and Prevention, 14*(2), 172-182.
- Carpenter, L. M., Nathanson, C. A., & Kim, Y. J. (2006). Sex after 40? Gender, ageism, and sexual partnering in midlife. *Journal of Aging Studies, 20*, 93-106.
- Carr, D. (2004). The desire to date and remarry among older widows and widowers. *Journal of Marriage and Family, 66*(4), 1051-1068. doi: 10.1111/j.0022-2445.2004.00078.x
- Centers for Disease Control and Prevention. (2017a, September 21). *HIV among people aged 50 and over*. Retrieved from <https://www.cdc.gov/hiv/group/age/olderamericans/index.html>
- Centers for Disease Control and Prevention. (2017b, March 8). *HIV cost-effectiveness*. Retrieved from <https://www.cdc.gov/hiv/programresources/guidance/costeffectiveness/index.html>
- Chambers, L. A., Wilson, M. G., Rueda, S., Gogolishvili, D., Shi, M. Q., Rourke, S. B., & The Positive Aging Review Team. (2014). Evidence informing the intersection of HIV, aging, and health: A scoping review. *AIDS Behavior, 18*, 661-675. doi: 10.1007/s10461-013-0627-5
- Champion, V. L. & Skinner, C. S. (2008). The health belief model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research, and practice* (pp. 45-65). San Francisco: Jossey-Bass.
- Chimbetete, M. & Gwandure, C. (2011). Impact of a workplace-based HIV and AIDS risk reduction training intervention. *Journal of Human Ecology, 35*(1), 11-19.

- Cianelli, R., Villegas, N., Lawson, S., Ferrer, L., Kaelber, L., Peragallo, N., & Yaya, A. (2013). Unique factors that place older Hispanic women at risk for HIV: Intimate partner violence, machismo, and marianismo. *Journal of the Association of Nurses in AIDS Care*, 24(4), 341-354. doi: 10.1016/j.jana.2013.01.009
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Corbin, D. E., Voisin, D. R., & Snell, C. L. (2009). Exploring the relationship between spirituality and HIV-related risk factors among young black college students. *Journal of HIV/AIDS & Social Services*, 8(3), 238-250. doi: 10.1080/15381500903130512
- Couper, M. P. (2008). *Designing effective web surveys*. Cambridge, NY: Cambridge University Press.
- Crocker, L. M. & Algina, J. (1986). *Introduction to classical and modern test theory*. Fort Worth, TX: Holt, Rinehart, & Winston, Inc.
- Davis, E. M. & Fingerman, K. L. (2016). Dating digital: Online profile content of older and younger adults. *Journals of Gerontology: Psychological Sciences*, 71(6), 959-967. doi: 10.1093/geronb/gbv042
- DeHart, D. D. & Birkimer, J. C. (1997). Trying to practice safer sex: Development of the sexual risks scale. *The Journal of Sex Research*, 34(1), 11-25. doi: 10.1080/00224499709551860
- Dickson, F. C., Hughes, P. C., & Walker, K. L. (2005). An exploratory investigation into dating among later-life women. *Western Journal of Communication*, 69(1), 67-82. doi: 10.1080/10570310500034196.
- Dillman, D. A., Smyth, J. D., & Christian, L. M. (2009). *Internet, mail, and mixed-mode surveys: The Tailored Design Method*. Hoboken, NJ: John Wiley & Sons, Inc.

- Diverse Elders Coalition. (2014). *Eight Policy Recommendations for Improving the Health and Wellness of Older Adults with HIV*. Retrieved from http://www.diverseelders.org/wp-content/uploads/2014/05/DEC-HIV-and-Aging-Policy-Report_web.pdf
- Downing-Matibag, T. M. & Geisinger, B. (2009). Hooking up and sexual risk taking among college students: A health belief model perspective. *Qualitative Health Research, 19*(9), 1196-1209. doi: 10.1177/1049732309344206
- Egleston, B. L., Miller, S. M., & Meropol, N. J. (2011). The impact of misclassification due to survey response fatigue on estimation and identifiability of treatment effects. *Statistics in Medicine, 30*(30), 3560-3572. doi: 10.1002/sim.4377
- Falvo, N. & Norman, S. (2004). Never too old to learn: The impact of an HIV/AIDS education program on older adults' knowledge. *Clinical Gerontologist, 27*(1-2), 103-107. doi: 10.1300/J018v27n01_09
- Fan, W. & Yan, Z. (2010). Factors affecting response rates of the web survey: A systematic review. *Computers in Human Behavior, 26*, 132-139. doi: 10.1016/j.chb.2009.10.015
- Fisher, J. D. & Fisher, W. A. (2002). The information-motivation-behavioral skills model. In R. J. DiClemente, R. A. Crosby, M. C. Kegler (Eds.), *Emerging theories in health promotion practice and research* (pp. 40-70). San Francisco, CA: Jossey-Bass.
- Foster, V., Clark, P. C., Holstad, M. M., & Burgess, E. (2012). Factors associated with risky sexual behaviors in older adults. *Journal of the Association of Nurses in AIDS Care, 23*, 487-499. doi: 10.1016/j.jana.2011.12.008
- Gakumo, C. A., Moneyham, L. D., Enah, C. C., & Childs, G. D. (2012). The moderating effect of sexual pressure on young urban women's condom use. *Research in Nursing and Health, 35*, 4-14. doi: 10.1002/nur.20465

- Galinsky, A. M. (2012). Sexual touching and difficulties with sexual arousal and orgasm among U.S. older adults. *Archives of Sexual Behavior, 41*, 875-890. doi: 10.1007/s10508-011-9873-7
- George, D. & Mallery, P. (2011). Factor Analysis. In D. George & P. Mallery (Eds.), *SPSS for Windows step by step: A simple guide and reference* (11th ed., pp. 245-260). Boston, MA: Allyn & Bacon.
- Groves, R. M., Fowler, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2009). *Survey methodology*. Hoboken, NJ: John Wiley & Sons, Inc.
- Grant, K. & Ragsdale (2008). Sex and the 'recently single': Perceptions of sexuality and HIV risk among mature women and primary care physicians. *Culture, Health, & Sexuality, 10*(5), 495-511. doi: 10.1080/13691050801948094
- Greenwood, S., Perrin, A., & Duggan, M. (2016, November 11). *Pew Research Center: Social media update 2016*. Retrieved from <http://www.pewinternet.org/2016/11/11/social-media-update-2016/>
- Hardy, S. E., Allore, H., & Studenski, S. A. (2009). Missing data: A special challenge in aging research. *Journal of the American Geriatrics Society, 57*(4), 722-729. doi: 10.1111/j.1532-5415.2008.02168.x
- Henderson, S. J., Bernstein, L. B., St. George, D. M., Doyle, J. P., Paranjape, A. S., & Corbie-Smith, G. (2004). Older women and HIV: How much do they know and where are they getting their information? *Journal of the American Geriatrics Society, 52*, 1549-1553. doi: 10.1111/j.1532-5415.2004.52421.x
- High, K. P., Brennan-Ing, M., Clifford, D. B., Cohen, M. H., Currier, J., Deeks, S. G., . . . Volberding, P. (2012). HIV and aging: State of knowledge and areas of critical need for

- research. A report to the NIH office of AIDS Research by the HIV and aging working group. *Journal of Acquired Immune Deficiency Syndromes*, 60, S1-S18. doi: 10.1097/QAI.0b013e31825a3668.
- Hillman, J. (2008). Knowledge, attitudes, and experience regarding HIV/AIDS among older adult inner-city Latinos. *International Journal of Aging and Human Development*, 66(3), 243-257. doi: 10.2190/AG.66.3.e
- Hochbaum, G. M. (1958). *Public Participation in Medical Screening Programs: A socio-psychological study*. Washington, D.C.: U.S. Department of Health, Education, and Welfare.
- Hyde, Z., Flicker, L., Hankey, G. J., Almeida, O. P., McCaul, K. A., Chubb, S. A. P., & Yeap, B.B. (2012). Prevalence and predictors of sexual problems in men aged 75-95 years: A population-based study. *Journal of Sexual Medicine*, 9, 442-453.
- Iwuji, C. C., Churchill, D., Gilleece, Y., Weiss, H. A., & Fisher, M. (2013). Older HIV-infected individuals present late and have a higher mortality: Brighton, UK cohort study. *BMC Public Health*, 13(1), 397-405. doi: 10.1186/1471-2458-13-397
- Jacobs, R. J. & Thomlison, B. (2009). Self-silencing and age as risk factors for sexually acquired HIV in midlife and older women. *Journal of Aging and Health*, 21, 102-128
- Jonson, H. & Siverskog, A. (2012). Turning vinegar into wine: Humorous self-presentations among older GLBTQ online daters. *Journal of Aging Studies*, 26(1), 55-64. doi: 10.1016/j.jaging.2011.07.003
- Johnston, C. L., Marshall, J., Qi, J., Zonneveld, C. J., Kerr, T., Montaner, J. S. G., & Wood, E. (2011). HIV knowledge and perceptions of risk in a young, urban, drug-using population. *Public Health*, 125(11), 791-794. doi: 10.1016/j.puhe.2011.09.008

- Kapadia, F., Frye, V., Bonner, S., Emmanuel, P. J., Samples, C. L., & Latka, M. H. (2012). Perceived peer safer sex norms and sexual risk behaviors among substance-using Latino adolescents. *AIDS Education and Prevention, 24*(1), 27-40. doi: 10.1521/aeap.2012.24.1.27
- Kennedy, B. L. & Roberts, S. T. (2009). Truths and myths that influence the sexual decision-making process among young multiethnic college women. *Archives of Psychiatric Nursing, 23*(5), 366-375. doi: 10.1016/j.apnu.2008.10.007
- Klein, R. (2004). *Principles and practice of structural equation modeling*. New York, NY: The Guilford Press.
- Lekas, H. M., Schrimshaw, E. W., & Siegel, K. (2005). Pathways to HIV testing among adults aged fifty and older with HIV/AIDS. *AIDS Care, 17*(6), 674-687. doi: 10.1080/09540120412331336670
- Lindau, S. T. & Gavrilova, N. (2010). Sex, health, and years of sexually active life gained due to good health: Evidence from two US population based cross sectional surveys on aging. *British Medical Journal, 340*, 1-11. doi: 10.1136/bmj.c810
- Lindau, S. T., Leitsch, S. A., Lundberg, K. L., & Jerome, J. (2006). Older women's attitudes, behavior, and communication about sex and HIV: A community-based study. *Journal of Women's Health, 15*(6), 747-753.
- Lindau, S. T., Schumm, L. P., Laumann, E. O., Levinson, W., O'Muirheartaigh, C. A., & Waite, L. J. (2007). A study of sexuality and health among older adults in the United States. *The New England Journal of Medicine, 357*, 762-774. doi: 10.1056/NEJMoa067423

- Linsk, N. L. (2000). HIV among older adults: Age-specific issues in prevention and treatment. *The AIDS Reader, 10*(7), 430-440.
- Lodge, A. C. & Umberson, D. (2012). All shook up: Sexuality of mid- to later life married couples. *Journal of Marriage and Family, 74*, 428-443.
- Mack, K. A. & Bland, S. D. (1999). HIV testing behaviors and attitudes regarding HIV/AIDS of adults aged 50-64. *The Gerontologist, 39*(6), 687-694. doi: 10.1093/geront/39.6.687
- Maes, C. A. & Louis, M. (2003). Knowledge of AIDS, perceived risk of AIDS, and at-risk sexual behaviors among older adults. *Journal of the American Academy of Nurse Practitioners, 15*(11), 509-516
- Mailhot, T., Cossette, S., Bourbonnais, A., Cote, J., Denault, A., Cote, M-C., ... Guertin, M-C. (2014). Evaluation of a nurse mentoring intervention to family caregivers in the management of delirium after cardiac surgery (MENTOR_D): A study protocol for a randomized controlled pilot trial. *Trials, 15*(306). doi: 10.1186/1745-6215-15-306
- Maliszewski, G. & Brown, C. (2014). Familism, substance abuse, and sexual risk among foster care alumni. *Children and Youth Services Review, 36*, 206-212. doi: 10.1016/j.childyouth.2013.11.021
- Malta, S. (2007). Love actually! Older adults and their romantic Internet relationships. *Australian Journal of Emerging Technologies and Society, 5*(2), 84-102.
- Malta, S. & Farquharson, K. (2014). The initiation and progression of late-life romantic relationships. *Journal of Sociology, 50*(3), 237-251. doi: 10.1177/1440783312442254
- McIntosh, W. D., Locker, L., Briley, K., Ryan, R., & Scott, A. J. (2011). What do older adults seek in their potential romantic partners? Evidence from online personal ads.

- International Journal of Aging and Human Development*, 72(1), 67-82. doi:
10.2190/AG.72.1.d
- McWilliams, S. & Barrett, A. E. (2014). Online dating in middle and later life: Gendered expectations and experiences. *Journal of Family Issues*, 35(3), 411-436. doi:
10.1177/0192513X12468437
- Milaszewski, D., Greto, E., Klochkov, T., & Fuller-Thomson, E. (2012). A systematic review of education for the prevention of HIV/AIDS among older adults. *Journal of Evidence Based Social Work*, 9(3), 213-230. doi: 10.1080/15433714.2010.494979
- Montano, D. E. & Kasprzyk, D. (2008). Theory of Reasoned Action, Theory of Planned Behavior, and the Integrated Behavioral Model. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), *Health behavior and health education: Theory, research, and practice* (pp. 67-96). San Francisco, CA: Jossey-Bass.
- National Institutes of Health Office of AIDS Research. (2014). *FY 2016 Trans-NIH plan for HIV-related research. Priority: Reducing new infections*. Retrieved from https://www.oar.nih.gov/strategic_plan/fy2016/FY-2016-Trans-NIH-Plan-for-HIV-Related-Research.pdf
- Oglesby, W. H. & Alemagno, S. A. (2013). Psychometric properties of an HIV knowledge scale administered with populations at high risk for HIV infection. *Health Promotion Practice*, 14(6), 859-867. doi: 10.1177/1524839912470453
- Orel, N. A., Stelle, C., Watson, W. K., & Bunner, B. L. (2010). No one is immune: A community education partnership addressing HIV/AIDS and older adults. *Journal of Applied Gerontology*, 29(3), 352-370. doi: 10.1177/109019818401100101
- Penhollow, T. M., Young, M., & Denny, G. (2009). Predictors of quality of life, sexual

- intercourse, and sexual satisfaction among active older adults. *American Journal of Health Education*, 40(1), 14-22.
- Pequegnat, W., Rosser, B. R. S., Bowen, A. M., Bull, S. S., DiClemente, R. J., Bockting, W. O., ...& Zimmerman, R. (2007). Conducting internet-based HIV/STD prevention survey research: Considerations in design and evaluation. *AIDS Behavior*, 11, 505-521. doi: 10.1007/s10461-006-9172-9
- Pfeiffer, E. & Davis, G. (1972). Determinants of sexual behavior in middle and old age. *Journal of the American Geriatrics Society*, 4, 151-158.
- Polit, D. F. & Beck, C. T. (2008). *Nursing research: Generating and assessing evidence for nursing practice*. Philadelphia, PA: Lippincott, Williams, & Wilkins.
- Pulerwitz, J., Michaelis, A., Weiss, E., Brown, L., & Mahendra, V. (2010). Reducing HIV-related stigma: Lessons learned from Horizons research and programs. *Public Health Reports*, 125(2), 272-281.
- Qaseem, A., Snow, V., Shekelle, P., Hopkins, R., & Owens, D. K. (2009). Screening for HIV in health care settings: A guidance statement from the American College of Physicians and HIV Medicine Association. *Annals of Internal Medicine*, 150(2), 125-131. doi: 10.7326/0003-4819-150-2-200901200-00300
- Roberson, D. W. (2018). Meeting the HIV prevention needs of older adults. *Journal of the Association of Nurses in AIDS Care*, 29(1), 126-129.
<http://dx.doi.org/10.1016/j.jana.2017.08.004>
- Rongkavilit, C., Wang, B., Naar-King, S., Bunupuradah, T., Parsons, J. T., Panthong, A., ...& Phanuphak, P. (2015). Motivational interviewing targeting risky sex in HIV-positive

- young Thai men who have sex with men. *Archives of Sexual Behavior*, 44(2), 329-340.
doi: 10.1007/s10508-014-0274-6
- Rose, M. A. (1996). Effect of an AIDS education program for older adults. *Journal of Community Health Nursing*, 13(3), 141-148.
- Rose, M. A. (1995). Knowledge of human immunodeficiency virus and acquired immunodeficiency syndrome, perception of risk, and behaviors among older adults. *Holistic Nursing Practice*, 10(1), 10-17.
- Rosenstock, I. M. (1966). Why people use health services. *Milbank Memorial Fund Quarterly*, 44(3), 94-127. doi: 10.2307/3348967
- Rosenstock, I. M. (1974). Historical origins of the Health Belief Model. *Health Education & Behavior*, 2, 328-335. doi: 10.1177/109019817400200403
- Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the Health Belief Model. *Health Education Quarterly*, 15(2), 175-183. doi: 10.1177/109019818801500203
- Rosenstock, I. M. & Hochbaum, G. M. (1961). Some principles of research design in public health. *American Journal of Public Health and the Nation's Health*, 51, 266-277.
- Rosenthal, L., Earnshaw, V. A., Lewis, J. B., Lewis, T. T., Reid, A. E., Staski, E. C., ...Ickovics, J. R. (2014). Discrimination and sexual risk among young urban pregnant women of color. *Health Psychology*, 33(1), 3-10. doi: 10.1037/a0032502
- Rote, N. S. & Huether, S. E. (2010). Infection. In K. L. McCance & S. E. Huether (Eds.). *Pathophysiology: The biologic basis for disease in adults and children* (pp. 293-335). Maryland Heights, MO: Mosby.

- Samji, H., Cescon, A., Hogg, R. S., Modur, S. P., Althoff, K. N., Buchacz, K.,...Gange, S. J. (2013). Closing the gap: Increases in life expectancy among treated HIV-positive individuals in the United States and Canada. *PLoS ONE*, 8(12). doi: 10.1371/journal.pone.0081355
- Sankar, A., Nevedal, A., Neufeld, S., Berry, R., & Luborsky, M. (2011). What do we know about older adults and HIV? A review of social and behavioral literature. *AIDS Care*, 23(10), 1187-1207. doi: 10.1080/09540121.2011.564115
- Sassler, S. (2010). Partnering across the life course: Sex, relationships, and mate selection. *Journal of Marriage and Family*, 72(3), 557-575. doi: 10.1111/j.1741-3737.2010.00718.x
- Shaweno, D. & Tekletsadik, E. (2013). Validation of the Condom Use Self-Efficacy Scale in Ethiopia. *BMC International Health and Human Rights*, 13(22).
<http://www.biomedcentral.com/1472-698X/13/22>
- Simon, P. M., Morse, E. V., Balson, P. M., Osofsky, H. J., & Gaumer, H. R. (1993). Barriers to human immunodeficiency virus related risk reduction among male street prostitutes. *Health Education & Behavior*, 20(2), 261-273. doi: 10.1177/109019819302000216
- Simons-Morton, B. S., McLeroy, K. R., & Wendel, M. L. (2012). *Behavior theory in health promotion practice and research*. Burlington, MA: Jones and Bartlett Learning.
- Singer, M., Dai, H., Weeks, M. R., & Malave, D. (1998). AIDS risk perception among women drug users in Hartford, CT. *Women & Health*, 27(1/2), 67-85. doi: 10.1300/J013v27n01_05
- Small, L. F. (2009). What older adults know about HIV/AIDS: Lessons from an HIV/AIDS education program. *Educational Gerontology*, 36(1), 26-45. doi: 10.1080/0360127090358317

- Smith, A. (2016, February 11). *15% of American adults have used online dating sites or mobile dating apps*. Retrieved from <http://www.pewinternet.org/2016/02/11/15-percent-of-american-adults-have-used-online-dating-sites-or-mobile-dating-apps/>
- Sormanti, M. & Shibusawa, T. (2007). Predictors of condom use and HIV testing among midlife and older women seeking medical services. *Journal of Aging and Health, 19*, 705-719
- Stall, R. & Catania, J. (1994). AIDS risk behaviors among late middle-aged and elderly Americans. *Archives of Internal Medicine, 154*, 57-63. doi: 10.1001/archinte.1994.00420010085010
- Swenson, R. R., Rizzo, C. J., Brown, L. K., Vanable, P. A., Carey, M. P., Valois, R. F., ... & Romer, D. (2010). HIV knowledge and its contribution to sexual health behaviors of low-income African American adolescents. *Journal of the National Medical Association, 102*(12), 1173-1182.
- Strahan, R. & Gerbasi, K. C. (1972). Short, homogeneous versions of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology, 28*(2), 191-193.
- Thornton, L., Batterham, P. J., Fassnacht, D. B., Kay-Lambkin, F., Calear, A. L., & Hunt, S. (2016). Recruiting for health, medical or psychosocial research using Facebook: Systematic review. *Internet Interventions, 4*(1), 72-81. <https://doi.org/10.1016/j.invent.2016.02.001>
- Traupmann, J., Eckels, E., & Hatfield, E. (1982). Intimacy in older women's lives. *The Gerontologist, 22*(6), 493-498.
- Trompeter, S. E., Bettencourt, R., & Barrett-Connor, E. (2012). Sexual activity and satisfaction in healthy community-dwelling older women. *The American Journal of Medicine, 125*(1), 37-43.

- United States Census Bureau. (n.d.). *Census regions and divisions of the United States*. Retrieved from https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf
- Vandeweerd, C., Corvin, J., Coulter, M., Perkins, E., Telford, R., Yalcin, A.,... Yegidis, B. (2014). A preliminary investigation of risks for adverse outcomes of relationship seeking on Social Network Sites (SNS): A descriptive study of women over 50 seeking relationships on MySpace in Hillsborough County, Florida. *Journal of Women & Aging*, 26, 127-145. doi: 10.1080/08952841.2014.884897
- Vandeweerd, C., Myers, J., Coulter, M., Yalcin, A., & Corvin, J. (2016). Positives and negatives of online dating according to women 50. *Journal of Women & Aging*, 28(3), 259-270. doi: 10.1080/08952841.2015.1137435
- Villegas, N., Santisteban, D., Cianelli, R., Ferrer, L., Ambrosia, T., Peragallo, N., & Lara, L. (2015). Pilot testing an Internet-based STI and HIV prevention intervention with Chilean women. *Journal of Nursing Scholarship*, 47(2), 106-116. doi: 10.1111/jnu.12114
- Volkman, T., Wagner, K. D., Strathdee, S. A., Semple, S. J., Ompad, D. C., Chavarin, C. V., & Patterson, T. L. (2014). Correlates of self-efficacy for condom use among male clients of female sex workers in Tijuana, Mexico. *Archives of Sexual Behavior*, 43(4), 719-727. doi: 10.1007/s10508-013-0149-2
- Walcott, C. M., Chenneville, T., & Tarquini, S. (2011). Relationship between recall of sex education and college students' sexual attitudes and behavior. *Psychology in Schools*, 48(8), 828-842. doi: 10.1002/pits.20592
- Waltz, C. F., Strickland, O. L., & Lenz, E. R. (2010). *Measurement in nursing and health research*. New York, NY: Springer Publishing Company.

- Ward, E. G., Disch, W. B., Levy, J. A., & Schensul, J. J. (2004). Perception of HIV/AIDS risk among urban, low-income senior-housing residents. *AIDS Education and Prevention, 16*(6), 571-588. doi: 10.1521/aeap.16.6.571.53795
- Watson, B., Robinson, D. H. Z., Harker, L., & Arriola, K. R. J. (2016). The inclusion of African-American study participants in web-based research studies: Viewpoint. *Journal of Medical Internet Research, 18*(6), e168. doi: 10.2196/jmir.5486
- Watson, W. K., Bell, N. J., & Stelle, C. (2010). Women narrate later life remarriage: Negotiating the cultural to create the personal. *Journal of Aging Studies, 24*, 302-312.
- Watson, W. K. & Stelle, C. (2011). Dating for older women: Experiences and meanings of dating in later life. *Journal of Women and Aging, 23*(3), 263-275.
- Weinhardt, L. S. (2002). Effects of a detailed sexual behavior interview on perceived risk of HIV infection: Preliminary experimental analysis in a high risk sample. *Journal of Behavioral Medicine, 25*(2), 195-203. doi: 10.1023/A:1014888905882
- Winningham, A., Corwin, S., Moore, C., Richter, D., Sargent, R., & Gore-Felton, C. (2004). The changing age of HIV: Sexual risk among older African American women living in rural communities. *Preventative Medicine, 39*, 809-814. doi: 10.1016/j.ypmed.2004.03.005
- Wion, R. K. & Loeb, S. J. (2015). Older adults engaging in online dating: What gerontological nurses should know. *Journal of Gerontological Nursing, 41*(10), 25-35. doi: 10.3928/00989134-20150826-67
- Younge, S. N., Salem, D., & Bybee, D. (2010). Risk revisited: The perception of HIV risk in a community sample of low-income African American women. *Journal of Black Psychology, 36*(1), 49-74. doi: 10.1177/0095798408320633

Zapata, H. J. & Shaw, A. C. (2014). Aging of the human innate immune system in HIV infection. *Current Opinion in Immunology*, 29, 127-136. doi: 10.1016/j.coi.2014.06.007

Appendix A

Condom Use Self-Efficacy Scale

Factor 1- Mechanics:

1. I feel confident in my ability to put a condom on myself or my partner.
2. I feel confident in my ability to use a condom correctly.
3. I feel confident I could gracefully remove and dispose of a condom when we have intercourse.
4. I feel confident in my ability to put a condom on myself or my partner quickly.

Factor 2- Partner's disapproval

1. If I were to suggest using a condom to a partner, I would feel afraid that he or she would reject me. R
2. If I were unsure of my partner's feelings about using condoms, I would not suggest using one. R
3. I would not feel confident suggesting using condoms with a new partner because I would be afraid he or she would think I have a sexually transmitted disease. R
4. I would not feel confident suggesting using condoms with a new partner because I would be afraid he or she would think I thought they had a sexually transmitted disease. R

Factor 3- Assertive

1. I feel confident in my ability to discuss condom usage with any partner I might have.
2. I feel confident in my ability to suggest using a condom with a new partner

3. I feel confident that I could suggest using a condom without my partner feeling “diseased”

Factor 4- Intoxicants

1. I feel confident that I would remember to use a condom even after I have been drinking.
2. I feel confident that I would remember to use a condom even if I were high.
3. I feel confident I could stop to put a condom on myself or my partner even in the heat of passion.

USE THE FOLLOWING RESPONSE CATEGORIES:

1. Strongly agree
2. Agree
3. Undecided
4. Disagree
5. Strongly disagree

Note: Items followed by an R should be reversed when coding.

Appendix B

Sexual Risks Scale

Scale items: Attitudes

1. It is a hassle to use condoms. R
2. People can get the same pleasure from "safer" sex as from unprotected sex.
3. Using condoms interrupts sex play. R
4. The proper use of a condom could enhance sexual pleasure.
5. Condoms are irritating. R
6. I think "safer" sex would get boring fast. R
7. "Safer" sex reduces the mental pleasure of sex. R
8. The idea of using a condom doesn't appeal to me. R
9. Condoms ruin the natural sex act. R
10. Generally, I am in favor of using condoms.
11. Condoms interfere with romance. R
12. The sensory aspects (smell, touch, etc.) of condoms make them unpleasant. R
13. With condoms, you can't really "give yourself over" to your partner. R

Scale items: Normative Beliefs

1. If I had sex and I told my friends that I did not use condoms, they would be angry or disappointed.
2. My friends talk a lot about "safer" sex.
3. My friends and I encourage each other before dates to practice "safer" sex.

4. If a friend knew that I had sex on a date, he/she wouldn't care if I had used a condom or not. R
5. When I think that one of my friends might have sex on a date, I ask them if they have a condom.
6. If a friend knew that I might have sex on a date, he/she would ask me if I were carrying a condom.
7. If I thought that one of my friends had sex on a date, I would ask them if they used a condom.

Scale items: Perceived Susceptibility

1. My sexual experiences do not put me at risk for HIV/AIDS. R
2. There is a possibility that I have HIV/AIDS.
3. I may have had sex with someone who was at risk for HIV/AIDS.
4. I am at risk for HIV/AIDS.

Scale items: Substance Abuse

1. When I socialize, I usually drink alcohol or use drugs
2. If I had a date, I would probably not drink alcohol or use drugs. R

Scale items: Intention

1. If I were going to have sex, I would take precautions to reduce my risk of HIV/AIDS.
2. "Safer" sex is a habit for me.
3. I intend to follow "safer sex" guidelines within the next year

4. If I were going to have sex in the next year, I would use condoms.
5. I would avoid using condoms if at all possible. R
6. I am determined to practice "safer" sex.
7. I would try to use a condom when I had sex.

Scale items: Expectations

1. If my partner wanted me to have unprotected sex, I would probably "give in". R
2. If my partner wanted me to participate in "risky" sex and I suggested a lower-risk alternative, we would have the "safer" sex instead.
3. If my partner wanted me to have unprotected sex and I made some excuse to use a condom, we would still end up having unprotected sex. R
4. If my partner wanted me to participate in "risky" sex and I said that we needed to be safer, we would still probably end up having "unsafe" sex. R
5. If a sexual partner didn't want to use condoms, we would have sex without using condoms. R

USE THE FOLLOWING RESPONSE CATEGORIES FOR SCALES ABOVE.

- a. Strongly disagree
- b. Disagree
- c. Neutral
- d. Agree
- e. Strongly agree

Note: Items followed by an R should be reversed when coding.

Appendix C

Institutional Review Board Approval Letter

PENNSSTATE



IRB Program
Office for Research Protections

Vice President for Research
The Pennsylvania State University
205 The 330 Building
University Park, PA 16802

Phone : (814) 865-1775
Fax: (814) 863-8699
Email : orprotections@psu.edu
Web : www.research.psu.edu/orp

APPROVAL OF SUBMISSION

Date: September 27, 2017

From: Joyel Moeller, IRB Analyst

To: Rachel Wion

Type of Submission:	Initial Study
Title of Study:	HIV Prevention in Older Online Daters: A Dissertation Study
Principal Investigator:	Rachel Wion
Study ID:	STUDY00008209
Submission ID:	STUDY00008209
Funding:	Not Applicable
IND, IDE, or HDE:	Not Applicable

Documents Approved:	<ul style="list-style-type: none"> • Consent Form (0.01), Category: Consent Form • Demographic Form (9.15.17), Category: Data Collection Instrument • Health Form (9.15.17), Category: Data Collection Instrument • HIV-KQ-18 (9.15.17), Category: Data Collection Instrument • IRB Protocol (0.02), Category: IRB Protocol • Modified CUSES (9.15.17), Category: Data Collection Instrument • Modified SRS (9.15.17), Category: Data Collection Instrument • New Questions from Expert Panel Review (9.15.17), Category: Data Collection Instrument • PROMIS Depression 6a (6.26.16), Category: Data Collection Instrument • Screening Form (9-15-17), Category: Recruitment Materials • Study Advertisement (9-21-17), Category: Recruitment Materials
Review Level:	Expedited
IRB Board Meeting Date:	

On 9/27/2017, the IRB approved the above-referenced Initial Study. This approval is effective through 9/26/2018 inclusive. You must submit a continuing review form with all required explanations for this study at least 45 days before the study's approval end date. You can submit a continuing review by navigating to the active study and clicking 'Create Modification / CR'.

If continuing review approval is not granted before 9/26/2018, approval of this study expires on that date.

To document consent, use the consent documents that were approved and stamped by the IRB. Go to the Documents tab to download them.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual ([HRP-103](#)), which can be found by navigating to the IRB Library within CATS IRB (<http://irb.psu.edu>). These requirements include, but are not limited to:

- Documenting consent
- Requesting modification(s)
- Requesting continuing review
- Closing a study
- Reporting new information about a study
- Registering an applicable clinical trial
- Maintaining research records

This correspondence should be maintained with your records.

Appendix D

Recruitment Materials for Study

Study Advertisement for Non-SurveyMonkey Audience Participants

Researchers at Pennsylvania State University are conducting a safe sex study aimed at online daters who are age 50 and older. Those who are eligible and complete the online study survey will be entered to win one of three \$100 Amazon eGift Cards. If you would like to learn more about the study please click on the following link [insert REDCap study link]. If you have any questions or concerns about this study please contact Rachel Wion via email: rkw12@psu.edu or phone: 814-386-1464.

Survey Monky Email Invitation

we have a new survey for
you to take!

[Start survey now](#)



Each survey is only available for a limited time, so get started right away. Complete it to generate \$0.50 for your charity, and a chance to win some **great prizes**.

Thanks!
The SurveyMonkey Contribute Team

SurveyMonkey Page Description for Email

Researchers at Pennsylvania State University are conducting a safe sex research study aimed at online daters who are age 50 and older. If you have any questions or concerns about this study please contact Rachel Wion via email: rkw12@psu.edu or phone: 814-386-1464.

Appendix E

SurveyMonkey Audience and REDCap Informed Consents

Consent for SurveyMonkey Audience Participants

CONSENT FOR RESEARCH

The Pennsylvania State University

Title of Project: Factors Involved in HIV Prevention in Older Online Daters: A Feasibility Study

Principal Investigator: Rachel Wion, MS, RN

Address:

Pennsylvania State University

College of Nursing

134 Nursing Sciences Building

University Park, PA 16802

Telephone Number: 814-386-1464

Advisor: Susan J. Loeb, PhD, RN, FAAN, FGSA

Advisor Telephone Number: 814-863-2236

We are asking you to be in a research study. This page gives you information about the research.

Whether or not you take part is up to you. You can choose not to take part. You can agree to take part and later change your mind. Your decision will not be held against you.

Please ask questions about anything that is unclear to you and take your time to make your choice.

1. Why is this research study being done?

We are asking you to be in this research because safe sex practices in middle-aged and older adults who are online daters are unknown.

This research is being done to find out safe sexual practices and HIV prevention factors in daters who are age 50 and older.

Approximately 400 people will take part in this research nationwide.

2. What will happen in this research study?

You will be presented with an online survey regarding safe sexual practices and HIV prevention factors. You are free to skip any questions on the survey that you prefer not to answer. Please complete the study survey in a private location.

3. What are the risks and possible discomforts from being in this research study?

There are no risks to participating in this research beyond those experienced in everyday life.

There is a risk of loss of confidentiality if your information or your identity is obtained by someone other than the investigators, but precautions will be taken to prevent this from happening. The confidentiality of your electronic data created by you or by the researchers will be maintained to the degree permitted by the technology used. Absolute confidentiality cannot be guaranteed.

4. What are the possible benefits from being in this research study?

4b. What are the possible benefits to others?

The findings in this study may help researchers understand more about safe sex practices and HIV prevention factors in middle-age and older adults who participate in online dating.

5. What other options are available instead of being in this research study?

You may decide not to participate in this research.

6. How long will you take part in this research study?

If you agree to take part, it will take you about 10 to 20 minutes to complete the survey.

7. How will your privacy and confidentiality be protected if you decide to take part in this research study?

Efforts will be made to limit the use and sharing of your personal research information to people who have a need to review this information.

- Your research records will be labeled with a code number and will be kept in a secure server and encrypted.

In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

We will do our best to keep your participation in this research study confidential to the extent permitted by law. However, it is possible that other people may find out about your participation in this research study. For example, the following people/groups may check and copy records about this research.

- The Office for Human Research Protections in the U. S. Department of Health and Human Services
- The Institutional Review Board (a committee that reviews and approves research studies) and
- The Office for Research Protections.

Some of these records could contain information that personally identifies you. Reasonable efforts will be made to keep the personal information in your research record private. However, absolute confidentiality cannot be guaranteed.

11. What are your rights if you take part in this research study?

Taking part in this research study is voluntary.

- You do not have to be in this research.
- If you choose to be in this research, you have the right to stop at any time.
- If you decide not to be in this research or if you decide to stop at a later date, there will be no penalty or loss of benefits to which you are entitled.

12. If you have questions or concerns about this research study, whom should you call?

Please call the head of the research study (principal investigator), Rachel Wion at 814-386-1464 if you:

- Have questions, complaints or concerns about the research.
- Believe you may have been harmed by being in the research study.

You may also contact the Office for Research Protections at (814) 865-1775, ORProtections@psu.edu if you:

- Have questions regarding your rights as a person in a research study.

- Have concerns or general questions about the research.
- You may also call this number if you cannot reach the research team or wish to offer input or to talk to someone else about any concerns related to the research.

INFORMED CONSENT TO TAKE PART IN RESEARCH

Your participation implies your voluntary consent to participate in the research. Please print a copy of this page for your records.

Consent for REDCap Participants

CONSENT FOR RESEARCH

The Pennsylvania State University

Title of Project: Factors Involved in HIV Prevention in Older Online Daters: A Feasibility Study

Principal Investigator: Rachel Wion, MS, RN

Address:

Pennsylvania State University

College of Nursing

134 Nursing Sciences Building

University Park, PA 16802

Telephone Number: 814-386-1464

Advisor: Susan Loeb, PhD, RN, FAAN, FGSA

Advisor Telephone Number: 814-863-2236

We are asking you to be in a research study. This form gives you information about the research.**Whether or not you take part is up to you. You can choose not to take part. You can agree to take part and later change your mind. Your decision will not be held against you.****Please ask questions about anything that is unclear to you and take your time to make your choice.****1. Why is this research study being done?**

We are asking you to be in this research because safe sex practices in middle-aged and older adults who are online daters are unknown.

This research is being done to find out safe sexual practices and HIV prevention factors in daters who are age 50 and older.

Approximately 400 people will take part in this research nationwide.

2. What will happen in this research study?

You will be presented with an online survey regarding safe sexual practices and HIV prevention factors. You are free to skip any questions on the survey that you prefer not to answer. Please complete the study survey in a private location.

3. What are the risks and possible discomforts from being in this research study?

There are no risks to participating in this research beyond those experienced in everyday life. It is possible that some of the questions asked about your safe sex practices may be uncomfortable to answer. You will be free to skip any questions you would prefer not to answer.

No identifying information (e.g., name or IP address) will be collected from you. You may opt to be put into a drawing to win an Amazon eGift Card by clicking on a link at the end of the survey. This link will take you to a separate website where you can input your email address to be entered into the Amazon eGift Card drawing. This separate website will not be able to link your email address to your survey results.

There is a risk of loss of confidentiality if your information or your identity is obtained by someone other than the investigators, but precautions will be taken to prevent this from happening. The confidentiality of your electronic data created by you or by the researchers will be maintained to the degree permitted by the technology used. Absolute confidentiality cannot be guaranteed.

4. What are the possible benefits from being in this research study?

4a. What are the possible benefits to you?

You may enjoy participating in this study.

4b. What are the possible benefits to others?

The findings in this study may help researchers understand more about safe sex practices and HIV prevention factors in middle-age and older adults who participate in online dating.

5. What other options are available instead of being in this research study?

You may decide not to participate in this research.

6. How long will you take part in this research study?

If you agree to take part, it will take you about 10 to 20 minutes to complete the online survey for this research study. After the survey is complete this research study does not require any additional time on your part.

7. How will your privacy and confidentiality be protected if you decide to take part in this research study?

Efforts will be made to limit the use and sharing of your personal research information to people who have a need to review this information.

- Your research records will be labeled with a code number and will be kept in a secure server and encrypted.

In the event of any publication or presentation resulting from the research, no personally identifiable information will be shared.

We will do our best to keep your participation in this research study confidential to the extent permitted by law. However, it is possible that other people may find out about your participation in this research study. For example, the following people/groups may check and copy records about this research.

- The Office for Human Research Protections in the U. S. Department of Health and Human Services
- The Institutional Review Board (a committee that reviews and approves research studies) and
- The Office for Research Protections.

Some of these records could contain information that personally identifies you. Reasonable efforts will be made to keep the personal information in your research record private. However, absolute confidentiality cannot be guaranteed.

9. Will you be paid or receive credit to take part in this research study?

There is no monetary compensation for taking part in this research. You can opt to be entered to win one of three \$100 Amazon eGift Cards.

11. What are your rights if you take part in this research study?

Taking part in this research study is voluntary.

- You do not have to be in this research.
- If you choose to be in this research, you have the right to stop at any time.
- If you decide not to be in this research or if you decide to stop at a later date, there will be no penalty or loss of benefits to which you are entitled.

12. If you have questions or concerns about this research study, whom should you call?

Please call the head of the research study (principal investigator), Rachel Wion at 814-386-1464 if you:

- Have questions, complaints or concerns about the research.
- Believe you may have been harmed by being in the research study.

You may also contact the Office for Research Protections at (814) 865-1775, ORProtections@psu.edu if you:

- Have questions regarding your rights as a person in a research study.
- Have concerns or general questions about the research.
- You may also call this number if you cannot reach the research team or wish to offer input or to talk to someone else about any concerns related to the research.

INFORMED CONSENT TO TAKE PART IN RESEARCH

Your participation implies your voluntary consent to participate in the research. Please print a copy of this form for your records.

VITA

Rachel K. Wion

7645 Edgewater Acres Circle | Alexandria, PA 16611 | rachelkw12@gmail.com

EDUCATION

2018	Ph.D.	Nursing Pennsylvania State University, University Park, PA
2012	M.S.	Nursing Pennsylvania State University, University Park, PA
2002	B.S.	Nursing Ohio State University, Columbus, OH

RESEARCH EXPERIENCE

2017 – present	Pennsylvania State University College of Nursing
2010 – 2016	Graduate Assistant, Research Assistant, and Graduate Fellow Professors: Dr. Susan J. Loeb, Dr. Nikki Hill, and Dr. Harleah Buck
2016 – 2017	Pennsylvania State University College of Nursing Project Director PI: Dr. Donna M. Fick Researching Efficient Approaches to Delirium Identification (NIH/NIA)

AWARD

2012 – 2014	Jonas Nurse Leaders Scholar
-------------	-----------------------------

SELECTED PUBLICATIONS

Loeb, S. J., **Wion, R. K.**, Penrod, J., McGhan, G., Kitt-Lewis, E. A., & Hollenbeak, C. S. (2018). A Toolkit for Enhancing End-of-Life Care: An Examination of Implementation and Impact. *The Prison Journal*, 98(1), 104-118. doi: 10.1177/0032885517743933

Hill, N. L., Mogle, J., **Wion, R. K.**, Kolanowski, A. M., Fick, D., Behrens, L., Mulhall, P., & McDowell, J. (2017). When study participants are vulnerable: Getting and Keeping the Right Team. *Nurse Researcher*, 25(2), 10-18. doi: 10.7748/nr.2017.e1519

Wion, R. K. & Loeb, S.J. (2016). End-of-life care behind bars: A systematic review. *American Journal of Nursing*, 116(3), 24-37. doi: 10.1097/01.NAJ.0000481277.99686.82

Hill, N. L., Mogle, J., **Wion, R. K.**, Munoz, E., DePasquale, N., Yevchak, A. M., & Parisi, J. M. (2016). Subjective cognitive impairment and affective symptoms: A systematic review. *The Gerontologist*, 56(6), e109-e127. doi: 10.1093/geront/gnw091

Wion, R.K. & Loeb, S.J. (2015). Older adults engaging in online dating: What gerontological nurses should know. *Journal of Gerontological Nursing*, 41(10), 25-35. doi: 10.3928/00989134-20150826-67