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IT'S A SMALL WORLD AFTER ALL: EXPLORING MOBILE DATING
APPLICATION USE AND SEXUAL PARTNER NETWORKS AMONG BLACK
MEN WHO HAVE SEX WITH MEN (BMSM)

by

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A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Philosophy
in the Department of Public Affairs
in the College of Community Innovation and Education
at the University of Central Florida
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ABSTRACT

Research supports risky sexual behaviors are especially pervasive traits in high risk groups such as gay and bisexual men; and despite representing a mere 12% of the total LGBTQ population, Black men who have sex with men (BMSM) are at highest risk for transmitting and contracting HIV and other non-HIV sexually transmitted diseases. Even knowing this, the disparity of research coverage of BMSM compared to White MSM is staggering. Recent research has indicated MSM are at even greater risk than before since the advent of mobile dating apps. Online partnering via mobile apps has been linked to overlapping sexual partner networks and outcomes such as greater numbers of sexual partners and a higher likelihood of practicing unprotected anal sex. As such, this study aimed to investigate how BMSM's sexual sensation seeking behaviors may be influenced by use of mobile dating apps and PrEP, as well as provide indication of BMSM attitudes related to sexual partner networks and their role as a risk factor. The study uses primary data collection via an online survey tool and univariate, bivariate, and multivariate analysis techniques were employed to analyze the collected data. Results revealed there is not a difference in sexual sensation seeking behaviors based on the number of mobile dating apps used, and that PrEP use and PrEP knowledge do not have an independent influence on sexual sensation seeking behaviors. However, there is a statistically significant influence on BMSM SSS by confirmed PrEP use and an average understanding of PrEP. Qualitative results expanded current research understanding of

why BMSM utilize mobile dating apps as well as BMSM sexual partner networks and how they influence BMSM sexual sensation seeking habits.

Keywords: Sexual Sensation Seeking, Mobile Dating Apps, BMSM, Sexual Partner Networks, PrEP

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~ For the pursuit and preservation of knowledge for us by us ~

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#WhoGotNext?

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OPERATIONAL LIST OF ACRONYMS (or) ABBREVIATIONS

AIDS – Acquired Immunodeficiency Syndrome

BMSM – Black Men who have Sex with Men

CDC – Center for Disease Control and Prevention

HIV – Human Immunodeficiency Virus

LGBTQ+ – Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, and others

MSM – Men who have Sex with Men

PrEP – Pre-Exposure Prophylaxis

SS – Sensation Seeking

SSS – Sexual Sensation Seeking

SSSS – Sexual Sensation Seeking Scale

STD – Sexually Transmitted Diseases

VIF – Variance Inflation Factor

CHAPTER ONE: INTRODUCTION

The following chapter first outlines how the nature of interaction and socialization has changed over years with the universal adoption and use of the internet and mobile applications (hereafter referred to as “mobile apps”). Next, it discusses sensation seeking behaviors of Black men who have sex with men (BMSM) and the use of mobile apps to seek out sexual partners, details the significance of the study, and discusses the theoretical framework applications.

Mobile Apps in Today’s Socio-Sexual Context

A salient component of one’s personality is his or her capacity to interact with others (Goldberg, 1990); and much can be predicated on these observed interactions. For decades, many psychological theorists have examined socialization between individuals as an indicator of development (Vygotsky, 1978), cognition (Rogoff & Lave, 1984), psychological well-being (Kawachi & Berkman, 2001), etc.; however, the nature of this socialization has changed significantly from what it once was. The dawn and rise of the Internet have revolutionized the ways people communicate, build and maintain relationships, live, work, and learn (Maxim, 2016). The Internet has managed to transcend geography—especially with the proliferation of mobile apps—by forging and bolstering social networks that, before, may not have existed. Communication has undergone a radical shift from being about personal, face-to-face interactions; to voice

(and/or fax); to electronic mail; to now being mobile, flexible, and customizable (Goggin, 2006). Consequently, it is important to understand how this change in communication affects interpersonal, sexual relationships among various communities, especially those in higher-risk groups.

Mobile Apps as Conduits

Research suggests risky sexual behaviors are especially pervasive traits in high risk groups such as gay and bisexual men (McBride, Reece, & Sanders, 2008; Grov, Parsons, & Bimbi, 2010). The rise in mobile communication, or increased adoption of the cell phone culture, heavily influences issues of sex and romance (Nafus & Tracey, 2002; Bauman, 2005; Goluboff, 2016). Incidentally, many mobile apps lend themselves to aid in the development of intimate relationships and often label themselves as “dating apps.” As sex and representations of sex are popularized and more socially accepted, the once traditional means of pursuing romantic relationships shifts to being more casual, brief, and uncommitted (Bogle, 2007, 2008; Garcia, Reiber, Massey, & Merriweather, 2012). Subsequently, mobile apps have become a common medium by which these encounters are arranged. Mobile apps officially advertised as social networking and dating applications targeted at the MSM community are more frequently regarded and reported as “hookup” applications as they are often used to find casual sexual partners (Gudelunas, 2012). These applications have proliferated and become much more mainstream in the worldwide application market in recent years (Lehmiller & Ioerger, 2014).

In addition to being at highest risk for contracting and transmitting STDs when considering traditional, face-to-face arrangements, recent research has shown that MSM are at even greater risk than before since the advent of mobile dating apps. According to Lehmilller & Ioerger (2014), dangers have increased since MSM began seeking sex over the Internet because of the speed and convenience associated with the arrangement of anonymous sexual encounters. Online partnering via mobile apps have been linked to outcomes such as greater numbers of sexual partners and a higher likelihood of practicing unprotected anal sex (Benotsch, Kalichman, & Cage, 2002; Ogilvie, et al., 2006). One might infer mobile apps are conduits for sexual sensation seeking and sexual compulsivity as they facilitate easy, uninhibited, partnering and opportunities to engage in risky sexual behavior. To this point, research suggests men who utilize technology to meet sexual partners may participate in more risky sexual behavior (Bolding, Davis, Hart, Sherr, & Elford, 2005; Hirshfield, Remien, Humberstone, Walavalkar, & Chiasson, 2004); exhibiting sexual sensation seeking and compulsivity traits by choosing risky venues, and often times sexual adventurism through unprotected oral and anal intercourse.

State of Research

Approximately 78% of BMSM who use mobile technology reported regular use of gay dating apps and inconsistent condom use with a higher average number of casual sexual partners (Badal, Stryker, DeLuca, & Purcell, 2018). While some studies have sought to understand the associations between mobile app use and risky sexual behaviors,

focus is often placed on largely Caucasian MSM demographics (Burrell, et al., 2012; Landovitz, et al., 2013; Grosskopf, LeVasseur, & Glaser, 2014; Lehmillier & Ioerger, 2014). Even though, by comparison, Black men who have sex with men are affected by sexually transmitted diseases at a disproportionate rate (Millett, Flores, Peterson, & Bakeman, 2007; Sullivan, et al., 2014). This is important to note as it marks the significance of this study's focus on the BMSM subpopulation.

Significance of the Study

As dating apps are considered a factor leading to the spread of STDs [in the community] (Kelsey, 2015; Wells, 2015; Chan, 2017), the potentially inadvertent corollaries for the end-user community should be appraised. The Black LGBTQ subpopulation represents 12% of the total LGBTQ population, a very small proportion. Of this, 38% are male (The Williams Institute, 2019). Despite being at highest risk for transmitting and contracting HIV and other non-HIV STDs, the disparity of research coverage of BMSM compared to White MSM is staggering. Moreover, this research has failed to emphasize and bring attention to shared spaces and sociosexual networks, essentially the spatio-temporal contexts in which BMSM live and associate. As these social mobile apps expand one's social reach and influence, data suggest social network factors have been linked to transmission of HIV and other STDs, warranting further study (Friedman, et al., 1997; Ward, 2007; Perisse, et al., 2010; Kelsey, 2015).

Because BMSM experience higher levels of stigmatization and discrimination, they are much more likely to exist in shared spaces with individuals with similar

phenotypical and demographic makeup (i.e. other BMSM) (Latkin, et al., 2011).

Common dating apps now introduce an added dimension of risk to this network wherein BMSM may potentially, and unknowingly, share sexual partners with other members of their social network. In addition, MSM who frequently use dating Websites are more likely to have a higher number of casual partners and report inconsistent condom use with these casual partners (Badal, Stryker, DeLuca, & Purcell, 2018). Therefore, it is vital to understand how mobile dating apps influence sexual sensation seeking among BMSM, and whether BMSM believe these mobile apps can be useful in prevention efforts and promoting healthy sexual behaviors.

This study will bring to light how sexual sensation seeking behaviors may be/are influenced by use of mobile dating apps. Additionally, it will provide some indication of the perceptions of BMSM regarding sexual partner networks, and dating application use for seeking out sexual partners.

Theoretical Framework

As this study aims to answer several central questions, there are three guiding theoretical frameworks applied to the study: Social Network Theory, Small World Principle, and Sensation Seeking Theory. Each of these theories informs a specific phase of the study which will bring to light useful information that will later amalgamate into a cohesive revelation regarding BMSM mobile application use and sensation seeking behaviors.

Social Network Theory

The Social Network Theory was coined by Jacob Moreno in the early 1930s as a means of understanding interpersonal relationships among individuals. At this time, he labeled the novel field sociometry, and used it to propagate the idea that social links between individuals (or actors) serves as channels for the flow of ideas (Borgatti & Ofem, 2010). The theory focuses on various levels of entity such as individuals, organizations, states, etc., often referred to as nodes. Much more, the theory provides a mechanism for understanding the ties that exist among entities, and allows researchers to understand attributes that are shared or distinctly occupied in a network or web, and provide context to the entity's environment or the social network.

Traditionally, the social network theory has been applied in social science research to understand behaviors of groups of individuals, and how the attributes of social networks influence or impede communication, the flow of, and adoption of ideas, beliefs, and attitudes, and how overall behavior is influenced as a result. Many research studies have propagated the idea that human social networks and interpersonal relationships have a significant impact on physical and psychological health (Cohen, Gottlieb, & Underwood, 2000; Goldsmith & Albrecht, 2011; Thoits, 2011; Wright, 2016). Social interactions are powerful mechanisms that have the ability to impact and influence attitudes, beliefs, and behaviors within a community. The information shared during interpersonal interactions can have a lasting and infiltrating effect on the shared beliefs of a network insofar that information can influence approaches to appraisal and preventive behavior. That said, helping individuals make healthy sexual choices requires an

interdisciplinary approach, and the involvement of all levels of one's social network – i.e. families, friends, communities, schools, churches, etc. to curb unhealthy attitudes and beliefs that aid in the perseverance of HIV and non-HIV STDs (Center for Disease Prevention and Control (CDC), 2019). Applying the Social Network theory to this study would establish a basis for understanding whether and/or how both physical and virtual (or digital) social networks explain sexual partner networks among BMSM who use mobile dating apps for sexual sensation seeking.

Small World Principle

The Small World Principle originated as a subconcept of the Social Network theory from a 1967 study by Stanley Milgram who sought to study networks between individuals. It is based on the idea that two individuals will be connected through a series of intermediaries (Milgram, 1967). The Small World Principle expanded the social network theory in that it added the idea dimensions may exist between nodes in a social network. To fully understand the phenomenon, Milgram had study participants in Nebraska and Kansas get a letter to someone they knew in Massachusetts only by forwarding the letter to someone who might know the individual, or to someone who might know someone who knew the individual. After concluding the study, it was discovered the letters took about six stops before reaching the target individual. Thus, the theory was later affectionately labeled the “six degrees of separation” phenomenon. To understand how this theory holds up in today's digital landscape, the experiment was

replicated using the Internet. At the conclusion of the replication, similar results were yielded (Dodds, Muhamad, & Watts, 2003).

One tenet of the small world principle is homophily, which is the principle that individuals connect to others who are like themselves, and hence, create many triangles; the other primary tenet is the notion of weak ties, or links to acquaintances that connect people to parts of a social network that would otherwise be far away (Watts & Strogatz, 1998). Extrapolating the assumptions posed by this theory to this study allows a predictive sense of what the socio-sexual networks may look like between BMSM, especially those sharing geographical boundaries.

Sensation Seeking Theory

Sensation seeking (SS) originated as a component of sensory deprivation research (Zuckerman, 1969) and was later formulated as its own theoretical framework.

Zuckerman (1994) described SS as a “trait characterized by the seeking of novel, complex, varied, and intense sensations and experiences and the willingness to take physical, social, legal, and financial risks for the sake of such experiences” (Zuckerman, 1994, p. 27). Research further asserts SS is a multi-dimensional construct that includes four components: thrill and adventure seeking, new experience seeking, disinhibition, and boredom susceptibility (Zuckerman, 1994). It has been associated with a number of high-risk activities, including extreme sports, reckless driving, driving under the influence, gambling, drug abuse, and risky sexual behavior (Zuckerman & Kuhlman, 2000). More specifically, concerning risky sexual behavior, high sensation seekers tend to engage in a

greater variety of sexual behaviors with a greater number of partners when compared to low sensation seekers (Zuckerman, 1994, p. 144).

The results of a 1990 application of the SS theory concluded sensation seekers constitute a high-risk group for HIV/AIDS and non-HIV STDs, owing to a greater number of sexual partners and generally lower level of concern about incurring the diseases (Fisher & Misovich, 1990, p. 57). Sensation seeking behaviors are postulated as being more elevated in homosexual and bisexual men and women (Stief, Rieger, & Savin-Williams, 2014; Kalichman, et al., 1994). Moreover, the Center for Disease Control and Prevention (CDC) supports BMSM are at highest risk for STD and HIV infection (CDC, 2019). Therefore, the SS Theory will be applied to this study to investigate the notion of whether BMSM exhibit greater sexual sensation seeking behavior when utilizing mobile dating apps for seeking sexual partners.

CHAPTER TWO: LITERATURE REVIEW

This literature review comprehensively details the history and background of mobile dating applications. The chapter also discusses pertinent research surrounding how mobile dating applications impact sexual partner seeking. Finally, the chapter introduces the Social Network Theory and Sensation Seeking Theory and proposes the application of these theories to understand how mobile dating apps influence sexual partner networks and explain SSS among BMSM.

Mobile Dating Applications

This section provides an overview of the history of mobile dating applications and discusses the suggested benefits, drawbacks, and perceptions of these mobile applications.

The Dawn of Mobile Dating

As access to the Internet increases universally and as communication channels become more electronic and digital and less personal, so do dating efforts. Over time, dating made its way from printed personal ads, to “computer love” using data gleaned from questionnaires to produce a list of potential matches, to anonymous chat rooms and public online dating empires (Thottam, n.d.). From the mid-to-late 1990s to the early 2000s, these online dating Websites, turned empires, boomed and became a trusted and primary source for meeting singles of similar interests. Circa 1998, the online dating

culture shifted with the release of the movie “You’ve Got Mail”, which shed a positive light on the possibility of meeting love on the Internet (Ali & Wibowo, 2011). At this juncture, it became clear the Internet was going to change every aspect of people’s lives — including one’s perceptions and expressions of love and romance (Lee, 2017).

By the early 2000s, the mobile Internet was introduced. Major technological corporations such as Apple, Samsung, and others, began releasing mobile phones with Internet connectivity. There was a quick and knee-jerk reaction to support this new communication mechanism. This era ushered in a new definition of convenience, one where individuals were able to connect in ways as never before. Mobile apps were created which allowed persons to perform banking functions, file insurance claims, pay mortgages, store and view medical records, and perform so many other vital life-changing commodities. Perhaps one of the most common and universal mobile app type created and used by everyday Americans are mobile dating applications, second to popular social networking applications such as Facebook, Instagram, Twitter, etc., and expected to grow in use over time (Clement, 2020).

Although some Americans still turn to online dating Websites to find their partners (long-term or otherwise), the convenience of mobile apps and familiarity with technology has caused a shift from dating Website usage to dating app use. This social shift has invented a new facet of the technology industry, worth upwards of \$3 billion (Lin, n.d.), focused solely on dating app development. Common, major dating and match-maker brands such as Match.com, Christian Mingle, and eHarmony have developed mobile apps which interface with their Websites to afford their already registered users

the ability to take their conversations mobile (Jung, Umyarov, Bapna, & Ramaprasad, 2014). While there are clear feature and functional differences between online dating Websites and mobile dating apps, both platforms boast their ability to help people find romance in one form or another on a secure network (Bryant & Sheldon, 2017).

Proliferation and Adoption of Mobile Dating Apps

Although both dating Websites and mobile dating apps are still used by a significant percentage of Americans, mobile dating app usage has significantly increased within recent years (Chan L. S., 2017). Data provided by Flurry.com in 2014 indicates users spend as much time per day on mobile dating apps as they do on online dating Websites (Flurry.com, 2014). Similarly, 9% of American adults had used a dating app on their phone in 2015, which is three times the number of users in 2013 (Smith & Duggan, 2013; Smith, 2016). This growth continues on a steady incline as the younger and more technologically savvy and supportive generation continues to grow and show interest in romanticism and dating. To support this growth, the dating app market continues to develop and launch new apps purporting to be better than the last. Lin (n.d.) asserts "...to date, there are over 1,500 dating apps ... looking to draw single men and women to their product, and to match them with one another" (Lin, n.d., para. 1). Fundamental economics explain that where there is great utility and demand, great supply will follow, especially where all things are held equal (Rice & Unruh, 2016). The proliferation of dating apps indicates a wide and diverse adoption of dating app use among Americans.

When considering the adoption and use of dating apps, it is important to grasp an idea of who is adopting and using the apps. Sociodemographic profiles are important to consider when appraising use of mobile dating apps as they provide a basis for understanding the market, as well as provide researchers with fundamental information for identifying and better understanding patterns of adoption and use. Young adults—specifically, age 25-34—are more likely to use dating apps than older adults. However, seniors (those ages 65 and over) are increasing use of mobile dating apps. Smith and Duggan (2013) indicate seniors were more likely to be or know a user of mobile dating apps in 2013 than in 2005. These studies suggest while age is a factor in appraising mobile dating app use, it does not exclude those whom would not usually be considered as proponents of mobile dating technology—or most technology, for that matter. Similarly, studies (Grosskopf, LeVasseur, & Glaser, 2014; Lehmilller & Ioerger, 2014; Holloway, et al., 2014) converge in that dating app users generally have higher education levels (Ali & Wibowo, 2011).

Race is another important demographic element in the study of mobile app use. Historically, mobile dating apps were tailored for and targeted at, the predominantly White, heterosexual demographic, especially those who could afford membership subscriptions to the dating services (Ali & Wibowo, 2011). However, as the Internet became more affordably accessible, demand for mobile dating services transcended social class, race, and sexual orientation, and spanned subcultures such as African American communities, LGBTQ+ individuals, and others. However, studies still indicate that even among this diversity exists a preponderance of Whites (Holloway, et al., 2014;

Lehmiller & Ioerger, 2014). Nonetheless, this demand led to the need for the development of secure mobile dating services geared specifically toward these communities. Thus, the presence and success of apps such as Match and eHarmony birthed queer-centric apps such as Grindr, ROMEO, Hornet, Adam4Adam, Jack'd, HER, Only Woman, WAPA, and others.

Dating App Use Patterns

According to Gordon (2013), the National dating app user-base peaked at 17 million active users; however, in a later development in 2017, researchers indicated that 19.6 million (6%) Americans confirmed active use of dating apps (Statista Research Department, 2019). This 15.5% increase demonstrates the continued adoption of mobile dating apps, potentially by markets that were before never targeted. Not only are mobile dating apps becoming increasingly popular to first time users, users are spending an average of 1.5 hours per day on the app, and are logging in upwards of 8 times daily (Lehmiller & Ioerger, 2014; Holloway, et al., 2014; Sumter, Vandenbosch, & Ligtenberg, 2017).

Motivations for this increased use have been studied and exist on a broad spectrum; however, there are some convergences of ideals. Before the development of geosocial-networking apps that leverage use of the global positioning system (GPS) to map user proximities to one another, mobile dating apps were used predominantly to find long-term partners, “soulmates,” and companionship (Bryant & Sheldon, 2017). However, as of later years, more study themes have identified sex seeking, boredom,

stress relief, and “looking for fun,” as the more common reasons for use—especially within LGBTQ+ populations (Johnson, Vilceanu, & Pontes, 2017; Clemens, Atkin, & Krishnan, 2015; Anzani, Di Sarno, & Prunas, 2018).

Considerations for Use

Expectedly and understandably, the most commonly touted benefit of using mobile dating applications is the convenience. According to Smith and Anderson (2016), what was once stigmatized is now widely accepted to be a good way to meet people. Approximately 87 percent of single American males, and 83 percent of single American females view mobile dating as socially acceptable and normal (Johnson, Vilceanu, & Pontes, 2017). The widespreadness and adoption of mobile dating apps makes it particularly convenient to chat, and potentially meet, like-minded individuals, with almost no downtime or delay. This new paradigm has completely revolutionized the way most persons view dating. As novel technological advancements emerge, the knee-jerk reaction is to make once complex endeavors more simple and achievable. Navigating once-complex dating traditions through courtship and familial involvement is now replaced by simply swiping left or right on a mobile app.

On the other hand, this convenience is often argued as one of the most detrimental attributes of mobile dating applications (Finkel, Eastwick, Karney, Reis, & Sprecher, 2012). While many may believe it is a great benefit to be able to coordinate a meeting or date out of thin air, one must also consider the appraisal and assessment opportunities that users are deprived of. This convenience often leads to impulsive decision-making

and greater chance of engaging in casual sexual behavior without true and thorough appraisal (Landovitz, et al., 2013; Phillips, et al., 2014; Race, 2015). As mentioned previously, this impulsivity is a known attribute to the rising transmission of HIV and STDs among vulnerable populations—especially the BMSM community.

Another noteworthy benefit of using mobile dating apps is the ability to connect and communicate with individuals far beyond one’s immediate physical and social reach—essentially, expanding one’s dating pool (Clark, 1998; Barraket & Henry-Waring, 2008; David & Cambre, 2016). A 2018 study aimed at understanding [users’] motivation for using mobile dating apps found that while these mobile apps are designed for dating purposes, many participants are not actively looking for a relationship on the apps (Tanner & Huggins, 2018).

In that same vein, some researchers believe mobile dating apps have revolutionized the dating landscape insofar that many app users leverage the convenience for sexual sensation seeking as opposed to pursuing long-term or serious relationships. Race (2015) asserts “... by foregrounding the proximity of same-sex sexual and social opportunities, these devices produce a novel experience of social space oriented towards the production of homosexual encounters” (p. 498). Therefore, more emphasis and attention is afforded to convenience over the pursuit of true and (potentially) lasting intimacy. Garcia and colleagues posit that with this revolutionization came a new culture, one in which there is a new definition of intimacy where uncommitted sexual encounters prevail over the Western-traditional marry-then-mate algorithm (Garcia, Reiber, Massey, & Merriwether, 2012). This new culture has brought with it new attitudes toward, and

approaches to intimacy and in conjunction with advancements made in contraceptive medicine, sexual liberty free of previous fears (Hekma & Giami, 2014; Timmermans & Courtois, 2018).

Another important consideration, especially in today's technologically advanced landscape, is mobile dating app users' consideration of the privacy and security infrastructure of mobile dating apps. Many mobile apps involving the use of personally identifiable information can be, and are used for criminal exploitation (Do, Martini, & Choo, 2015). Users often times do not consider the level of harm that can be inflicted on a victim using these apps—whether it be physical (e.g. stalking, sexual assault, etc.), or reputational (e.g. identity theft, harassment, bullying, etc.) (Shetty, Grispos, & Choo, 2017). Research has also revealed privacy concerns affect intention to disclose private information (Bansal, Zahedi, & Gefen, 2010) as a result of a risk benefit analysis (Dinev & Hart, 2006). However, it is important to consider whether users, particularly BMSM, perform these risk-benefit analyses when deciding to engage with potential partners on mobile dating apps. In a 2015 study on the privacy of mobile dating apps, researchers were able to recover private messages sent or received by users; and the same-sex sexual networking app Grindr was found to contain the most data about both the user and the users they engaged with (Farnden, Martini, & Choo, 2015). These mobile dating apps store immense amounts of information such as geolocation data as well as email addresses, photos, private messages, and importantly, images of all nearby user accounts with which a user has interacted (Murphy, 2018). It is important to approach mobile dating apps with the same level of scrutiny as mobile banking apps. As information

becomes more useful, it becomes more valuable; therefore, users must consider the privacy and security of their (and others') personal data when making the decision to use and share information on mobile dating apps.

Probabilistic reasoning would lead one to believe that Black, non-Hispanic users are not the most prevalent users of mobile dating apps when compared to other ethnicities occupying the majority. However, this demographic makes up 31 percent of mobile dating app users, compared to 29 percent White, non-Hispanic, and 28 percent Hispanic (Clement, 2020). While the pros of using mobile dating apps are relatively beneficial to some, the cons can be damaging to a community already socially predisposed to contracting and transmitting HIV and STDs and other social and economic vulnerabilities. Therefore, it is crucial to explore and better understand mobile app data usage among BMSM and develop ways to curb the effects associated with chronic use and the behaviors that lead to increased risk.

BMSM Mobile Dating App Use

The academic repertoire surrounding patterns of BMSM mobile dating app use is lean, at best. According to Sawyer, Smith, and Benotsch (2017) there is a shortage of research concerning dating app use among young heterosexual adults; however, researchers also suggest few studies explore app use in the LGBTQ+ population as a whole (Anzani, Di Sarno, & Prunas, 2018). While research surrounding mobile dating app use, in general, is emerging, literature specifically targeted at understanding mobile dating app use in the BMSM community is scarce-to-none. Of the studies conducted to

date, many of them focus on the White MSM subpopulation, or on the LGBTQ+ population-at-large, with largely White MSM participants/respondents (Quiroz, 2013; Corriero & Tong, 2016; Goedel & Duncan, 2015; Miller & Behm-Morawitz, 2016; Pines, Karris, & Little, 2017; Chan, 2017; Yeo & Fung, 2018). While these studies produce findings that are pertinent and provide useful implications for research and practice, they are not necessarily extrapolatable to the BMSM community. Many cultural and social barriers exist which often render programs and services geared toward the general LGBTQ+ inaccessible and/or ineffective for BMSM. These issues surrounding access to health care and other healthcare-related intervention services may explain the disproportionate numbers of LGB ethnic minorities experiencing poor health outcomes relative to nonminority and non-LGBTQ persons. The goal of this study is to add to the current body of literature, elucidating mobile dating app use behaviors and motivations of BMSM and bring forth implications for future research.

Theoretical Approaches to Mobile Dating App Use

This section provides background on the theories this study employs to understand mobile dating app use and bring light to the social structures that permeate certain behaviors, attitudes, etc., which may explain sexual partner concurrency in BMSM. Figure 1 demonstrates how the theories work in tandem to support the study.

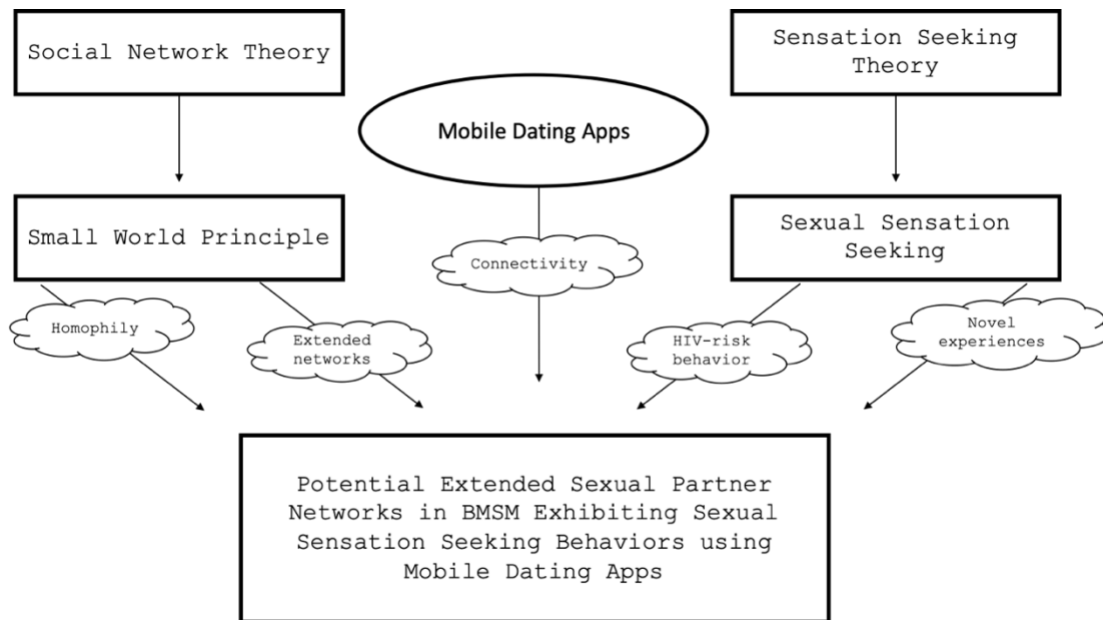


Figure 1: Conceptual model

Source: Milgram, 1967; Zuckerman, 1969; Zuckerman, 1994; Kalichman & Rompa, 1995

Social Network Theory Applications

Social Network Theory is a dynamic, versatile, and robust theory that has been applied across many industries and fields to understand and explore different phenomenon. Most frequently, the theory is applied in psychology as a means to understand networks surrounding individuals and how support systems are built within these networks. However, the versatility of the theory affords researchers the ability to find novel ways of applying the theory to understand and/or solve complex social problems. However, for this purpose, in order to apply the Social Network Theory to this

study, the theory’s concepts and constructs must be understood. Table 1 lists and defines notable Social Network Theory concepts and constructs.

Table 1: Social Network Theory Overview

Construct	Definition
Nodes	Individual, organization, or other entity
Ties	Relationships between entities (nodes)
Norms	Accepted social rules entities agree upon
Social Network	Network of nodes connected by ties
Social network analysis	Process of mapping connections among entities
Social connectivity	The place of a particular actor in a network
Homophily	Forming ties with persons similar to oneself in socially significant ways

Source: Moreno, 1934; Wasserman, 1994; Harrison, Sciberras, & James, 2011; McPherson, Smith-Lovin, & Cook, 2001

The Social Network Theory can be traced back to the mid-to-late 1890s where sociologist Emile Durkheim sought out to understand *social groups* and their existence as direct relationships that link individuals who share beliefs, in an early effort to understand social/societal structure (Durkheim, 1895). This work and concept was grasped by researchers from many fields, but was most notably evolved by psychologist Jacob Moreno into what is now recognized as Social Network Theory and its subconcept social network analysis.

The Theory and Practice of Analyzing Social Networks

Social network theory laid an impactful and useful framework for understanding various levels and dimensions of society and interrelations among individuals, businesses, states, countries, etc. The work was revolutionized when Moreno and colleagues expanded the application of the theory into a practical means of measuring and analyzing these social networks (Moreno, 1934; Lewin, 1936). One of the core assumptions of social network analysis is the patterns of these relationships can have important and significant effects on individual and organizational behavior, constraining or enabling access to resources and/or exposure to information and behavior (Steketee & Spiegelman, 2015).

Between the late 1950s and mid-to-late 1960s, researchers had begun developing formal methodologies for performing social network analysis which involved algebraic computation (White, 1963); multidimensional scaling models (Laumann, 1966), and matrix analysis (White, 1992; Boorman & White, 1976). Scott (2011) discussed that a series of major methodological advancements were made over time by Burt (1982), Freeman and colleagues (1989), Wasserman and Galaskiewicz (1994), and most recently in the works documented by Scott and Carrington (2011). Over time, most methodological iterations of social network analysis have involved the mathematical approach, graph theory (Scott, 2011); however, recent work has brought about the use of statistical significance tests, the development of models of longitudinal change, the exploration of new methods of visualisation, and explorations into the cultural context of

social network models. Understanding the cultural context of social networks is important in describing characteristics of these networks.

With all noted methodological advancements made, perhaps one of the most renowned and impactful revelations of social network theory research is the Small World Principle, or six degrees of separation concept. This concept revolutionized the ways in which social ties are viewed by adding dimensionality to how immediate social networks are visualized.

The Small World Principle and Mobile Dating App Use

The social network theory's applications over the years have encouraged a resurgence of experiments studying the descriptive characteristics of social networks. Most notably, Stanley Milgram's (1967) study of dimensions of social networks fascinated many researchers when it revealed that there is, on average, 6 steps or intermediaries between two individuals. A modern criticism of Milgram's original study argued that there is a lack of data to support his theory, considering a number of the letters sent in the study did not make it to their final destination (Bryner, 2012). However, in 2003, a team of researchers from Columbia University replicated the study only to find that, even when substituting letters for e-mails, the results mimicked that of Milgram's original study (Knight, 2003). The study found that even with the high number of broken chains, the e-mails reached the intended target in 5 to 7 steps.

This discovery has the potential to be particularly impactful to the understanding of social networks – whether geographical, physical, or sexual. Understanding the

number of intermediaries that exist between two actors or nodes help to: 1) explain how people are randomly connected; 2) understand how members of large groups relate to others in the group; and 3) provide useful and constructive insight into viral phenomena—be it disease, information, or other content (Claywell, n.d.).

For the purpose of this study, understanding these characteristics of social networks will help conceptualize shared sexual partner networks among BMSM. To aid in this reconceptualization, social network theory offers concepts such as homophily which explains how actors behave in networks. Specifically, researchers define homophily as “... the principle that a contact between similar people occurs at a higher rate than among dissimilar people. The existence of homophily means that cultural, behavioral, genetic, or material information that flows through networks will tend to be localized” (McPherson, Smith-Lovin, & Cook, 2001, p. 416). A person's social network tends to be a reflection of himself or herself because people feel more comfortable being with people like themselves rather than with people who are different (Valente, 2010). Understanding this, in conjunction with knowledge of the Small World Principle, one may infer that because BMSM constitute a minority subpopulation already subject to homophily, the use of mobile dating apps extends connectivity across sexual partner network clusters that already exist within the network, increasing chances of establishing larger, unbeknownst shared sexual partner networks. Sexual partner networks are groups of persons who are connected to one another sexually, whether directly or indirectly (University of California San Francisco Prevention Science Department, 2003). The number of persons in a network, social connectivity, and the number of “links” each has

to others all determine how quickly HIV/STDs can spread through a network (Potterat, Muth, & Brody, 2000).

Considering this, it is important to understand BMSM motivations for using mobile dating app technology and their sexual sensation seeking behaviors exhibited when using the apps.

Sexual Sensation Seeking within Extended Networks

The Sensation Seeking Theory has evolved and gained dimensionality over time. While the core concept behind the theory remains unchanged—that individuals seek novel, stimulating experiences, and accept certain risks to seek said experiences—the research over the years has added impactful elements to the theory which have opened many doors for applicability. Zuckerman (1994) proposes novel components of the theory as various ways people seek sensation in life: risk taking, sports, and vocations; social, sexual, and marital relationships; art, music, fantasy, and humor; smoking, drinking, drugs, and eating; and psychopathology. Needless to say, the theory's applicability transcends its initial purposes. This study will focus on those concepts associated with sexual sensation seeking, specifically.

Research around sex and sensation seeking began around the 1970s, a time many call the sexual revolution or time of heightened sexual liberty (Zuckerman, 2006); however, the core foundation of sexual sensation seeking has not changed since its introduction to research. During this time, it was crucial to determine motivations for sexual sensation seeking, and to better understand psychological processes associated

with risk-taking and sensation seeking. As in other realms of sensation seeking, high sensation seekers seek more intense sensations and arousal and use variety to maximize arousal (Zuckerman, 2006). This variety of experiences many believe is largely responsible for the peak of certain STDs and HIV seen in the early 1980s. Zuckerman (2006) posits sensation seekers may be among those willing to take risks for the sake of intensified sensations in unplanned encounters. One might consider biological characteristics of sensation seeking are similar to adrenaline-seekers, drug-seekers, etc.; there is a heightened level of endorphins released when experiencing these novel and stimulating situations that may have addictive effects on an individual. Thus, impulsive sensation seekers are at particular risk because of their characteristic lack of restraint in situations of potential pleasure (Zuckerman, 2006).

To better understand this phenomenon, Kalichman and colleagues (1994) built upon the foundation laid by Marvin Zuckerman by developing a tool geared towards measuring sensation seeking propensity specific to sexual behavior. According to these researchers, “sexual sensation seeking was operationally defined as the propensity to attain optimal levels of sexual excitement and to engage in novel sexual experiences” (Kalichman, et al., 1994, p. 387). These researches took this concept and applied it to demystify increases in HIV and STD transmission in the general MSM community. Much like most research performed on mobile dating application use, sexual sensation seeking research has featured predominantly caucasian MSM participants and shed little light on the BMSM community. Historically, the theory and scale were also not applied on a micro/individual level and results therefore extrapolated the general community.

For this study, it is important to consider sexual sensation seeking as a component of defining motivations for mobile dating app use. Understanding BMSM sexual sensation seeking behaviors could provide salient information not only on an individual level, but on a macro/community level. Themes can be extracted from scale response data and bring forth revelations as to how the BMSM community approaches sexual sensation seeking when using mobile dating applications. Further, compounded with information regarding BMSM knowledge of sexual partner networks and considerations of sexual partner network consolidation, understanding sensation seeking would provide constructive implications for prevention of HIV/AIDS and other STDs, practice, and future research.

Sexual Sensation Seeking and Prevention in BMSM

Tantamount to understanding sensation seeking habits among BMSM is the need to understand prevention mechanisms employed by the community. For decades, public health officials have propagated myriad ways in which persons can prevent the contraction and spread of sexually transmitted diseases. Most often, recommendations include strategies such as abstinence, limiting one's number of sexual partners, never sharing needles, and using condoms correctly every time one has sex (CDC, 2019). Consistent and correct use of male latex condoms can reduce (though not eliminate) the risk of STD and HIV transmission (CDC, 2013). Emphatic consistency is an especially important theme when discussing prevention among BMSM as research suggests measures of condom use in MSM and BMSM primarily, show significant room for

improvement (Badal, Stryker, DeLuca, & Purcell, 2018). Studies indicate always using condoms (based on self-report) during receptive anal sex with HIV-positive partners reduces the risk of HIV acquisition by an estimated 72% (Smith, Herbst, Zhang, & Rose, 2015) and an estimated 91% (Johnson, O'Leary, & Flores, 2018) among HIV-negative MSM.

Statistics considered, the scientific community saw a need to develop a reliable clinical intervention for preventing HIV contraction for persons who are HIV-negative. As a result, the groundbreaking pre-exposure Prophylaxis (PrEP) intervention originated. The CDC defines PrEP as "... a way for people who do not have HIV but who are at very high risk of getting HIV to prevent HIV infection by taking a pill every day" (CDC, 2019, para 1). When using PrEP consistently, the risk of contracting HIV is reduced by approximately 99 percent in MSM (Grant, et al., 2014; Marcus, Hurley, Nguyen, Silverburg, & Volk, 2017); however, effectiveness decreases by about 15 to 25 percent in persons who inject drugs (Choopanya, et al., 2013; Martin, et al., 2015).

Many studies have focused on studying condom use efficacy and condom use in high risk groups such as BMSM; however, because PrEP is a novel drug, particularly in the BMSM community due to limited access, less studies have sought to understand BMSM knowledge, use, and perceptions of PrEP. Research suggests BMSM are a salient population in the National HIV/AIDS Strategy; yet very few individuals in the community believe PrEP would be personally helpful. Furthermore, research indicates BMSM are wary of giving medication to healthy people and of the potential adverse effects, and describe a distrust of the pharmaceutical industry and seeing PrEP as an

option for others, but not for themselves (Philbin, et al., 2016). On the other hand, for some members of the BMSM community who use PrEP, the drug is associated with increases in the number of sexual partners, more frequent sex, reduced condom use, and decreased stress about not using condoms (National Coalition of STD Directors, 2019).

Because both condom and PrEP effectiveness depend highly on consistent and correct usage, it is critical high risk groups such as BMSM are aware of the utility of PrEP, and particularly, its strength in efficacy of preventing HIV and other STDs when used in tandem with condoms. It is also crucial to gain an understanding of barriers to PrEP access and use as experienced and perceived by BMSM. Moreover, to exploring BMSM sexual sensation seeking habits related to PrEP knowledge and use could bring about constructive findings that may aid in the development of targeted awareness and prevention efforts.

Sexual Sensation Seeking on Lockdown

Exploring SSS via mobile dating apps in BMSM is important at any time; however, one might assert it is especially crucial to explore during a time when persons have much less option for entertainment. Considering the context in which this study is being carried out, understanding how BMSM SSS habits may change in the midst of a global pandemic is critical.

Determining whether BMSM risk-appraisal processes change and whether greater risk is ultimately accepted during pandemics (like the SARS-CoV-2 or “COVID-19” virus pandemic of 2019-current) could provide useful findings toward knowing how

awareness and prevention tactics should adjust and adapt during times like these. Not only is this important in HIV and STD prevention, but it is important in preventing continued and future outbreaks of novel viruses such as COVID-19, which may weaken the immune system and potentially lead to greater risk of acquiring HIV and other STDs.

In a time when physical contact is limited and the economic fallout of the pandemic results in widespread job loss, many persons have no outlet to turn to except social media, dating apps, and the like. However, research indicates some persons report having more sex and/or masturbating, and others report not having the urge to have sex at all (Lehmiller J. , 2020; Abad-Santos, 2020). This is especially vital when considering Black Americans have been disproportionately affected by the COVID-19 virus when compared to their White counterparts. Data suggest an overrepresentation of Black Americans among those critically impacted by the virus; and identified death rates among Black/African American persons (92.3 deaths per 100,000 population) and Hispanic/Latino persons (74.3) that were significantly higher than that of White (45.2) or Asian (34.5) persons (CDC, 2020).

Gaining an understanding of how high risk group SSS habits have been influenced by the current pandemic can set the precedent for future research and prevention efforts for preventing upticks in HIV, STDs, and other viruses when facing a pandemic.

CHAPTER THREE: METHODOLOGY

The following chapter delineates the research questions addressed by this study, details the research design and sampling methods to include data collection and measurement, and explains the data analysis techniques employed.

Research Questions and Hypotheses

This study will employ mixed-methods research methodology to answer the following research questions:

RQ1: Do differences exist in sexual sensation seeking behavior via mobile dating apps between BMSM who use 2 or less apps versus BMSM who use 3 or more apps?

H₀: No differences exist between the two groups.

H₁: There is a statistically significant difference in sexual sensation seeking behavior between the two groups.

RQ2: To what extent do quantitative and qualitative results regarding BMSM ideas of major contributors to using mobile dating apps for sexual sensation seeking agree?

RQ3: To what extent do quantitative and qualitative indications of BMSM belief that sexual partner networks contribute to STD and HIV risk factors converge?

RQ4: In what ways do BMSM feel new knowledge about sexual partner networks will influence their future sexual sensation seeking behaviors?

RQ5: What influence does PrEP knowledge and use have on measures of BMSM sexual sensation seeking?

H_{0A}: Knowledge about PrEP has no influence on BMSM sexual sensation seeking.

H_{0B}: PrEP use has no influence on BMSM sexual sensation seeking.

H_{1A}: Knowledge about PrEP influences measures of BMSM sexual sensation seeking.

H_{1B}: PrEP use influences measures of BMSM sexual sensation seeking.

Research Design

This study utilized primary data captured through a survey conducted over a two-month period. As this study aims to obtain different but complementary data on the same topic in order to best understand the research problem, a convergent mixed-methods case study design was used (Creswell & Clark, 2017; Morse & Niehaus, 2009). Furthermore, this study employed a convergent mixed-methods research approach to provide both content and context. Appendix A provides a visual depiction of the mixed-method research procedure followed for this study. Patton (1990) suggests this type of design pools strengths and weaknesses of quantitative and qualitative methodology. That said, employing the convergent design in this study provided a more panoramic view of the interaction between mobile dating apps and sexual sensation seeking in BMSM. It was necessary to collect primary data for this study due to a lack of prior research addressing this subject. Before data were collected, the Institutional Review Board at the University of Central Florida (UCF IRB) completed a review and approved the data collection methodology.

In this particular study design, the results are attributable to the study itself, and not to flaws in the design or extraneous factors. One strong characteristic of the study design is the cross-sectional approach, which categorically eliminates threats to internal validity such as maturation, instrumentation, testing, and mortality. However, as a survey questionnaire will be administered via the Internet, selection-bias could be a considerable threat to internal validity (Babbie, 2001). In response, the recruitment measures featured an on-line nationwide selection and enlistment methodology. Exclusion criteria enlisted Black MSM who are age 18 and over and currently use mobile dating apps. Participants were recruited primarily using public fora such as Facebook groups, Instagram, Twitter, etc. Participants were also convenience sampled by word-of-mouth communications to local groups with which the researcher is affiliated. The researcher also reached out to University LGBTQ services/programs to gain participants who represent college-aged users (56 percent of mobile dating app users) (Clement, 2019).

The study questionnaire featured a combination of questions pooled from pre-screened, reliable questionnaires developed by subject matter experts. Primarily, the Sexual Sensation Seeking Scale (SSSS) (Kalichman & Rompa, 1995) is employed to measure BMSM tendency to seek out novel or risky sexual stimulation (Gaither & Sellbom, 2003). Qualitative, contextual questions are coupled with this scale to provide descriptive information regarding whether and how participants consider sexual partner networks when using mobile apps for sex seeking. More discussion on these is located in the Measurement section.

Population and Sample

The population for this study is BMSM who use mobile dating applications such as Grindr, Jack'd, Scruff, Adam4Adam, ManHunt, and Tinder. According to prior research (Gudelunas, 2012; Lehmler & Ioerger, 2014; Chan, 2017), these applications are most widely used by gay and bisexual men (men who have sex with men). This study focused on this particular population because, as previously stated, BMSM are often identified as being at highest risk for HIV and STD transmission and contraction; and studies have now begun to assert mobile dating apps are attributable to the rising statistic in MSM in general. Therefore, special focus should be placed at those at highest risk—BMSM.

To ensure the sample of participants is representative of the general population of BMSM using mobile dating apps, a non-probability purposive sampling methodology was used. Essentially, sampling is conducted based on a set of pre-defined characteristics (Babbie, 2001). These characteristics included identification as being of Black or African American ethnicity, 18 years of age or older, and uses or have at some point used mobile dating apps—such as those named above—to seek out sexual partners. The sample size was then selected based on an average of sample sizes from previous studies of similar nature (Dolwick-Grieb, Davey-Rothwell, & Latkin, 2012; Carey, Scott-Sheldon, Senn, & Carey, 2013; Miller & Behm-Morawitz, 2016; Pines, Karris, & Little, 2017; Sawyer, Smith, & Benotsch, 2017; Chan L. S., 2017; Bryant & Sheldon, 2017). Each study's sample size ranged roughly from 158-370 participants. Based on a confidence interval of 95% as is used in most social science research (Babbie, 2001), an acceptable margin of

error of 5% is appropriate assuming based on the confidence interval, 5% skewed or erroneous data is acceptable to the study (Cochran, 1977; Hunter, n.d.; Ahmad & Halim, 2017).

Additionally, the Raosoft sample size calculator was used to determine an appropriate and recommended sample size with a margin of error of 5%, a significance level of 0.05, and a population of 20,000 (selection made for unknown population sizes) (Raosoft, 2004), yielding a recommended sample size of 377. The researcher then took the median sample size from the observed studies (median=264), and the recommended sample size of 377, and calculated the average of the two, yielding a target sample size of 320 participants. However, because the population represents a very small proportion of the national LGBTQ+ population, a low response rate was expected. The researcher consulted with a statistician and subject matter expert who suggested because of the specificity of the study and target population, a sample size as large as targeted may be unrealistic. By the end of the two-month data collection period, there were 66 responses received. Therefore, in the interest of time, the researcher performed tests for normality on several study variables (i.e. education and SSSS total score) which indicated the data were normally distributed.

Measurement

The unit of analysis for this study was BMSM who use mobile dating apps for sex seeking. The units of observation were the aggregated survey responses. As the surveys have been previously tested and established, the consolidation of the scales meets

reliability and validity standards as proposed by prior research (Babbie, 2001; Dillman, Smyth, & Christian, 2014). Coverage, sampling, nonresponse, and measurement errors are important to consider in survey research and have been addressed by the study. Specifically, to address coverage error, the study's population was narrowed specifically to BMSM. Additionally, to address sampling error, the survey will be distributed via the Internet, assuming most members of the population have access to it. The survey will also be administered via the mobile apps advertisement feature. In regards to the nonresponse error, the request for participants is written in a manner to be understood by anyone with, at most, an 8th grade education. Measurement error is addressed through the survey being easy to complete, and was reviewed by a panel of subject matter experts to ensure ease of comprehension and use, and applicability to a wide range of participants and scenarios. Moreover, questions that do not apply to the study directly were redacted to encourage open, honest participation and completion.

Mixed-Method Questionnaire

For this study, the researcher developed a brief 20-item questionnaire which featured demographic questions to capture qualities and characteristics of the participants, and quantitative and qualitative questions regarding BMSM mobile app use behaviors and sexual partner networks. Quantitative questions utilized closed-ended question guidelines prompted by prior research (Babbie, 2001) such as forced and/or multiple choice responses, and qualitative questions featured an open-ended design to afford participants the freedom to provide as much context as they see fit. In addition to

the aforementioned, the questionnaire also integrated the SSSS as a means to capture participant self-reported attitudes, beliefs, and behaviors related to novel sexual experiences. Appendix H displays the questionnaire used for data collection.

Sexual Sensation Seeking Scale (SSSS)

Sexual sensation seeking was captured and measured using the sexual sensation seeking scale (SSSS) (Kalichman, et al., 1994). The scale features 11 Likert-scale items measured on a four-point scale, ranging from 1 (not at all like me) to 4 (very much like me), yielding a total minimum score of 11 and maximum score of 44. Scale reliability and internal consistency was tested at several junctures post-development, yielding an initial value of 0.75 (Kalichman, et al., 1994). Further validation reported an internal consistency value of 0.81 and 3-month retest reported a value of 0.73 (Kalichman & Rompa, 1995). A recent adaptation of the scale applied to five hundred and forty-six heterosexual college students revealed an internal consistency of 0.81 (Gaither & Sellbom, 2003). Internal consistency was also validated in this study and was found to be acceptable (Cronbach's $\alpha = 0.82$). Appendix H includes the SSSS as part of the questionnaire.

Operationalization of Variables

Table 2 displays the operationalization of variables after data had been recoded to enumerate text responses into integers for statistical analyses.

Table 2: Operationalization of Variables Studied

Variable	Type	Classification	Measure	Definition
PrEP Use	Independent	Categorical	No=0 Yes=1	Currently use daily PrEP medication
PrEP Knowledge	Independent	Categorical	Poor=1 Fair=2 Average=3 Above Average=4 Excellent=5	Self-rating on PrEP knowledge level
Sexual Sensation Seeking Scale Total	Dependent	Continuous	Number	Measure of participant SSS based on self-identified agreement with scale behavior descriptions

Data Collection

Data collection utilized the University of Central Florida Qualtrics online survey tool. The survey link was an easily accessible, truncated link enabling ease of use in the event the link must be typed into a browser manually. This survey development and administration method minimizes costs associated with this portion of the research. In order to reach a sufficient sample size, the link was distributed via Facebook, Instagram and Twitter, announced at local BSM advocacy group meetings, distributed via closed, nationwide, member’s only BSM-centric groups with which the researcher is affiliated (Appendix G), e-mailed to various University LGBTQ+ services and programs (Appendix C), and where feasible, promoted using the mobile app advertisement feature (Appendix D). The initial link and calls for participation were sent, with weekly follow-up posts until the target sample size was met.

Data Analysis

Univariate and bivariate statistics were used to characterize and analyze the data in order to address the proposed research questions. Statistical analyses were performed using Stata™ IC Statistical Analysis software, version 15.

Descriptive statistics were analyzed to provide demographic detail regarding the sample—i.e. age, geographical region / zip code, education level, knowledge about PrEP, etc. Understanding the basic characteristics of the sample allowed comparison between this study's sample and that of similar studies. Moreover, descriptive statistics also helped detect sample characteristics that may influence conclusions at the completion of the study (Thompson, 2009). Stata was used to compile and analyze demographic information for participants, with exception to the participants' Zip codes. eSpatial Mapping Software™ was used to map and analyze geographic regions for participants based on Zip codes.

Bivariate analyses featured an independent samples t-test which were run in Stata™ to account for statistically significant differences in means related to sex seeking in BMSM who use 2 or less apps versus those who use 3 or greater, testing hypothesis #1 (H_1) and answering research question #1 (RQ1). Understanding this difference is important as research states an increase in the number of mobile dating apps use increases one's social connectivity. Increased social connectivity then expands one's social and sexual networks, potentially strengthening motivations for sex seeking driven by the opportunity for novel experiences (Zuckerman, 2006; Potterat, Muth, & Brody, 2000).

Multivariate statistical methods, namely linear regression analyses, were performed to identify patterns and relationships among study variables while controlling for covariates (Bachman & Paternoster, 1997; CAMO Software, 2011). This level of analysis will also predict the influence a change in one variable has on another, particularly as it relates to sexual sensation seeking behaviors (McQuitty, 2017; Bachman & Paternoster, 1997), addressing research question #5 (RQ5). Understanding whether any relationships exist among variables could provide useful and impactful implications for both research and preventive practice. Linear regression analysis follows the following model:

$$y = \alpha + \beta x \quad \text{where:}$$

α = Constant

β = Regression Coefficient

x = Independent and control variables

Additionally, a lack of multicollinearity is required, assuming the independent variables will not be correlated. This assumption was tested using a test for Variance Inflation Factors (Pallant, 2013).

Qualitative data were then aggregated and analyzed using the NVivo™ Qualitative Data Analysis application. Responses to open-ended questions regarding sex seeking via mobile dating applications were pooled. Then, data were coded by applying a focused, concept-driven coding approach to identify common themes and patterns in the participants' responses; thematic analysis was performed on the grouped data (Padgett, 2012; Creswell & Clark, 2017).

Codes to address research question #2 (RQ2) were developed using Zuckerman's explanations for/traits associated with sensation seeking behavior (i.e., thrill/adventure-seeking, experience-seeking, disinhibition, and boredom) (Zuckerman, 1971) and new codes were developed for emerging novel themes. Response data targeted at answering research question #4 (RQ3) were coded based on risk factors postulated by prior research (i.e. substance use, risky sexual behavior, education/awareness, disclosure concerns, psychopathology, and sexual partner networks) (Center for Disease Control and Prevention (CDC), 2019; Darling, Palmer, & Kipke, 2005; Gangamma, Slesnick, Toviss, & Serovich, 2008; Hou, 2009; Younuge, Corneille, Lyde, & Cannady, 2013; University of California San Francisco Prevention Science Department, 2003). Data collected geared toward addressing research question #4 (RQ4) were then analyzed using a word cloud to track trending responses and ultimately, identify the most emergent theme. Codes developed to aid in the development of the word cloud were derived from CDC "sexual education" recommendations for preventing and reducing STD and HIV risk (Center for Disease Control and Prevention, 2020). Once coded by the main coder, the coded data underwent an accuracy/quality check by a second, experienced coder to ensure reliability of code system and accuracy of code applications (Gibbs, 2007).

Once coded and analyzed, quantitative and qualitative findings were then compared side by side to expose any areas of convergence, divergence, and/or expansion. Convergence constitutes data that conforms to notions made by prior research, and/or provide supportive findings across quantitative and qualitative datasets. Conversely, divergence constitutes data that is inconsistent with assertions made by prior research,

and/or discrepant across datasets. Finally, areas of expansion describe emergent findings that have not been previously touted by prior research or theory and provide new considerations or conclusions which can be applied to the phenomenon being studied or the BMSM population.

Ultimately, this qualitative data could lend context to the quantitative results and provide additional information regarding sexual sensation seeking via mobile applications from the target population themselves and provide novel findings that add to the overall body of knowledge.

Data Cleaning

Once the data collection process ended and the survey closed, a review of the data was necessary to determine any need to clean the data. Of the 69 total responses received, two responses did not complete a majority of the quantitative questions, and none of the qualitative questions, which left 67 total responses. A pairwise deletion methodology was then applied when performing statistical analyses, which involved the omission of cases based on the variables included in the analysis (Statistics Solutions, n.d.).

Ethics

This study, as with all research, had many ethical considerations to make. Prior to data collection, Institutional Review Board (IRB) approval was required and obtained. The study's protocol and recruitment methodology were submitted to the University of Central Florida IRB, which then performed a thorough analysis of information to

determine whether the study required any additional consents, disclosures, or whether it constituted exemptible human subjects research. Appendix B displays study protocol information submitted to the IRB, and subsequent approval documents. Once approval was obtained, a group of BMSM reviewers reviewed the survey and provided feedback before implementation. These reviewers were excluded from recruitment to prevent testing interactions and subsequent threats to validity. Lastly, all data collected are maintained in accordance with the data protection and retention standards required by the UCF IRB.

CHAPTER FOUR: RESULTS

This chapter details the findings of the various levels of analyses performed and covered in Chapter 3. Descriptive statistics are discussed and the results of the bivariate and multivariate analyses employed to answer the research questions are delineated.

Descriptive Statistics

Descriptive statistics breakdown the demographic characteristics of individuals who voluntarily participated in the study to include where they reside geographically, their age, education, and PrEP-associated indicators of knowledge, and use. Table 3 provides a tabular breakdown of respondent localities with state- and region-specific identification, whereas, Figure 2 provides a visual representation of where participants live within the contiguous United States with a heat map superimposed to indicate frequency of responses. Appendix E displays the reference map created by the National Geographic Society that identified the States contained within the various Regions of the United States (O'Conner, 2012) to aid in the development of Table 3. Table 4 provides a summary of demographic statistical data to include measures of central tendency for several characteristic variables. Finally, Table 5 explicates demographic information and provides depth and clarity to the statistical data displayed in Table 4.

Table 3: Respondent Geographical Representation

Region	States	N	%
Midwest	Indiana	4	5.97
	Illinois	2	2.99
	Kansas	1	1.49
	Michigan	1	1.49
	Ohio	5	7.46
<i>Subtotal</i>		13	19.4
Northeast	Connecticut	1	1.49
	Maryland	4	5.97
	Massachusetts	1	1.49
	New Jersey	2	2.99
	Pennsylvania	1	1.49
	Rhode Island	1	1.49
<i>Subtotal</i>		10	14.92
Southeast	Alabama	1	1.49
	Florida	17	25.37
	Georgia	10	14.93
	Louisiana	1	1.49
	North Carolina	2	2.99
	South Carolina	4	5.97
	Tennessee	2	2.99
	Virginia	3	4.48
<i>Subtotal</i>		40	59.71
Southwest	Texas	4	5.97
<i>Totals</i>		67	100.00

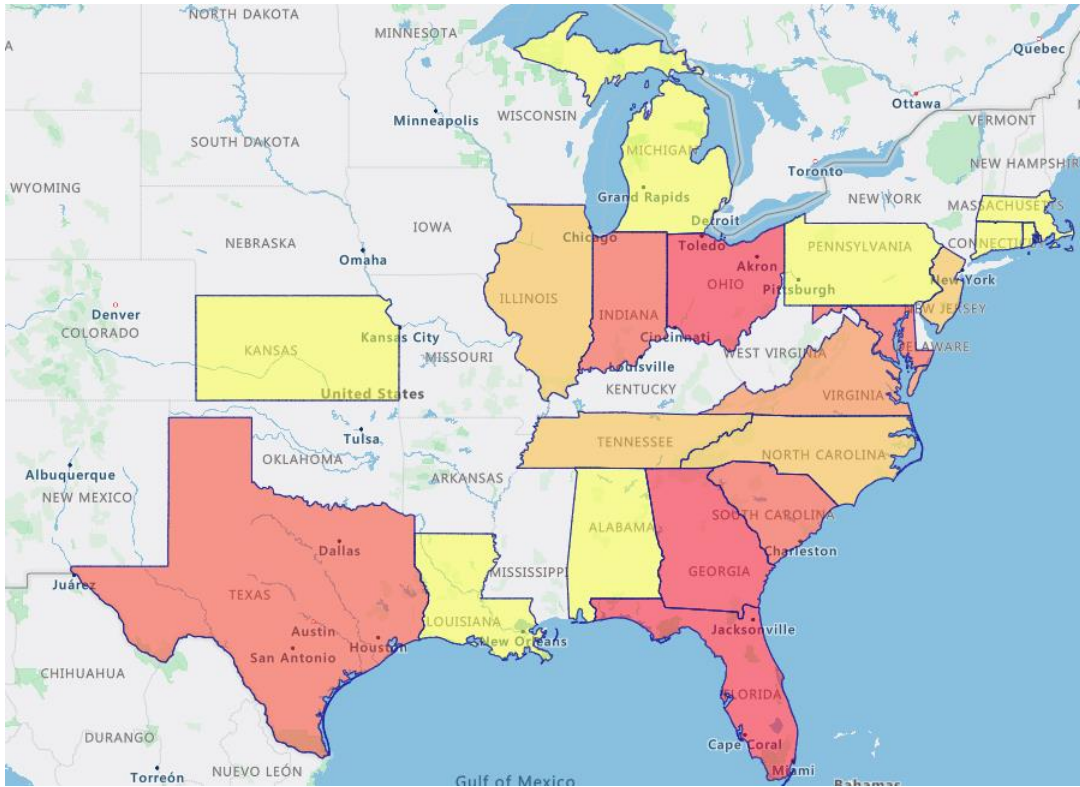


Figure 2: Geographic Mapping of Respondent Location

Legend: ■ <=1 ■ <=2 ■ <=3 ■ <=4 ■ >4

Source: www.espatial.com

As demonstrated by both Table 3 and Figure 2, a large majority of survey responses were from individuals who resided in the Southeast Region of the United States (59%; n=40); with 25% (n=17) of total responses from Floridian participants, approximately 15% (n=10) from Georgian respondents, and 19.41% (n=13) from the other States within the Region. The Midwest Region accounts for another 19.4% (n=13) of total responses; the Northeast region for 14.92% (n=10); and the Southwest region for 5.97% (n=4) of total responses. It is important to acknowledge there were no respondents from the Western United States. However, historically speaking, these states are

predominantly inhabited by Non-Hispanic Whites, and the Black subpopulation accounts for only 4.6% of the total Western population (Statistical Atlas, n.d.).

Comparatively, Appendix F displays LGBT population density across the US.

On average, respondents' ages fell between 18-34, with a majority of participants reporting being aged 25-34. Also, on average, respondents reported possessing at least a Bachelor's degree, self-rated their PrEP knowledge as Average to Above Average, and indicated they are not currently using PrEP. Table 5 provides further detail regarding participant demographics.

Table 4: Characteristics of the sample, n=67

Variable		Number	%
Age	18-24	20	29.85
	25-34	36	53.73
	35-44	10	14.93
	45-54	1	1.49
Education	High School	18	26.87
	Bachelor's Degree	32	47.76
	Master's Degree	14	20.90
	Terminal Degree	3	4.48
Heard of PrEP?	No	6	9.09
	Yes	60	90.91
PrEP Knowledge	Poor	2	3.03
	Below Average	7	10.61
	Average	24	36.36
	Above Average	22	33.33
	Excellent	11	16.67
PrEP Use	No	55	83.33
	Yes	11	16.67

Participant demographics are outlined in Table 4. Specifically, approximately 30% (n=20) of respondents reported being between ages 18-24; 54% (n=36) between ages 25-34; 15% (n=10) between ages 35-44; and 1% (n=1) between ages 45-54. Of note,

no respondents reported being aged 55 and over. While it is likely BMSM aged 55 and over account for a very small percentage of mobile dating app users, their representation is still important.

Another important demographic component to consider is participants' level of education. Most participants reported possessing some level of post-secondary education; i.e. 47.76% (n=32) having a bachelor's degree, 20.90% (n=14) having a master's degree, and 4.48% (n=3) having a doctorate or other terminal degree. The remaining 26.87% of participants reported completing at least a high school diploma. While education is not a salient variable in this study, it is an important variable to consider as it illustrates that most, if not all, participants would have come into contact with some form of sexual education or other awareness program/material. This educational foundation is an important indicator of future decision-making, risk appraisal, and SSS.

As previously discussed, PrEP has been propagated as an effective clinical intervention to prevent the spread of HIV, especially in high-risk groups such as BMSM. Therefore, it is important to understand what BMSM know about PrEP and whether they subscribe to its use. A sweeping majority of participants indicated they had heard of PrEP (90.91%, n=60). PrEP knowledge was a self-reported variable which included five categories: Poor, Fair, Average, Above average, and Excellent. A large number of respondents rated their knowledge of PrEP as Average to Excellent (86.36%, n=57). Of note, however, only 16.67% (n=11) of participants indicated they are currently using PrEP as a method of prevention. This variance might suggest there are barriers that exist related to BMSM PrEP use—whether related to access, confidence, or otherwise.

RQ1: App Use and Sexual Sensation Seeking

As research suggests that sexual minorities exhibit greater risky sexual behaviors (Saewyc, et al., 2006), this study, supported by the Sensation Seeking Theory, operationalized this assertion on the basis that participants exhibiting greater risky sexual behaviors will have a higher sum total score on the SSSS. Furthermore, participants seeking greater novel experiences may utilize a greater variety of mobile dating apps in an effort to extend their networks and connect with different individuals. Therefore, Research Question #1 aimed to determine whether differences in measures of SSS behavior existed between BMSM who use 2 or less mobile dating apps, and those who use 3 or more dating apps. As such, an independent t-test was performed to investigate the following question and hypotheses:

RQ1: Do differences exist in sexual sensation seeking behavior via mobile dating apps between BMSM who use 2 or less apps versus BMSM who use 3 or more apps?

H₀: No differences exist between the two groups.

H₁: There is a statistically significant difference in sexual sensation seeking behavior between the two groups.

An independent *T*-test was run on a sample of 65 BMSM who utilize mobile dating apps to determine if there were differences in sexual sensation seeking behaviors based on the number of apps used, consisting of those using 2 or less mobile dating apps, and those using 3 or more. Essentially, the t-test investigated the equality of means between the two groups. The results indicated there is not a statistically significant

difference in means between groups [$t(63)=0.6412, p=0.52$], and thus, the null hypothesis (H_0) is rejected. Table 5 summarizes these findings.

Table 5: Results of Independent sample T-test between mean SSSS scores according to number of apps used

	Category	<i>N</i>	Mean	Std. Dev.	<i>T</i> -test	Df	<i>P</i>
Total SSSS scores	2 or less	46	25.76	7.19	0.6412	63	0.52
	3 or more	19	24.42	8.73			

* $p<0.05$

RQ2: BMSM Motivations for Using Dating Apps

While Zuckerman (1994) suggests explanations for sensation seeking involve thrill/adventure-seeking, experience-seeking, disinhibition, and boredom, it is important to investigate the applicability and/or relativity of these trait dimensions to the BMSM community of today. Therefore, this study employed a mixed-methods approach to understanding whether these explanations apply to the target demographic and operationalized this tactic by analyzing quantitative and qualitative indications of BMSM motivations for using mobile dating apps for SSS. As such, a univariate analysis of quantitative measures was performed and said results were juxtaposed against results of qualitative, thematic analyses of self-reported indications of mobile dating app use. This mixed-method comparative analysis was performed in order to investigate the following question:

RQ2: To what extent do quantitative and qualitative results regarding BMSM ideas of major contributors to using mobile dating apps for SSS agree?

Quantitative Results

Quantitative indications of sexual sensation seeking motivations were operationalized by extrapolating Zuckerman's proposed explanations for sensation seeking (i.e. thrill/adventure seeking; new experience seeking; disinhibition/impulsivity; or boredom), whereby participants selected the response they felt most accurately described their personal motivation for using mobile dating apps for SSS purposes. A large majority of respondents (54.84%, n=34) indicated they use the apps due to boredom. Approximately 24% of respondents (24.19%, n=15) suggested using the mobile dating apps to seek out new experiences; and nearly 18% of individuals (17.74%, n=11) indicated they use mobile dating apps for thrill/adventure seeking.

A very small number of participants (3.23%, n=2) suggested using the apps as a result of impulsivity. These results are important in understanding whether the explanations proposed by the theory and concept proponents are currently relevant. As such, results indicated, generally speaking, BMSM use mobile dating applications for at least one of the reasons suggested by prior research. To build upon this idea, however, qualitative data will reveal whether participants' explanations are the same or similar when afforded the freedom of expression in open ended questioning as opposed to being provided a fixed list of options/responses.

Qualitative Results

Qualitative investigation involved the thematic analysis of participants' self-reported personal motivations for utilizing mobile dating applications. Once responses were aggregated, they were then coded by applying Zuckerman's dimensions of sensation seeking as detailed in the quantitative analysis. Findings indicated a moderate number of participants (18.92%, n=14) use mobile dating apps in order to "shake things up" or "do something different" (Thrill/Adventure Seeking). In comparison, a small number of participants indicated they use mobile dating apps for seeking new experiences (8.11%, n=6) or as the result of boredom (9.46%, n=7). However, no participants suggested they use mobile dating apps as the result of impulsive behavior.

More notably, however, this thematic analysis revealed the emergence of new themes and explanations for BMSM mobile dating app use. A vast majority of participants (63.51%, n=46) reported using mobile dating apps for reasons outside of those proposed by Zuckerman's theory. Many participants (43.24%, n=32) indicated using mobile dating apps to connect with and/or meet new people. Similarly, a number of respondents (16.22%, n=12) indicated they use mobile dating apps specifically to make emotional connections and/or to look for long-term relationships. Finally, while minute, it is noteworthy that a number of participants (4.05%, n=3) suggested using mobile dating apps for validation and/or self-gratification. Themes and example comments are exemplified in Table 6 below. This analysis especially displayed the value of mixed methods research as it revealed the more common reasons BMSM utilize mobile dating applications.

Table 6: Open-ended comments regarding motivations for mobile app use, N=74

Themes	Quotes
Thrill/Adventure Seeking n=14	<p>“I hope to find sexual partners willing to explore kinky, perhaps more taboo, sexual activity.”</p> <p>“The occasional hot conversation”</p>
New Experience Seeking n=6	<p>“Mostly for hooking up, but it is also a great way to learn about the local gay culture when coming to a new place.”</p> <p>“I wanted to try something different.”</p>
Boredom n=7	<p>“Other times boredom, browsing profiles, and looking at pictures. Many time people unlock their pictures and share nudes.”</p> <p>“Boredom and the urge to ‘do something’ or not be alone.”</p>
Connectivity* n=32	<p>“Using a dating app has better accessibility to more people in different areas in a shorter amount of time.”</p> <p>“Every app is different. Grindr/Jackd I utilize for a hookups. Tinder is a bit more wholesome so if I want to meet new friends, I’ll use their platform.”</p> <p>“Possible new friends and connections. I enjoy having great convos with new people. Whatever happens along the way happens.”</p>
Emotional Connection* n=12	<p>“I want a long term boyfriend and can't see that happening without them.”</p> <p>“Seeking partners hope to make a right connection”</p>
Validation* n=3	<p>“Validation of being a wanted sexually or found attractive by someone.”</p> <p>“Deep down I actually feel kind of alone. They help me fill that void momentarily.”</p> <p>“Attention”</p>

(*) = Denotes novel/expansive themes

Mixed-Methods Synthesis

In this scenario, the qualitative results significantly expanded upon the quantitative results in that they added new dimension to previous understanding of the reasons individuals choose to use mobile dating apps. Specifically, it identified additional reasons BMSM in particular use mobile dating apps, which is vital to addressing the issue of STD and HIV incidence among this high-risk group. There were also instances of both convergence and divergence between the two data sets. Table 7 features a joint display which integrates and synthesizes the quantitative and qualitative data analyzed in the study.

Table 7: Joint display of integrated data, RQ2

Themes	Qn	Ql	Mix-Method Inferences
Thrill and Adventure Seeking	n=11 17.74%	n=14 18.92%	<i>Convergence</i> A consistent representation of BMSM indicate using mobile dating apps for thrill/adventure seeking.
New Experience Seeking	n=15 24.19%	n=6 8.11%	<i>Divergence</i> There was a notable decrease in support of experience seeking being the impetus behind app use.
Disinhibition or Impulsivity	n=2 3.23%	n=0 0%	<i>Convergence/Expansion</i> Data suggest little-to-no indication that impulsivity drives app use. Results diverge from what is suggested by the theory and can inform future research on the subject.
Boredom	n=34 54.84%	n=7 9.46%	<i>Divergence</i> There was a significant difference between data sets that presents research and practice implications related to healthy outlets for BMSM.
Connectivity*		n=32 43.24%	<i>Expansion</i> New themes emerged as large number of participants indicated looking to meet people, seeking emotional connections, or wanting to “feel wanted” which disrupt the notions made by prior research about this demographic.
Emotional connection*		n=12 16.22%	
Validation*		n=3 4.05%	

(*) = Denotes novel/expansive themes

RQ3: BMSM Sexual Partner Networks as a Risk Factor

As sexual networks often resemble and/or overlap with social networks

(University of California San Francisco Prevention Science Department, 2003), a full

scope comprehension of BMSM attitudes and beliefs regarding sexual partner networks and the associated risks is critical to reduce and address the risks inherent to the community. Therefore, this study also applied both quantitative and qualitative research methodology to investigate the following research question:

RQ3: To what extent do quantitative and qualitative indications of BMSM belief that sexual partner networks contribute to STD and HIV risk factors converge?

Quantitative Results

Participants indicated the extent to which they agree or disagree with the notion that sexual partner networks are a major contributor to HIV and STD risk factors, as suggested by prior research (University of California San Francisco Prevention Science Department, 2003; Dolwick-Grieb, Davey-Rothwell, & Latkin, 2012; Pines, Karris, & Little, 2017).

Analysis revealed roughly 56% (55.56%, n=35) of respondents disagreed with the notion; and another 27% (26.98%, n=17) indicated they strongly disagreed. On the other hand, 11% (11.11%, n=7) respondents indicated they agreed with the statement; and just 6% (6.36%, n=4) strongly agreed.

Qualitative Results

Analyzing respondents' qualitative and subjective opinions of what BMSM believe constitute major STD and HIV risk factors are an important dimension in addressing risk within the community. It also provides indication as to whether BMSM

consider sexual partner networks when provided freedom to identify from their perspective what the top STD and HIV risk factors are for the BMSM community. As such, participant responses were analyzed and coded predicated on risk factors suggested by prior research (i.e. substance use, risky sexual behavior, education/awareness, disclosure concerns, psychopathology, and sexual partner networks).

Results showed a wide array of risk factors suggested by participants; some supportive of prior research and others arise as new considerations. A considerable number of respondents (39.5%, n=30) supported the assertion risky sexual behaviors and experiences contribute to STD/HIV risk factors. Whereas, 16% (15.8%, n=12) identified education/awareness; 11% (10.5%, n=8) mentioned disclosure concerns or non-disclosure; 12% (11.8%, n=9) suggested psychopathology; and paramount to this study, 8% (7.9%, n=6) indicated sexual partner networks. Interestingly, however, no participants cited substance use as a major contributor to STD and HIV risk within the community. This might suggest BMSM do not often engage in drug-induced sexual experiences as is commonly purported by LGBTQ+ health research. However, future research focused on the subject is necessary to effectively draw this conclusion.

Several participants also suggested other themes they believed to contribute to risk. While not mentioned by a large number of participants, it is still noteworthy as it can potentially expand current understanding of risk within this community. A few participants (3.9%, n=3) identified complacency as a risk factor; others suggested convenience (2.6%, n=2), access to care (2.6%, n=2), and social/cultural impositions

(5.3%, n=4). Table 8 below displays participant descriptions of what they believe are major factors contributing to BMSM STD and HIV risk.

Table 8: Open-ended comments regarding STD and HIV risk factors

Themes	Quotes
Complacency* n=3	<p>“With the advancements that have been made in pharmaceuticals, there is no fear of contracting an incurable STD and possibly dying. I think this harmful because it has led people to have risky sex.”</p> <p>“PREP. People forget about all other diseases because the one that can kill you doesn't have that power to anymore.”</p>
Convenience* n=2	“Convenience of sexual encounters”
Access to Care* n=2	<p>“Limited access to healthcare”</p> <p>“Lack of testing due to limited to no access to healthcare”</p>
Education and Awareness n=12	<p>“Not knowing their status about HIV”</p> <p>“Poor sex education knowledge, especially gay sex knowledge”</p>
Psychopathology n=9	<p>“the toxic behaviors and/or unresolved traumas that the individual has experience in their life and using sex or drugs as an escape for their life problems.”</p> <p>“Fear of testing due to negative stigma”</p>
Disclosure concerns n=8	“Knowing their status but afraid to share with sexual partners and won't disclose.”
High Risk Behaviors n=30	“Recklessness toward sexual intercourse and wanting skin to skin contact and an exchange of bodily fluids. Also, sex in groups (sex parties) in which they are not using protection or aware of other's statuses.”
Sexual Partner Networks n=6	<p>“Bisexual male encounters”</p> <p>“Having multiple sex partners who also have multiple sex partners.”</p>
Social/Cultural Impositions* n=4	<p>“Pressure from partners to go without a condom.”</p> <p>“Random hookup culture and cultural pressures”</p>

(*) = Denotes novel/expansive themes

Mixed-Methods Synthesis

The synergy of the quantitative and qualitative data sets was particularly useful in understanding whether BMSM consider sexual partner networks when identifying HIV risk factors. As research has indicated, sexual partner networks are a major risk factor to BMSM as aforementioned concepts of homophily and social connectivity theoretically increase chances of establishing larger, unbeknownst shared sexual partner networks (Claywell, n.d.; McPherson, Smith-Lovin, & Cook, 2001; Potterat, Muth, & Brody, 2000; Valente, 2010). Therefore, investigating the stance members of the BMSM community take on sexual partner networks could have major practice and preventive implications.

Table 9: Joint display of integrated data regarding sexual partner networks, RQ3

Category	Qn	Ql	Mix-Method Inferences
Strongly disagree	n=17 26.98%		<i>Convergence / Divergence</i> A vast number of participants indicated they either disagree or strongly disagree with classifying sexual partner networks as an STD and HIV risk factor for the community, compared to those who agree. Similarly, a very small number of participants explicitly identified Sexual Partner Networks as a risk when provided an opportunity for open-ended responses. However, this differs from what is suggested by prior research. This provides some basis for expanding education and awareness efforts, continued research, and practice/preventive protocols.
Disagree	n=35 55.56%		
Agree	n=7 11.11%	n=6 7.9%	
Strongly agree	n=4 6.35%		

Table 9 provides a joint display presenting an integration of the quantitative and qualitative data regarding sexual partner networks as well as mixed-methods inferences that can be drawn from the data. While the data converge across data sets, there is a clear chasm between the data and what is suggested by prior research. This does not negate

that sexual partner networks are a positive risk factor. Instead, it indicates sexual partner networks may not be high on the list for BMSM when compared to risks such as high risk behaviors, education and awareness, psychopathology, etc.

RQ4: Sexual Partner Network Knowledge Influence on BMSM Sexual Behavior

Before innovating the best ways and means to address issues inherent to any community, one must first understand the community members' attitudes and beliefs toward change. Research suggests individuals with underrating and resistant attitudes seem to have a low potential for lifestyle change (Mantyselka, Kautiainen, & Miettola, 2019). Therefore, while research question #3 sought to understand whether BMSM consider sexual partner networks to be a risk factor, this question is a critical element in addressing risks related to mobile dating apps, sexual partner networks, and the BMSM community. As such, this study employed qualitative methodology to answer the following question:

RQ4: In what ways do BMSM feel new knowledge about sexual partner networks will influence their future sexual sensation seeking behaviors?

As the CDC recommends specific approaches best geared toward minimizing the risks of contracting and transmitting STDs and HIV, these themes were used to analyze the qualitative responses regarding behavior change, specifically, abstinence, condom use/PrEP, fewer sexual partners, vaccination, communication regarding sex practices, regular testing, and avoid mixing alcohol and recreational drugs with sex (Center for Disease Control and Prevention (CDC), 2020). Results showed 13% (n=6) of participants

indicated learning about sexual partner networks would encourage practicing greater condom use and/or considering PrEP. Another 13% (n=6) indicated they may engage with fewer sexual partners, and 4% (n=2) supported increased testing. The majority of participants (38%, n=18) suggested they would improve communication regarding their and their partners' sexual practices. This is an especially important preventive mechanism as increased conversation will facilitate openness and transparency about sexual practices and potentially relieve disclosure concerns. However, most notably, 32% (n=15) of participants indicated learning about sexual partner networks would have no influence on their current sexual practices—healthy or otherwise. Figure 3 provides a visual representation of this information.



Figure 3: Word Cloud illustrating BSM behavior change after learning of sexual partner networks

Source: www.wordart.com

Perhaps the most salient takeaway from this qualitative analysis is the revelation that many BMSM indicated knowledge of sexual partner networks will not influence or change their sexual sensation seeking behaviors. This is an important finding as it can provide predictive indication as to how amenable BMSM may be to change and ultimately, whether programming geared toward addressing HIV risk and related outcomes will be effective. Further analysis of BMSM adaptation to change is warranted.

RQ5: Influence of PrEP Knowledge and Use on BMSM SSS

As research suggests, PrEP is an extraordinarily effective tool in reducing the risks of HIV when used consistently (CDC, 2019; Grant, et al., 2014; Martin, et al., 2015). However, although research heavily promotes and supports its use, many members of the BMSM community are not particularly amenable to using the drug. Additionally, it is important to investigate whether BMSM SSS habits and behaviors are influenced by PrEP knowledge and/or PrEP use. Therefore, research question #5 applied multivariate analysis techniques in order to answer the following question and hypotheses:

RQ5: What influence does PrEP knowledge and use have on measures of BMSM sexual sensation seeking?

H_{0A}: Knowledge about PrEP has no influence on BMSM sexual sensation seeking.

H_{0B}: PrEP use has no influence on BMSM sexual sensation seeking.

H_{1A}: Knowledge about PrEP influences measures of BMSM sexual sensation seeking.

H_{1B}: PrEP use influences measures of BMSM sexual sensation seeking.

Bivariate Analysis

To assess the association between independent (PrEP Knowledge and PrEP Use) and dependent (Total SSSS score) variables of the study, and to understand how the value of the outcome variable depends on the values of the explanatory variable, bivariate analysis techniques such as a one-way analysis of variances (ANOVA) and an independent samples *T*-test were employed (Bertani, Di Paola, Russo, & Tuzzolino, 2018).

PrEP Knowledge and SSS

A one-way ANOVA was performed to test the relationship between a categorical and interval variable by investigating the differences in means of the SSSS scores broken down by the levels of self-reported PrEP knowledge (Institute for Digital Research & Education, 2020). However, ANOVA requires the meeting of three underlying assumptions: assumption of independence, assumption of normality, and assumption of homogeneity of variance. To meet the assumption of independence, the observations were randomly and independently sampled from the general BMSM population. Normality of the data was tested using the Shapiro-Wilkes test for normality, which indicated SSS score data were normally distributed ($W=0.91$, $p=0.00$). Finally, to test the

assumption of homogeneity of variance, Levene’s Test was used to determine whether the PrEP knowledge groups or factors have equal variances (Hinkle, Wiersma, & Jurs, 2003). This statistic indicated the standard deviation in SSSS score is higher for those who rated their PrEP knowledge as Excellent (SD=12.28), and Poor (SD=9.19) versus those who indicated having Fair (SD=3.15), Average (SD=7.74) and Above Average (SD=7.32) knowledge of PrEP. However, Levene’s Test statistic indicated there is not a statistically significant difference in the variance of SSSS scores between the various knowledge levels whether centered using the mean, median, or the 10% trimmed mean ($W_0=1.65, p=0.17$; $W_{50}=0.96, p=0.44$; $W_{10}=2.14, p=0.09$). Therefore, all assumptions underlying the ANOVA were met.

The ANOVA output revealed the between group sum of squares for the model is 200.81 with 4 degrees of freedom, resulting in a mean square of 50.20. The corresponding F statistic is 0.74 and has a significance level of 0.57. Therefore, the analysis did not find significant differences in mean SSSS scores due to PrEP knowledge level, and the study fails to reject the null hypothesis (H_{0A}). Analysis output is summarized in Table 10.

Table 10: ANOVA Summary Table for SSSS scores by PrEP Knowledge Level

Source	SS	Df	MS	F	<i>p</i>
PrEP Knowledge	200.81	4	50.20	0.74	0.57
Error	4156.17	61	68.13		
Total	4356.98	65	67.03		

* $p < 0.05$

PrEP Use and SSS

An independent *T*-test was run on a sample of 65 BMSM who utilize mobile dating apps to determine if there were differences in BMSM SSS behaviors based on PrEP Use. The variable groups consisted of BMSM who currently use PrEP versus those who do not. The results indicated there is not a statistically significant difference in mean SSSS scores between groups [$t(64)=0.2316, p=0.23$]. Table 11 summarizes these findings.

Table 11: Results of Independent sample T-test between mean SSSS scores according to PrEP Use

	Category	<i>N</i>	Mean	Std. Dev.	<i>T</i> -test	<i>Df</i>	<i>P</i>
Total SSSS scores	Use="No"	55	25.53	7.10	0.2316	64	0.23
	Use="Yes"	11	22.27	12.4			

* $p<0.05$

PrEP Knowledge, PrEP Use, and BMSM SSS

While the results of the bivariate analysis did not reveal significant findings or associations between PrEP Knowledge and Use, and SSSS scores, it is worth investigating as part of the multivariate analysis to determine whether any associations are present when the variable exists as part of a model, as multivariate analysis provides a more powerful test of significance and provides a more wide-scoping view of the relationship among variables (Bachman & Paternoster, 1997; Jackson, 2018).

Regression Analysis

Multivariate analysis provides a robust mechanism for determining how much of the variance in the dependent variable can be explained by the independent variables together and how much of this combined variance is independently attributable to each independent variable (Bachman & Paternoster, 1997). As such, this study employed multivariate linear regression analysis to identify the impact PrEP knowledge and PrEP use have on measures of BSM sexual sensation seeking. Table 12 presents the results of the multivariate linear regression analysis.

Table 12: Multivariate linear regression for SSSS scores

	β Coef.	SE	t	P> t	95% CI
PrEP Use	-4.097	2.938	-1.39	0.168	1.774185
PrEP Knowledge	0.8127	1.108	0.73	0.466	3.025993

N=66

* $p < 0.05$

$R^2 = 0.0306$

The regression model contained two independent variables, PrEP use and PrEP knowledge. The model suggests a one unit increase in PrEP use may result in a 4 point decrease on the SSSS. Or, adopting PrEP use may lead to less sexual sensation seeking or inversely, improved sexual habits. Similarly, a one unit increase in PrEP knowledge may result in a 0.81 point increase on the SSSS. Or, the more one knows about PrEP, the greater his sexual sensation seeking habits. However, neither variable showed a statistically significant relationship with BSM sexual sensation seeking, therefore there is not enough evidence to reject the null hypotheses H_{0A} and H_{0B} .

Collinearity

The Variance Inflation Factor (VIF)/Tolerance test was used to test for the lack of multicollinearity among independent variables. Tolerance levels below 0.10 and/or VIF values above 10 would indicate a high correlation between variables (Walden, 2018). As displayed in Table 13, both variables had scores outside of these ranges; therefore, there is a lack of multicollinearity.

Table 13: VIF/Tolerance

	VIF	Tolerance
PrEP Knowledge	1.18	0.847
PrEP Use	1.18	0.847

Similarly, a correlation analysis of the independent variables was performed as a secondary test for lack of multicollinearity. Research indicates when two variables are being assessed for collinearity, a correlation statistic of 0.70 is concerning (Bachman & Paternoster, 1997). As demonstrated in Table 14, correlation value between the two independent variables is small, which indicated a lack of multicollinearity.

Table 14: Correlation of Variables, N=66

	PrEP Knowledge	PrEP Use
PrEP Knowledge	1.0000	
PrEP Use	0.3907	1.0000

Post-regression Test for Interactions

As the purpose of regression analysis is to determine the independent influences each independent variable may have on the dependent variable, a post-hoc test for interactions was performed on the regression model to determine whether statistically significant relationships exist when the independent variables interact. That is, what is the change in sexual sensation seeking for an individual who may know about PrEP and elect not to use it, versus those who know about PrEP and use it. In addition, with each increase in knowledge level, does sexual sensation seeking change?

Therefore, another level of multivariate analysis was employed to study the interactions between variables in the regression model, which revealed different results. At the 0.1 significance level, the model indicated those who use PrEP exhibit greater sexual sensation seeking behaviors, with each increase in knowledge level ($\beta = 7.490$, $p=0.061$). As only approximately 17% of participants actually use PrEP, the small subsample ($n=11$, 16.67%) may explain the closeness to significance at the 0.05 level, but not quite meeting the threshold. However, further post-regression analysis also revealed that when interactions are tested across independent knowledge levels and PrEP use, those who have an “Average” understanding of PrEP and use the drug exhibit significantly less sexual sensation seeking behaviors ($\beta = -28.88$, $p=0.002$) when compared to the other knowledge levels. Model fit statistics ($R^2 = 0.2122$, $p=0.044$) indicate the independent variables reliably predict the dependent variable (UCLA Institute for Digital Research & Education, 2020). The post-estimation test of overall significance of the interaction indicated a statistical significance ($F=5.17$, $p=0.0086$).

Post-hoc Statistical Power Analysis

Statistical power for regression analysis is the probability of a significant finding when there is a significant relationship in the population based on the phenomenon studied (Newsom, 2020). Sufficient power is not only critical for ensuring we do not miss important significant effects, but it is also important because power plays a vital role in successes and failures to replicate findings and in lowering the risk of Type II errors (Fraleigh & Vazire, 2014). Conventionally, a minimum statistical power value of 0.80 is ideal. As such, a post-hoc power analysis was performed, using Stata 15, to assess the level of statistical power of the linear regression model and post-regression test for interaction model. The linear regression model parameters ($\alpha=0.05$, $R^2=0.0306$, $\delta=0.0316$, and $N=66$) yielded an insufficient statistical power of 22%. The test for interaction model parameters ($\alpha=0.05$, $R^2=0.2122$, $\delta=0.2694$, and $N=66$) yielded a statistical power value of 97%; therefore, interaction analyses confidently detect differences and relationships when they are present.

CHAPTER FIVE: DISCUSSION

This chapter concludes this study by summarizing the findings from the various levels of analysis performed in the preceding chapter, discussing the theoretical and practical contributions, and detailing the Public Affairs implications. It also discusses the limitations of the study, suggests areas and/or avenues for future research, and provides a conclusion for the study.

Summary of Findings

The aims of this study were to understand BMSM sexual sensation seeking habits when utilizing dating apps and investigate how sexual sensation seeking behaviors may be influenced by use of mobile dating apps. Additionally, this study sought to discover the influence preventive mechanisms such as PrEP may have on sexual sensation seeking habits, and to provide context to current research focused on the perceptions of BMSM regarding dating application use and sexual partner networks. The exploration of these relationships was predicated upon assertions made by prior research and relevant theoretical frameworks and as such, this study hypothesized that (1) there is a difference in sexual sensation seeking behavior between BMSM who use 2 or less dating apps, and those who utilize 3 or more (RQ1); and (2) PrEP use and knowledge both influence BMSM sexual sensation seeking (RQ5). Multivariate linear regression along with bivariate analyses techniques such as an independent samples *T*-test and ANOVA were employed to test these hypotheses.

Results from the various quantitative analysis methods provided indication that there is not a difference in SSS among those who utilize 3 or more mobile dating apps versus those who use 2 or less. Essentially, greater connectivity does not by nature suggest an increase in SSS behaviors. While the analysis did not reveal any significant findings related to the number of apps used, it does not negate the notion that there is an inherent risk when using mobile dating apps—be it 1 or 4. Moreover, as supported by the Small World Principle, greater connectivity and homophily (i.e. using a greater number of apps and engaging with other high-risk individuals) pose a significant risk to networks involving high risk groups such as BMSM. Also, analyses revealed PrEP use, independently, has a negative relationship with sexual sensation seeking. In effect, when one goes up, the other goes down. However, neither model demonstrated statistical significance.

Another level of multivariate analysis was employed to study the interactions between variables in the regression model. This analysis revealed for those who use PrEP, the greater the knowledge level results in the greater the sexual sensation seeking behaviors; although these results did not quite meet the threshold for significance at the 0.05 level ($p=0.061$). This finding could be an important revelation and direction for future research as it may indicate the use of PrEP may lead to an increase in risky sexual behaviors. Most studies conducted to date focused on PrEP involve largely White MSM samples (CDC, 2019; Grant, et al., 2014; Marcus, Hurley, Nguyen, Silverburg, & Volk, 2017; Martin, et al., 2015), therefore, further research focusing on BMSM PrEP use is warranted, perhaps involving a larger sample size if feasible.

Research asserts BMSM are a key population in the US National HIV/AIDS strategy, yet few individuals believe PrEP would be personally helpful as BMSM are wary of the medication and its potential adverse effects (Philbin, et al., 2016). This study supported this notion in revealing that only 17% of participants actually use PrEP daily, even though 91% have heard of PrEP and 86% rate their knowledge as Average to Excellent. These variances may indicate a lack of fundamental knowledge and/or access, and/or an uncertainty related to the long-term effects of PrEP, which would be a major implication for future practice in prevention. This also indicates a need to investigate barriers to PrEP use that may explain why there is a lack of PrEP use adoption among Black MSM. As CDC research suggests PrEP is 99% effective at reducing the risk of HIV (CDC, 2019), PrEP should be promoted within the BMSM community, especially, in effort to reduce HIV incidence rates and disparity.

In this study, mixed-method research demonstrated immense value in that the qualitative data revealed findings which in some cases explained the quantitative results, and in other cases, expanded upon them. Aggregated data (both quantitative and qualitative) revealed that, generally speaking, disinhibition or impulsivity is not a reason BMSM engage in sexual sensation seeking via mobile dating apps.

When identifying their motivations for mobile dating app use (RQ2) among the four categories proposed by theory, boredom is the modal selection. However open ended responses revealed BMSM more often engage in SSS via mobile dating apps to meet people, find long-term relationships, and to seek validation. This finding contradicts the popular narrative attributed to MSM as being sexually compulsive (Groves, Golub,

Mustanski, & Parsons, 2010; Grov, Parsons, & Bimbi, 2010; Saewyc, et al., 2006), and suggests more emotional, intimate motivations. Connectivity, emotional connection, and validation/self-gratification are novel considerations, and may be constructive to future research, and useful in potentially adding a new dimension to the sexual sensation seeking paradigm. Engaging in sexual sensation seeking to ameliorate emotional trauma and challenges is a critical indicator of the necessity to promote healthy outlets for this high risk group. As research indicates, emotional difficulty is a precursor to risky sexual behavior (Rizor, Callands, Desrosiers, & Kershaw, 2017). Therefore, it is important for psychologists, physicians, nurses, counselors, and other practitioners with whom BMSM come into frequent contact, to promote emotional intelligence, and encourage healthier outlets and means of meeting other persons to reduce dependence on mobile dating apps. Also, of note, research suggests ethno-cultural services are critical to promoting attitude and behavior change (Gopalkrishnan, 2018). Therefore, there is a need for Black psychologists, nurses, physicians, etc., who may have shared similar life experiences, and to whom BMSM may be more receptive.

Furthermore, mixed-method research revealed significant findings about BMSM attitudes and beliefs related to sexual partner networks (RQ3). As discussed, research suggests sexual partner networks, while a more novel consideration, constitute a major HIV and STD risk factor for high risk groups (Dolwick-Grieb, Davey-Rothwell, & Latkin, 2012; Jung, Umyarov, Bapna, & Ramaprasad, 2014; University of California San Francisco Prevention Science Department, 2003). Although research involving sexual partner networks and associated risk is meager, it is important to assess and understand

general knowledge of sexual partner networks, and acknowledgement of the risks associated with these networks.

Recognizing that BMSM largely disagree that sexual partner networks are a major risk factor for HIV and STD contraction and transmission is a notable and important finding. However, findings also revealed several novel themes that diverge from the risk factors propagated by HIV and STD practice and activism. As indicated in Chapter 4, participants identified complacency, convenience, access to care, and social/cultural impositions as major risk factors for BMSM. While only few participants appeared to support these themes, it introduces new things to consider. Some themes support the theoretical frameworks of the study (i.e. convenience and the small world principle), and others, i.e. access to care and social/cultural impositions, are often discussed as social, environmental, and institutional determinants of health in health disparity research, but are not often applied to understanding HIV incidence, prevalence, and outcome disparities among the LGBTQ+ community. This reveals there is more work to be done in this area of research and that practical education is critical beyond the research as there is a gap in knowledge and understanding of Sexual Partner Networks in BMSM. As BMSM are at highest risk for HIV and STDs (Center for Disease Control and Prevention (CDC), 2019), it is important they are educated about the fundamental risks associated with sexual partner networks and how mobile dating applications predispose high risk groups to saturated and overlapping sexual partner networks. Results revealed that a very small percentage of the community believe sexual partner networks are a considerable contributor to STD and HIV risk in BMSM. However, after learning very superficially

about sexual partner networks as part of this study, many participants showed promise of improved, healthier sexual sensation seeking behaviors (RQ4). Continued research on the topic is paramount in bringing awareness to the concept of sexual partner networks, and educating high risk groups of the inherent risk associated with their social and sexual networks.

As 38% of participants indicated they will communicate more with their sexual partners before engaging in sex, this demonstrates that providing knowledge to BMSM may aid in healthier sexual habits such as increased communication about sexual histories and potential concurrency, as well as engaging with fewer sexual partners altogether. This finding is incredibly encouraging for researchers and practitioners as it demonstrates the power of information, and how it can potentially alter behaviors that may lead to an improved outlook and potentially reduced sexual health disparities. This is particularly important as although a greater number indicated they would improve habits, it is not to overshadow the fact that 32% indicated the limited information provided would not influence or change their SSS behavior at all.

Theoretical Contributions

This study applied several theoretical frameworks and concepts to frame and execute the study, inclusive of the Social Network Theory and Sensation Seeking Theory. In addition to the overarching theories, the study applied specific sub-concepts of the theories; specifically, the Small World Principle and concept of homophily of the Social Network Theory, and Sexual Sensation Seeking of the Sensation Seeking Theory. From

this application, the study extended observations and assertions made by the theories to the study of BMSM and sexual sensation seeking habits and behaviors to identify areas of accord, dissension, and/or expansion.

The most notable area of agreement between this study and the theories is the concept of homophily which indicates individuals likely form ties with other persons who are demographically and socially similar to them. This study revealed, based on a demographically representative sample, many BMSM (43.75%) will engage with individuals who are racially and/or ethnically similar to them. From this, it may be inferred that social and sexual networks BMSM engage with and participate in may be saturated with a greater number of individuals at high-risk for HIV and STDs. This also aligns with assertions made by prior research and health governance organizations such as the CDC which suggest BMSM are at highest risk for HIV and STD transmission/contraction. Therefore, although participants opine differently, sexual partner networks are a potential risk factor for HIV and STDs in BMSM. This supports the notion the social network theory is an appropriate framework by which studies regarding BMSM sexual networks can be studied.

Conversely, the Sensation Seeking Theory posits disinhibition or impulsivity would be a primary factor in sensation seeking motivation, suggesting persons who are sensation seekers or thrill seekers are likely to act impulsively in an effort to experience the highs of adrenaline rushes (Zuckerman, 2006). However, findings of this study reveal little to no participants agree impulsivity is a primary driver of their mobile dating app use or sensation seeking. Instead, participants cited the other three domains of sensation

seeking characteristics (i.e. thrill seeking, new experience seeking, and boredom), and added new dimensions to consider as potential expansions of the theory and/or concept.

That said, this study revealed a novel area of expansion to the Theory of Sensation Seeking in that participants suggested they use mobile dating apps for sensation seeking for reasons beyond that suggested by the theory. Namely, as indicated in Chapter 4, participants cite connectivity or wanting to meet new people; seeking emotional connections or meaningful romantic relationships; and seeking validation or wanting to feel wanted, as the impetus behind their app use and subsequent SSS via mobile dating apps. This introduces an opportunity to potentially add a new dimension to the concept of SSS, whereby sensation seekers may be led to this type of behavior as a result of emotional pressures or emotional voids they experience. This is particularly relatable to the concept of sexual sensation seeking as research indicates individual emotional difficulties are positively associated with sexual risk behavior (Rizor, Callands, Desrosiers, & Kershaw, 2017).

Practical Implications

As mentioned earlier in this chapter, this study posed several implications for practitioners such as community program counselors and educators, nurses, physicians, psychologists, etc. First, there is indication of uncertainty related to the long-term effects of using PrEP, and an associated lack of confidence in PrEP effectiveness by BMSM. As CDC statistics suggest and findings of this study support, there is a wide variance in

terms of PrEP use by BMSM when compared to other demographics, primarily White MSM.

This underscores gaps and deficiencies in effective PrEP implementation efforts in the United States and indicates focused outreach is warranted. Before outreach is possible, research is required to determine the barriers to PrEP use by BMSM. This is addressed in the Future Research section of this chapter. However, based on this study's findings alone, community program counselors and educators have an obligation to determine ways and means of promoting PrEP knowledge and use in the BMSM community in order to reduce sexual health disparities. As increased information about the drug is necessary, free programs or seminars about the drug should be offered to the community, in the community. It is important when engaging in community-based outreach to engage with a community in their own territories to promote comfort and reduce reticence and trepidation (Schulz, et al., 1998). Propagating information about the drug may be effective in improving outcomes; however, counselors and educators must be certain not to allow this information to overshadow that of the more widely promoted forms of prevention. Incorporating PrEP information into programs, seminars, and even in sexual education programs in schools could be beneficial to BMSM as they grow and become curious to learn more.

An additional implication subsequent to this study is the need for a diverse psychological workforce, ensuring there is representation of all racial groups. As earlier indicated, and bolstered by the Social Network Theory, individuals tend to seek out other individuals who are like themselves. This notion transcends emotion, industry, politics,

etc., and underscores the idea that individuals are likely to be more receptive to persons with shared backgrounds, experiences, and qualities. Therefore, it is important to encourage and promote diversity of practitioners across disciplines, providing opportunity for BMSM to receive counsel from individuals like themselves, potentially influencing significant attitude and behavior change related to PrEP use and SSS.

Research suggests studies focused on particular communities require collaboration among researchers and community members to encourage mutual trust, shared experiences, and most importantly, the development of culturally appropriate awareness materials and interventions (Schulz, et al., 1998). This methodology bridges the gap between science and practice, and provides a more accurate framework for developing and adapting best practices to the community's needs (Altman, 1995). This is especially important when promoting an intervention in a community that appears wary of the intervention. In order to change attitudes and behaviors, collaboration and trust are paramount. Therefore, to connect PrEP knowledge with PrEP use, practitioners must establish trust, or share similar experiences (background, race, etc.) with BMSM.

Additionally, as the study revealed the emotional motivations for sexual sensation seeking via mobile apps, practitioners such as nurses, physicians, psychologists, and community health clinicians should encourage healthy emotional outlets for BMSM who may experience emotional voids such as a lack of genuine friendship, long-term relationship, or self-gratification. What exactly this may look like may depend on the practitioner or the method of presentation, however, no matter the former, what is important is the information. Social supports; self-soothing activities such as journaling,

exercise, and hobbies; open discourse about mental health; and connecting with one's spirituality and faith are all beneficial outlets promoted as ways to center oneself and process emotions in a healthy and constructive manner (ZenCare, 2020). Promoting these tactics among BMSM with whom a practitioner comes into contact may be new and unforeseen information that may enable BMSM to find healthier ways to channel their emotions and not depend on mobile dating apps for filling emotional voids and seeking validation. In that same vein, however, it is important to recognize this list is not exhaustive; and practitioners should seek opportunities outside of the aforementioned.

Finally, BMSM attitudes and beliefs related to the concept of sexual partner networks as a risk factor are tenuous, at best. This indicates there is much more education required to improve BMSM understanding of sexual partner networks and the implications associated therewith. This means education is needed beyond research. Practitioners must remain abreast of new and innovative information related to HIV and STD risk factors and prevention. Practitioners should read, and where possible, engage in research related to the subject area to ensure they are privy to new knowledge in the field. This will bridge the gap between research and education, ensuring awareness materials and mechanisms are up-to-date and incorporate innovative and constructive information, like sexual partner networks.

Public Affairs Implications

This study presents a number of opportunities for Public Affairs involvement in order to address the gaps and disparities that exist among BMSM and in comparison to

non-Black MSM. Various tools of government may be useful in addressing these disparities; however, issues that combat the achievement of social change regarding health disparity are the asymmetry and inconsistency of information, as well as limited access to necessary information to make informed decisions regarding one's health. As such, findings and practical implications reveal a necessity for interdisciplinary action to promote consistency of information across disciplines, ensuring symmetry of information. This is by no means to suggest local county health departments make no attempt at providing meaningful information to the public to improve health.

Additionally, it is also true that private health institutions are known to dedicate resources to public health initiatives in local areas. However, these phenomena have been witnessed to exist in silos. The information, programs, and resources dedicated between public and private organizations to tackle the same health issues have been, for long, inconsistent. Local county health departments have little to no influence on the operations of private health institution public health departments, and vice versa. Therefore, there is a clear chasm in the information propagated by these institutions.

This synergy of information promotes cohesion among public entities and the community they aim to serve and can also serve as a point at which beliefs and attitudes of the group as a whole, form and focus. Public or community information is useful in promoting the sharing, convergence and implementation of thoughts, ideas and or plans between actors and community members. This would be an incredibly important public affairs undertaking to promote healthy sexual behaviors, and ideally, improve the adoption of PrEP use in this high-risk demographic.

Additionally, after research has been conducted on the barriers to PrEP use, it may be discovered there are institutional barriers (i.e. cost, access, coverage, etc.) that preclude BMSM from adopting PrEP use. The potential for this research is discussed in the Future Research section of this chapter. This discovery would present an opportunity for public actors such as community programs, pharmaceutical organizations that create and promote drugs such as Discoverey and Truvada, and the state and federal government to collaborate on identifying ways to break down institutional barriers that may lead to unequal access, use, and overall sexual health disparity among the MSM population.

Limitations

This study involved several limitations. First, the study involved a smaller than ideal sample size. As the target demographic represents only 4.6% of the total United States population (UCLA School of Law Williams Institute, 2020), and recruitment was further narrowed only to those who use mobile dating applications, there was a high likelihood the sample size would be small to moderate. Potentially a consequence of the smaller than ideal sample size, another limitation was a low statistical power for the linear regression model. Due to these power limitations, there could be various relationships that would not be detected and/or examined in the analysis if they exist. Secondly, threats to internal validity such as history could have affected the dependent variable. As the novel Coronavirus peaked at/around the time the data were collected, participants' measure of their *current* sexual sensation seeking could have been impacted as it is likely their behaviors changed as a result of the pandemic. However, while worth

mentioning, because the event would have impacted all participants, the effects of the history event would be inconsequential. Finally, the sample did not include participants aged 55 and older. Although the data collection methodology aimed to reach participants of all ages, no participants over age 54 participated in the study. While this is not a data collection error, future research should attempt to include this age group using targeted recruitment methodology. However, it is also likely a very small percentage of the BMSM population who use mobile dating apps are over the age of 54. Despite these limitations, the data provided a valuable source of information to study the phenomena as it exists within this high-risk group.

Future Research

While this study provided notable findings, it also provided opportunities for future research. First, although this study recruited BMSM who identify as gay, bisexual, and/or pansexual, there was no operationalization of this variable. Therefore, future research on BMSM sexual sensation seeking should measure and focus on the differences between the various categories of BMSM as it could reveal major differences among the three groups.

Additionally, findings also presented an opportunity for future behavioral and psychological research related to motivations for social media and dating app usage insofar that these emotional motivators may indicate a gateway to use and potential overuse of mobile networking and dating apps and social media. Future research should

focus on mechanisms to circumvent dependence on these mobile apps to ameliorate emotional pressures.

Another opportunity for future research is investigating barriers to PrEP use by BMSM. It is widely known there is a slow-moving adoption of PrEP use by BMSM; however, this may not be solely attributable to uncertainty or lack of confidence. There are likely additional, unexplored barriers to PrEP use experienced by this community such as lack of insurance, cost, access, etc. BMSM should be provided the opportunity to identify barriers to use, and research should then work to develop means of addressing and reducing these barriers.

Another avenue for future research is analyzing state characteristics such as sex education, religiosity, and demographic density through geospatial mapping and statistical analyses. These could bring about revelations and innovative information related to BMSM SSS behaviors and how they may relate to social pressures experienced through forced religiosity, demographic density, etc.

Finally, as the study did not include participants over the age of 54, future research targeted at understanding BMSM SSS in this age group would bring about meaningful and potentially impactful knowledge of whether they use mobile dating apps, and if so, what their level of engagement and sensation seeking behaviors are.

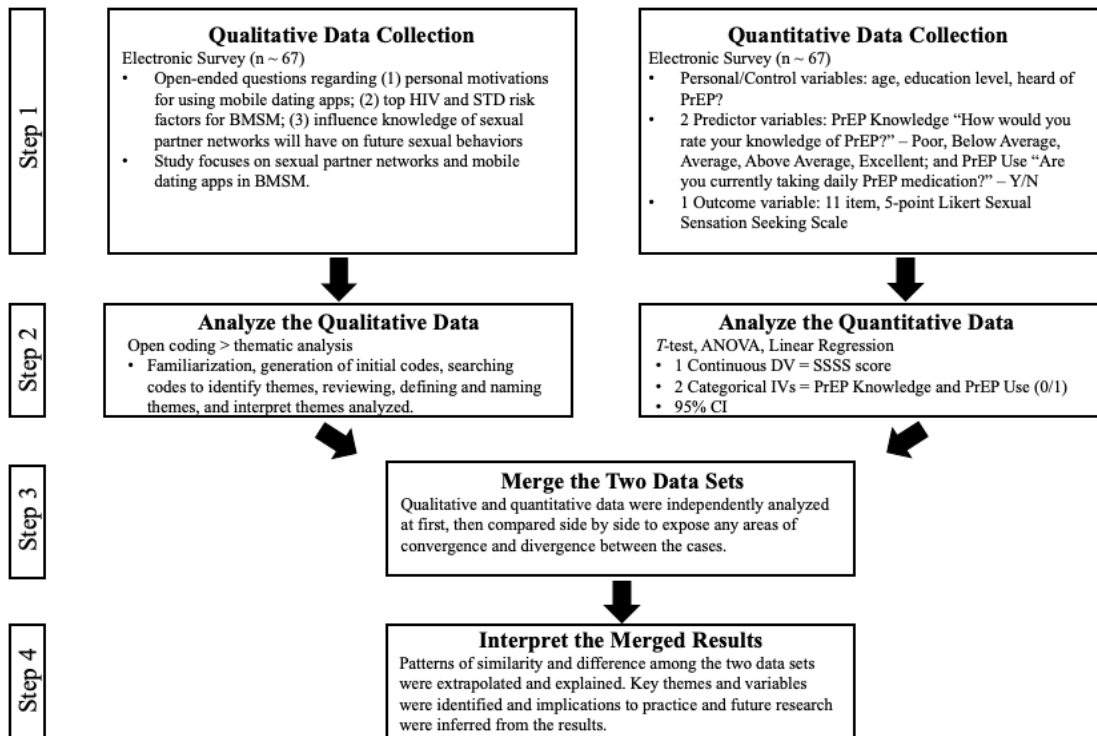
Conclusion

The main objectives of this study were to understand BMSM sexual sensation seeking habits when utilizing dating apps and investigate how sexual sensation seeking

behaviors may be influenced by use of mobile dating apps. As such, this study employed mixed-method research methodology and brought to light several discoveries. Results from the quantitative analyses revealed there is no difference in sexual sensation seeking behaviors based on the number of mobile dating apps used. Additionally, it was discovered PrEP use and PrEP knowledge do not have an independent influence on sexual sensation seeking behaviors; however, there is a statistically significant relationship between confirmed PrEP use and an average understanding of PrEP, and BMSM sexual sensation seeking. Further, qualitative results expanded current research understanding of why BMSM utilize mobile dating apps, as well as BMSM sexual partner networks and how they influence BMSM sexual sensation seeking habits.

Overall, the results of this study generate a deeper, nuanced understanding of BMSM SSS, contribute to the existing body of knowledge, and provide several practical, public affairs, and future research implications for potentially addressing sexual health disparities between Black MSM and MSM of other racial and ethnic backgrounds.

APPENDIX A: MIXED-METHOD PROCEDURE



APPENDIX B: IRB APPROVAL



UNIVERSITY OF CENTRAL FLORIDA

Institutional Review Board
FWA00000351
IRB00001138, IRB00012110
Office of Research
12201 Research Parkway
Orlando, FL 32826-3246

EXEMPTION DETERMINATION

May 13, 2020

Dear Donovan Williams:

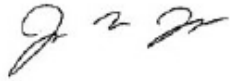
On 5/13/2020, the IRB determined the following submission to be human subjects research that is exempt from regulation:

Type of Review:	Initial Study, Category 2
Title:	It's a Small World After All: Exploring Mobile Dating Application Use and Sexual Partner Networks in Black Men who have Sex with Men (BMSM)
Investigator:	Donovan Williams
IRB ID:	STUDY00001791
Funding:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none"> • IRB_FA review.pdf, Category: Faculty Research Approval; • Diss_Survey.docx, Category: Survey / Questionnaire; • IRB_Consent.pdf, Category: Consent Form; • IRB_Recruitment.docx, Category: Recruitment Materials; • IRB-Request for Exemption.docx, Category: IRB Protocol; • RecruitmentFlyer.docx, Category: Recruitment Materials;

This determination applies only to the activities described in the IRB submission and does not apply should any changes be made. If changes are made, and there are questions about whether these changes affect the exempt status of the human research, please submit a modification request to the IRB. Guidance on submitting Modifications and Administrative Check-in are detailed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system. When you have completed your research, please submit a Study Closure request so that IRB records will be accurate.

If you have any questions, please contact the UCF IRB at 407-823-2901 or irb@ucf.edu. Please include your project title and IRB number in all correspondence with this office.

Sincerely,

A handwritten signature in black ink, appearing to read 'R. Jacques', written in a cursive style.

Racine Jacques, Ph.D.
Designated Reviewer

**APPENDIX C: SOCIAL MEDIA / E-MAIL RECRUITMENT
SCRIPTS**

Recruitment

Social Media Post Script (280 characters max):

[attach flyer]

Hi! I'm conducting a study about dating app use and sexual partner networks in Black MSM. If you are 18 or older, and identify as a Black same-gender loving male, please click this link to complete our survey that should take no more than 15 minutes [insert link].

E-mail Script:

[attach flyer]

Hello,

My name is Donovan Williams, and I am a Doctoral Candidate at the University of Central Florida in Orlando. I am conducting an IRB-approved research study which seeks to explore sexual networks and mobile dating app use among Black same-gender-loving men. I would truly appreciate it if you would assist me with recruitment by sending the text below as well as the attached flyer to your distribution list.

Mobile dating apps allow persons to connect with more persons socially and intimately, expanding social and sexual networks. Data suggests mobile dating app use has been linked to transmission of HIV and other sexually transmitted diseases, particularly in the Men who have Sex with Men (MSM) community. Black MSM are disproportionately afflicted with HIV and non-HIV STDs when compared to White MSM. Therefore, it is important to learn more about the topic in effort to work toward the necessary interventions to curb the inequity.

If you are of Black or African American ethnicity, age 18 and above, identify as male, and consider yourself gay, bisexual, and/or pansexual, you are an ideal person to provide valuable, firsthand information that would help us learn more about the topic.

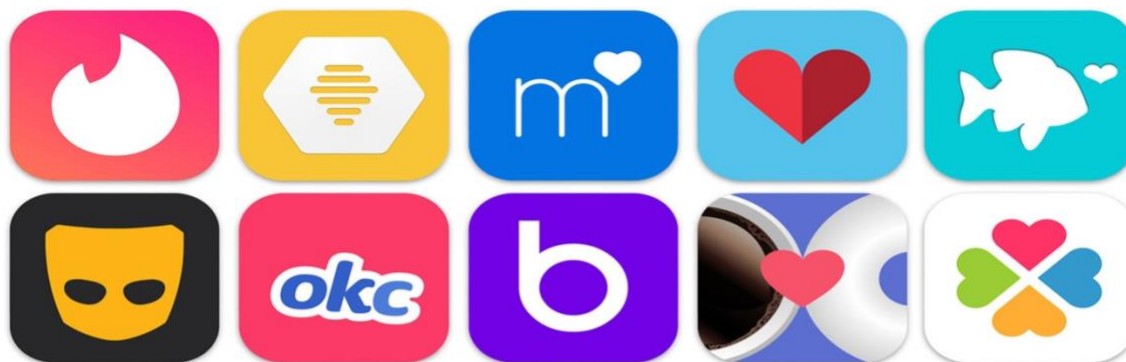
If you agree to participate in this study, you will be asked to complete a brief 20-item survey where you will choose the best response from the available response set, and/or type in a free-text response to an open-ended question. The survey may be completed on a computer or mobile device, and should take no more than 15 minutes to complete.

If you are eligible and willing to participate, please go to <http://tiny.cc/bmsmstudy>

Thank you for your time,

Donovan J. Williams, MHA, HCISPP, CHPSE, RHIA
Doctoral Candidate, University of Central Florida
DonovanJBWilliams@knights.ucf.edu

Are you a black, same-gender-loving man? Do you use mobile dating apps like Grindr, Tinder, Jack'd?



PARTICIPANTS NEEDED!

for a Research Study on

Sexual partner networks and Black, same gender loving men's use of mobile dating apps

Hello! I am conducting a research study to better understand black, same gender loving men's motivations for using mobile dating apps and assess how knowledge and/or consideration of sexual partner networks influences use. If you are interested in participating in this study, and meet the eligibility criteria listed below, please click the link to the survey. You will be redirected to the landing page which will ask you to complete a 20-item survey that should take no longer than 15 minutes.

Eligibility criteria:

- Black/African American ethnicity
- Identify as male
- Identify as gay, bisexual, or pansexual
- 18 years of age, or older
- Currently use mobile dating apps such as, but not limited to, Grindr or Jack'd?

TO TAKE THE SURVEY:

<http://tiny.cc/bmsmstudy> or scan the QR code



Questions? Please contact Donovan Williams, Doctoral Candidate, University of Central Florida at DonovanJBWilliams@knights.ucf.edu.

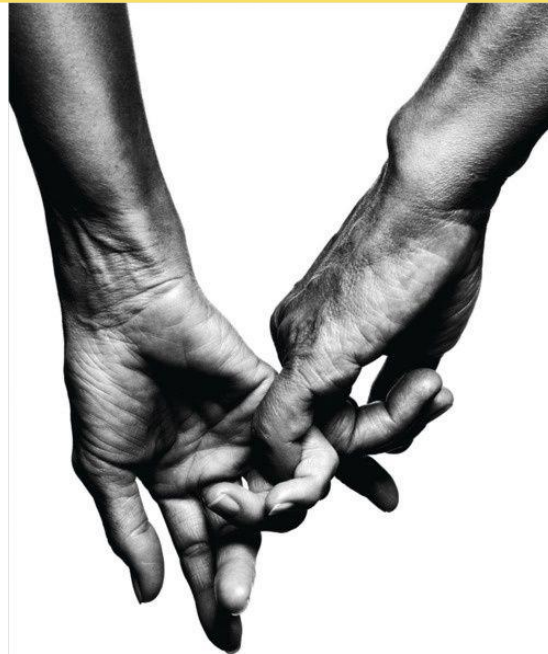
This study is being conducted under the supervision of Dr. Su-I Hou, Professor, University of Central Florida, who can be reached at Su-I.Hou@ucf.edu.

APPENDIX D: MOBILE APP ADVERTISEMENT

PARTICIPANTS NEEDED

for a study on

Sexual Partner Networks and Black Same Gender Loving Men's Use of Mobile Dating Apps



- Are you 18+ years old?
- Are you of Black or African American ethnicity?
- Do you identify as bisexual, gay, or pansexual?
- Do you use mobile dating applications such as Grindr, Jack'd, Tinder, etc.?



TAKE OUR 20-ITEM SURVEY TODAY!

APPENDIX E: UNITED STATES OF AMERICA REGIONAL MAP

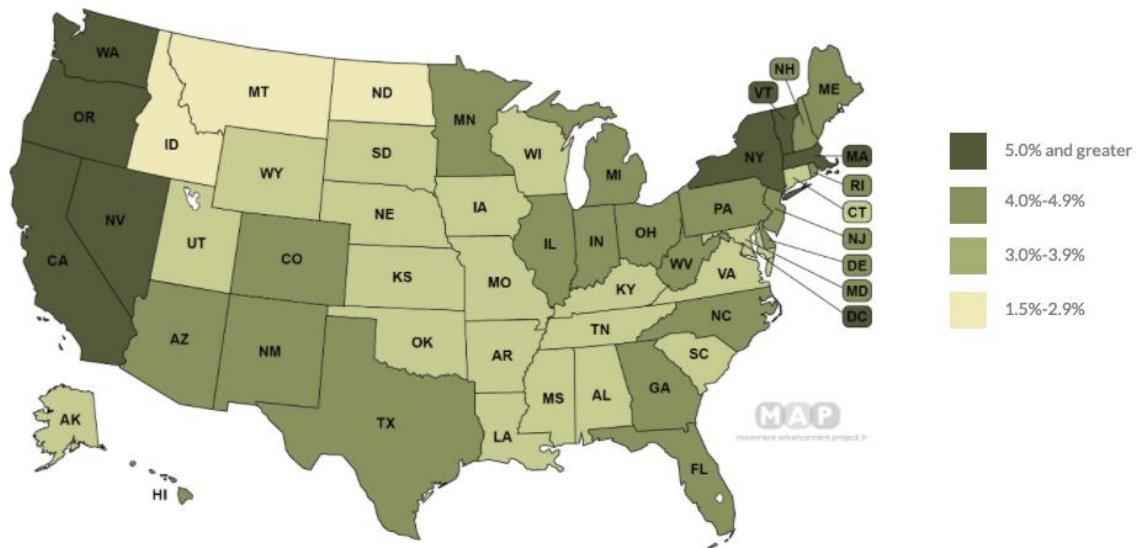


Appendix E: United States reference map displaying Regions and States within each Region

Source: National Geographic Society

<https://www.nationalgeographic.org/maps/united-states-regions/>

APPENDIX F: LGBT POPULATION DENSITY



Appendix F: LGBT adult population density across the United States

Source: Movement Advancement Project
www.lgbtmap.org/equality-maps/lgbt_populations

APPENDIX G: PARTICIPANT SOURCES

Participant Sources

Researcher-affiliated:

Bros in Convo – Orlando
Miracle of Love – Orlando
PFLAG – Orlando
Zebra Coalition – Orlando
The Academia Society, Inc.
Men of DISTINCT, Inc.
Zeta Alpha Delta, Inc.
Mu Omicron Delta, Inc.
Xavier University of Louisiana (Public Health)

Non-affiliated groups

PFLAG – Atlanta
Morehouse School of Medicine (Public Health)
Georgia State University (Public Health)
Howard University (Public Health)
University of South Florida (Public Health)
LGBT @ Emory University
University LGBTQ Services (nationwide)

APPENDIX H: STUDY QUESTIONNAIRE

RQ #1

RQ #2

RQ #3

RQ #4

RQ #5

1. Zip Code _____

2. What is your age?

- 18 – 24 years old
- 25 – 34 years old
- 35 – 44 years old
- 45 – 54 years old
- 55 – 64 years old
- 65 years old or older

3. What is the highest level of education you have completed?

- Some High School
- High School / GED
- Bachelor's Degree
- Master's Degree
- Ph.D. or other terminal degree

4. Have you ever heard of Pre-Exposure Prophylaxis (PrEP)?

- Yes
- No

5. How would you rate your knowledge of PrEP (purpose, use, effectiveness, how to get prescribed)?

- Poor
- Below Average
- Average
- Above average
- Excellent

6. Are you currently taking daily PrEP medication?

- Yes
- No

7. If you answered 'No' to question #4, explain why. _____

8. To what extent do you agree or disagree with the following statement?

“I have (or would have) anal sex without a condom more often when taking PrEP”

- N/A (I never use condoms anyway)
- Strongly disagree
- Disagree
- Agree
- Strongly Agree

9. Which of the mobile dating applications below do you currently use? (Select all that apply)

- Grindr
- Jack'd
- Adam 4 Adam
- Scruff
- Manhunt
- Tinder
- Other _____
- None

10. Of those listed below, which do you feel **best** describes why you use mobile dating apps?

- Thrill / Adventure seeking (“Shaking things up / Doing something different”)
- Experience seeking (“Looking for something new”)
- Disinhibition (“No holding back / Impulsivity”)
- Boredom (“Nothing else to do”)

11. Since the rise of the COVID-19 pandemic, have you found the frequency of your mobile dating app use:
 Increased Decreased Did not change at all

12. Regarding your response to question #11, did your use of mobile dating apps increase/decrease:

- Very little Somewhat By a great extent

13.

Definition: Sexual partner networks are groups of persons who are connected to one another sexually, whether directly or indirectly. Sexual networks are distinct from, but often overlap with social networks.

Based on the definition above, to what extent do you agree or disagree with the statement “Sexual partner networks are a major contributor to HIV and STD risk factors”.

- Strongly disagree Disagree Agree Strongly Agree

14. Do you consider the other individual’s current or past sexual partner network when seeking sexual partners on mobile dating apps?

- Always Sometimes Never

15. When seeking out partners on the mobile dating app of your choice, do you usually engage with persons:

- ...who are racially and/or ethnically similar to you?
- ...who are racially and/or ethnically different from you?
- ...who are kind because race and ethnicity doesn’t matter?

16. Please read the following statements and rate whether or not the statements reflect your own experiences, thoughts or feelings. Indicate the response that best fits your reaction to the statement.

Not at all like me Somewhat like me Often like me Very much like me
1 2 3 4

- a) I like the “wild” sexual encounters.
- b) The physical sensations are the most important thing about having sex.
- c) I enjoy the sensation of intercourse without a condom.
- d) My sexual partners probably think I'm a "risk taker".
- e) When it comes to sex, physical attraction is more important to me than how well I know the person.
- f) I enjoy the company of “sexual” people.
- g) I enjoy watching "X-rated" videos.
- h) I have said things that were not exactly true to get people to have sex with me.
- i) I am interested in trying out new sexual experiences.
- j) I enjoy exploring my sexuality.
- k) I like new and exciting sexual experiences and sensations.

17. Do you worry about your information being inappropriately shared when using a dating app?

- Yes No

18. What do you believe to be your personal motivations for using mobile dating apps? _____
19. In your opinion, what are the top HIV and STD risk factors for BSM? Feel free to list as many as you choose

20. How do you think considering sexual partner networks will influence your sexual behavior in future? What are some things you may do differently? _____

Notes:

Original SSSS altered to reflect clarified verbiage:

I like the "uninhibited" sexual encounters.

The physical sensations are the most important thing about having sex.

I enjoy the sensation of intercourse without a condom.

My sexual partners probably think I'm a "risk taker".

When it comes to sex, physical attraction is more important to me than how well I know the person.

I enjoy the company of "sensual" people.

I enjoy watching "X-rated" videos.

I have said things that were not exactly true to get people to have sex with me.

I am interested in trying out new sexual experiences.

I feel like exploring my sexuality.

I like new and exciting sexual experiences and sensations.

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