

THE INFLUENCE OF CANNABIS ON SEXUAL FUNCTIONING AND SATISFACTION

by

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The purpose of this study was to examine the perceived influence of cannabis on sexual functioning and satisfaction. This study used Kaplan's and Masters and Johnson's sexual response cycle (desire, excitement, orgasm, plateau, resolution) and included satisfaction as the final stage. This framework was complimented with feminist theory to provide insight and explanation. A scale was created to measure participants' perceptions of how sexual functioning and satisfaction are affected when using cannabis ($\alpha = .897$). This nationwide study had a final sample size of 811 with participants of varying ages, occupations, and cannabis use preferences. Overall, scale scores indicated that participants perceived that cannabis use increased their sexual functioning and satisfaction. Age and gender were not found to have significant effects on cannabis use and sexual functioning and satisfaction. Participants reported increased desire, orgasm intensity, and masturbation pleasure. Results indicated that taste and touch were enhanced when using cannabis. This study updates the current literature and provides implications for improving sexual quality.

THE INFLUENCE OF CANNABIS ON SEXUAL FUNCTIONING AND SATISFACTION

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By

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“I want to thank me. I want to thank me for believing in me. I want to thank me for doing all this hard work. I want to thank me for having no days off. I want to thank me for never quitting. I want to thank me for always being a giver and trying to give more than I receive. I want to thank me for trying to do more right than wrong. I want to thank me for just being me at all times.”

— Snoop Dogg

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CHAPTER 1: INTRODUCTION

Cannabis sativa, also known as “cannabis” or “marijuana”, encompasses different varieties based on cannabinoid profiles (Small, 2017). Cannabis has been historically used as a multi-functional crop, but literature reveals that cannabis has also been used as a medicine since ancient times (Mechoulam, Hanuš, Pertwee, R., & Howlett, 2014; Mikuriya, 1969; Russo, 2005). Cannabis has been considered as an aphrodisiac for many centuries (Touw, 1981) and other studies report cannabis as a potential treatment for sexual dysfunctions (Dawley, Baxter, Winstead, & Gay, 1979), such as low sexual desire or sexual pain. The purpose of this study is to examine the influences of cannabis on sexual functioning and satisfaction.

The rationale for this study includes a gap in the literature between 1970’s and 1980’s until recently as few studies have been recently published regarding this topic. Cannabis has also never been studied extensively in reference to the sexual response cycle. No previous literature has included sexual consent while using cannabis despite sexual assault and rape being prevalent in today’s society. For these reasons, there is a great need for this research to be conducted as it would extend the literature as well as include possible beneficial implications. This paper will use the term “cannabis” in reference to all forms of *Cannabis sativa*, except within data collection where the term “marijuana” is used as a more recognizable term for all audiences.

Sexual functioning is the measurement of physiological responses associated with the sexual response cycle that includes desire, excitement, plateau, orgasm, and resolution (Kaplan, 1974; Masters & Johnson, 1966). Sexual satisfaction encompasses both emotional and physical satisfaction (Basson, 2001). Sensuality involves the different sensual effects (touch, taste, smell, sound, and sight) that are associated with sex. Specifically, this study utilizes sexual satisfaction by incorporating sexual functioning, sensuality, and other pertinent factors that play a role in

sexual satisfaction. While sexual satisfaction has been shown to be influenced by sexual functioning, there has also been literature that states that sexual satisfaction could be considered as the last phase of the sexual response cycle (Basson, 2001; Kontula & Miettinen, 2016). For the purpose of this study, sexual satisfaction will be added as the last stage of the sexual response cycle as it is all-encompassing of sexual functioning.

The sexual response cycle provides a framework for this study to be organized by each phase (desire, excitement, plateau, orgasm, resolution, satisfaction). Feminist theory is used as a complimentary theory for this study based on its concepts of gender equality and its implications for closing the orgasm inequality gap in our society (Mintz, 2018). The orgasm inequality gap refers to the fact that orgasms are less consistent for females (Mintz, 2018). While there is not one singular feminist theory, there are many different perspectives and subjective inferences within this theory (Osmond & Thorne, 1993). Although sex is a fundamental aspect of human lives, it is often taboo to discuss sex in many cultures. However, when sex is talked about, it is generally from a double-standard perception of the physical looks of women and the sexual endeavors of men (Jozkowski, Marcantonio, & Hunt, 2017). Equality is not often present in discussions about sex in our society; male sexual dysfunctions are commonly talked about, while female sexual dysfunctions are rarely discussed. The current research study incorporates feminist theory by emphasizing women's sexual functioning and satisfaction, as well as men's, and recognizing the orgasm inequality gap that is present in our society. Regular orgasms during sex are less likely for women, which emphasizes the importance of the possible implications that cannabis has regarding sexual functioning and satisfaction (Kontula, 2009). Using cannabis before sex has possibilities for social change by increasing sexual pleasure for women as well as

men within our society as previous research indicates beneficial sexual implications, especially for females (Sun & Eisenberg, 2017).

CHAPTER 2: LITERATURE REVIEW

The literature reviewed will be organized by sexual functioning (specifically using the sexual response cycle as a framework), sexual satisfaction, cannabis, and finally reviewing the existing literature on cannabis' influence on sexual functioning and satisfaction.

Sexual Functioning

Masters and Johnson (1966) established the sexual response cycle that includes four phases: excitement, plateau, orgasm, and resolution. Each phase is identified by physiological responses of the body during sex; however, each phase may not be distinguishable from the next and may differ extensively each time and by each individual.

Kaplan's Triphasic Concept of sexual response includes desire, excitement, and orgasm (Kaplan, 1979). Kaplan's model is unique by including desire as a distinct stage of the sexual response cycle. Kaplan suggested that it is possible to have difficulty in one stage while able to function normally in the other stages (1979). The sexual response cycle, including desire, will be used as an organizational framework to explain how cannabis influences sexual functioning and satisfaction.

A major limitation of Masters' and Johnson's sexual response cycle is the lack of a stage that precedes excitement, specifically a phase that determines if or how excitement is achieved. Helen Kaplan created an updated sexual response cycle, named the "Triphasic Concept", in 1979 that incorporated desire as the first stage to the sexual response cycle (Kaplan, 1979). Sexual desire, also known as libido, is characterized as a sexual drive or interest in sex (Kaplan, 1979). Kaplan (1979) described desire as an effect that lasts throughout the sexual encounter until orgasm or satisfaction reached. Including desire as a stage of the sexual response cycle was crucial as desire indicates the drive or interest to have sex, while excitement indicates the

increased sexual arousal levels (Kaplan, 1979; Masters, Johnson, & Kolodny, 1995). Without desire, one may not experience the excitement phase or any following stages of the sexual response cycle.

Excitement is characterized by an increase in sexual tension from an unaroused state and occurs as a result of psychical and/or psychological sexual stimulation (Masters et al., 1995; Masters et al., 1979). Physiological responses that occur during the excitement phase for both sexes include myotonia (increased neuromuscular tension that occurs throughout the entire body, not just the genital region), and vasocongestion (the swelling of bodily tissues in the genital region due to increased blood flow). Vasocongestion causes lubrication in females and an erection in males.

During the plateau phase, sexual arousal is increased while sexual tension levels off prior to reaching the threshold levels required to trigger an orgasm (Masters et al., 1979). During orgasm, there is a release of accumulated sexual tension and the body induces involuntary rhythmic contractions within the genital region. However, an orgasm is a total body response and is not strictly localized to the pelvic region (Masters et al., 1979). While it is typical for males to ejaculate shortly after orgasm, female ejaculation is not common (Masters et al., 1995). While each phase is different each time and varies by individual, this is particularly true for the orgasm phase. The perception of an orgasm is subjective; the intensity of physiological responses (such as muscular contractions) does not necessarily determine a more satisfying orgasm (Masters et al., 1995).

After orgasm, the body enters the resolution phase and returns to its unaroused state. However, if a woman maintains sexual arousal, she is physiologically capable of being multi-orgasmic, meaning having more than one orgasm before returning to her pre-aroused state.

Males are typically unable to be multi-orgasmic because of the inevitable phase of the refractory period (i.e., the recovery period required for males to orgasm once again after orgasm and ejaculation, which typically gets longer with age). During this time, the male's body recovers to its unaroused state and orgasm and ejaculation are physiologically impossible. However, once the recovery period is over, males are able to start the cycle over again starting with excitement to reach another orgasm (Masters et al., 1995).

Sexual Satisfaction

Sexual satisfaction can be defined as an individual's subjective evaluation of the positive and negative aspects of one's sexual relationships (Lawrance & Byers, 1995) and some researchers consider sexual satisfaction to be the last stage of the sexual response cycle (Basson, 2001). Many factors are associated with influencing one's sexual satisfaction such as relationship quality, physical health, and overall well-being (Sánchez-Fuentes, Santos-Iglesias, & Sierra, 2014). Sexual functioning has been associated with sexual satisfaction, including desire, arousal, and orgasm (Hurlbert, Apt, & Rabehl, 1993; Kontula & Miettinen, 2016). Specifically, having multiple orgasms as well as having more consistent orgasms were associated with sexual satisfaction (Hurlbert, Apt, & Rabehl, 1993; Kontula, 2009). Having sex more often was also found to be correlated with higher sexual satisfaction (Hurlbert et al., 1993).

Orgasm Equality. This study uses the gender equality concept of feminist theory to examine sexual functioning and satisfaction in both males and female. Sexual satisfaction can be considered an "equal right" for both males and females (Lafrance, Stelzl, & Bullock, 2017). Specifically, regarding orgasm, previous studies have provided consistent results that men experience orgasm during intercourse considerably more often than women (Breslaw, Khidekel, & Ruiz, 2015; Reece, Herbenick, & Fortenberry, n.d.). While more than 90% of men report

usually experiencing and orgasm during sex, less than 50% of women regularly experience orgasm during intercourse and only six percent reported always experiencing an orgasm during sex (Kontula, 2009). Laurie Mintz (2018) in her book *Becoming Cliterate* coined the term “orgasm inequality” to describe the phenomenon of men having routine and consistent orgasms, while women do not. Orgasm consistency is significantly related to sexual satisfaction in females, but not in males; it has also been found that women who do not orgasm often or at all is a crucial predictor of sexual satisfaction (Kontula, 2009; Waterman & Chiauzzi, 1982). This implies that orgasms during sex are expected for men, but a bonus if accomplished for females.

Cannabis

Cannabis sativa is the botanical term that many people know as “cannabis”. Cannabis contains two contrasting varieties: hemp has been utilized for hundreds of years for use of fibers and energy and is high-inducing due to its low content of tetrahydrocannabinol (THC; Small, 2017). Marijuana, also known as “pot” or “weed”, is known for having higher THC content and due to genetic modifications, this cannabinoid has increased dramatically within the majority of cannabis plants throughout the years (Lafaye, Karila, Blecha, & Benyamina, 2017; Mehmedic et al., 2010; Piomelli & Russo, 2016). It is reported that 7.9% of individuals aged 26 or older are current users of cannabis (Substance Abuse and Mental Health Services Administration [SAMHSA], 2018).

Cannabis History and Legalization. Cannabis was first historically reported to have been used in ancient Asia as a form of medicine as well as being used for the creation of textiles, rope, paper, and oil (Touw, 1981). Cannabis’ medicinal value was gravitated to Western medicine in the 1800’s and could be found as an over-the-counter medication for uses as a sedative, analgesic, and treatment for lack of appetite, and sexual disorders in both males and females. The

Marijuana Tax Act was enacted in 1937 which reduced access to cannabis for individuals (Mikuriya, 1969). The availability of cannabis as a medicine lasted until 1941 when cannabis was removed from the *National Formulary and Pharmacopoeia* (Mikuriya, 1969). Since 1970, cannabis has been a federally Scheduled I drug that is recognized as a substance with no medicinal value and high potential for abuse. Other substances listed under Schedule I include heroin, lysergic acid diethylamide (LSD), and methylenedioxymethamphetamine (ecstasy; Drug Scheduling, n.d.).

Cannabinoids in Cannabis. Over 100 cannabinoids have been identified within the cannabis plant and with each cannabinoid having their own effects on the body (Mechoulam et al., 2014). Various combinations and ratios of the differing cannabinoids are typically used and produce differing effects among the individual. The most recognized and researched cannabinoids are tetrahydrocannabinol (THC) and cannabidiol (CBD). THC is the most well-known high-inducing compound within cannabis while CBD is better known to have relaxation and pain-relief properties (Hanusš & Mechoulam, 2005; Mechoulam et al., 2014). CBD and THC act synergistically resulting in what has been termed the “entourage effect”. While THC can cause adverse psychoactive effects (such as anxiety and paranoia), CBD counteracts the negative reactions to THC (MacCullum & Russo, 2018; Russo & Guy, 2005). Therefore, a balance of CBD and THC is important to avoid adverse reactions.

Endocannabinoid System. The endocannabinoid system (ESC) is responsible for maintaining homeostasis within the body by working together with virtually all other body systems (integumentary, skeletal, muscular, nervous, endocrine, cardiovascular, lymphatic, respiratory, digestive, urinary, and male and female reproductive systems; Small, 2017). The ESC contains CB1 and CB2 receptors throughout the body that creates a binding effect for

cannabinoids within the body (Hanuš & Mechoulam, 2005). The endocannabinoid system is found in every animal (except insects) and the human body naturally produces endogenous cannabinoids, such as anandamide. Cannabis contains phytocannabinoids (cannabinoids such as THC and CBD found within the plant) that also bind to the receptors. The cannabinoids found in cannabis can simulate the endogenous endocannabinoids found naturally in one's body to create a state of homeostasis (Small, 2017). Research shows a relationship between endocannabinoid concentrations in one's body and sexual arousal, which leads to believe that the endocannabinoid system is associated with male and female sexual functioning (Klein, Hill, Chang, Hillard, & Gorzalka, 2012).

Forms and Methods. Cannabis forms include flower and concentrates. Flower is the dried plant material from the female cannabis plant. More recent cannabis forms are concentrates, also known as extracts. Extracts are typically made from extracting an accumulation of trichomes from cannabis resin (collected from the flower) and processed or infused into other products (such as oil or wax). Typically, concentrates are highly concentrated (hence the name) and typically result in a highly potent product. Concentrates can include kief (raw trichomes from the cannabis plant) or be processed in wax or oil. Different forms of oil and wax are typically named based on the consistency of the product and each are utilized in different ways. Oral delivery and topical methods are typically created with the use of concentrates.

Common methods can be categorized by inhalation, oral, and topical. Each method varies on the psychological and physiological effects, duration, and peak effects (Newmeyer, Swortwood, Abulseoud, & Huests, 2017). Inhalation by smoking (specifically flower) is the most common method (MacCallum & Russo, 2018; Russell, Rueda, Room, Tyndall, & Fischer, 2018;

Schauer, King, Bunnell, Promoff, & McAfee, 2016). Flower can be inhaled as a smoke (combustion method) or vapor (typically with use of an electronic device; temperature is kept below the point of combusting or burning the flower). Combustion methods include bowl/pipe, bongs, water bowl/pipe, hookah, and blunt (cigar paper filled with cannabis). Inhaling cannabis using combustion methods, specifically smoking a joint or using a bowl/pipe, are reported to be the most common method of cannabis use (Schauer et al., 2016).

Oral delivery methods include alcohol or oil-based tinctures, pills, and edibles (any food or beverage infused with cannabinoids; Geshtakovska & Stefkov, 2016). Cannabis via oral methods take longer for the consumer to notice any effects since the product must be metabolized through the liver before feeling an effect. In contrast, inhalation methods go directly to lungs, bloodstream, and brain resulting in more immediate effects (Geshtakovska & Stefkov, 2016; MacCullum & Russo, 2018).

Topicals are cannabis-infused lotions, creams, or any other infused-product that can be applied directly to the skin. Topical methods are used for localized absorption, meaning the user will not feel high-inducing effects, but only the area to which it is applied may feel relief (Geshtakovska & Stefkov, 2016; MacCullum & Russo, 2018).

Intentionality of Use. Cannabis can be used medicinally or recreationally. Individuals using cannabis typically have a primary goal or intention for their use, which generally distinguishes between medical or recreational intent. Medical intentions indicate using cannabis to help treat or cure specific symptoms or conditions, while recreational use has the goal of altering one's state of mind with no medicinal intent (Barrus et al, 2016). A 2016 study found that 10.5% of participants self-reported medicinal-only use, 53.4% self-reported recreational-only use, and 36.1% self-reported both (Schauer et al., 2016). However, with cannabis having medicinal

properties, if the individual uses cannabis with a recreational intent, the individual will still gain medicinal value, possibly without realizing it.

Research has shown that individuals use cannabis intentionally for sexual enhancement and increased pleasure (Palamar et al., 2018; Weller & Halikas, 1984). Cannabis is used more often than alcohol or other drugs in combination with sex (Halikas, Weller, & Morse., 1982). A study found that 76% of individuals have used cannabis as a preparation for intercourse and 20% use it regularly for this purpose (Weller & Halikas, 1984). Frequent cannabis users are more likely to use cannabis as a preparation for sex compared to less frequent users (Weller et al., 1982).

Despite cannabis being a federally illegal and highly criminalized substance, research regarding medical use has been exponentially expanding. In recent years, an increasing amount of research has suggested cannabis to have medicinal value for certain conditions, but many of the studies have methodological limitations due to restricting federal laws (Behere, Behere, & Sathyanarayana, 2017; Drug Scheduling, n.d.; Pinkas, Jablonski, Kidawa, & Wierzba, 2016). Medical cannabis use has increased in prevalence since 2013 and is more prevalent in the Western part of the United States where there are more states in which cannabis is legal (Han, Compton, Blanco, & Jones, 2018; Schauer et al., 2016).

Cannabis is a multimodal treatment in which it has capabilities to treat multiple symptoms and conditions simultaneously, which could help reduce side-effects with other drugs (MacCallum & Russo, 2018). THC has been shown to be effective for pain, nausea, appetite stimulation, and insomnia, while CBD can be used as a neuroprotectant, anti-inflammatory, and anti-anxiety aid (MacCullum & Russo, 2018; Piomelli & Russo, 2016).

Chronic pain is one of the most common reasons why individuals use cannabis (Baron, Lucas, Eaders, & Hogue, 2018). Many times, individuals who find relief from cannabis will replace their pharmacy-prescribed pills for medical cannabis. Pharmacological prescriptions that have been replaced with cannabis include opiates/opioids, anti-depressant/anti-anxiety, NSAIDS, triptans, anti-convulsants, muscle relaxers, and ergots. (Baron et al., 2018).

Sex and Cannabis

Cannabis has been identified to have sexually stimulating effects and intensify sexual experiences (Cohen, 1982; Koff, 1974). THC content in cannabis has dramatically increased since the 1970's when this topic was first emerging and studied (Hasin, 2018; Lafaye et al., 2017; Mehmedic et al., 2010; Piomelli, & Russo, 2016). The THC content in cannabis greatly influences sexual functioning and satisfaction as too much THC causes more inhibiting effects (Koff, 1974; & Palamar et al., 2018). A 1976 study comparing cannabis users of various ages found that younger users reported increased sexual performance and enjoyment when using cannabis (Chopra & Jandu, 1976), which shows a possible age variability when cannabis is used before sex; however, this group have not used cannabis for a long period of time and used smaller doses.

Dose Dependent. Universally, there is no standard amount for a dose of cannabis. Cannabis dosing depends on many factors such as personal history, medical condition if used for medicinal purpose, and tolerance levels (Small, 2017). Dosage is also dependent on the potency of the cannabis (typically determined by THC content) as well as the quantity. There is a biphasic effect when using cannabis with low dosage causing general beneficial effects (e.g., pain relief, euphoria, increased sexual desire and enjoyment), while high doses increases the potential for negative effects (e.g., paranoia, anxiety, inhibited orgasm, lack of interest) (Balon,

2017; Gorzalka, Hill, & Chang, 2010). One recent study found that females were more likely to describe cannabis-induced anxiety in the form of paranoia, while males were more likely to describe the effects as distracting thoughts and having their minds drift (Palamar et al., 2018). Any adverse reactions caused by cannabis use vary with dosage and typically stop once the substance wears off (Chopra & Jandu, 1976).

Dosage has been found to greatly influence sexual functioning and satisfaction. The amount of cannabis consumed was found to have an effect on body sensations, length and intensity of sex, sexual dysfunction, and certain sexual behaviors (Palamar et al., 2018). Higher dosages of cannabis have more inhibitions for males compared to females in reference to overall sexual functioning (Koff, 1974). Koff (1974) found that low doses (equivalent to 1 joint) had sexually stimulating effects, while higher doses (more than one joint) still had an increase, but to a lesser extent. Chopra and Jandu (1976) revealed that the sexual inhibition effect among chronic users was because of a decrease in general motor functioning and the sedation effects of cannabis. Cannabis can be inhibitory for sex because of its relaxing and sleepiness effects (Masters et al., 1979; Palamar et al., 2018).

Older research found that using cannabis regularly for a long period of time can cause a lack of desire and inability to perform, especially for males (Chopra & Jandu, 1976). Scher (1970) found that individuals who have been using cannabis for 5 years or longer tended to progressively lose interest in sex. However, gender is not explicitly stated and it is commonly reported that males are more likely to have sexual inhibitory effects from cannabis, which could lead to a loss of sexual interest (Masters et al., 1979). Recent studies examining the influence of cannabis on sex is extremely limited.

Consent. To prevent sexual assault and rape, consent for sexual activity is suggested to not able to be given when the user is incapacitated (What Consent Looks Like, n.d.). However, only 17.8% of cannabis users felt that the effects lowered their inhibitions or caused a false sense of ability to perform physically and intellectually (Chopra & Jandu, 1976). Cannabis has also been found to be less likely than alcohol to be used before undesired intercourse (Halikas et al., 1982). Research has not analyzed how sexual consent is given or received when using cannabis; given the increased attention of sexually assault, this is an important issue to address (Sharp, Weaver, Zvonkovic, 2017).

Sexual Functioning and Cannabis. Limited research has been established to analyze the effects of cannabis on sexual functioning. Cannabis does not appear to impair female sexual functioning (Sun & Eisenberg, 2017). Due to the muscle relaxant properties (Small, 2017), cannabis use may be inhibitory to male sexual functioning yet, beneficial for female sexual functioning. Klein et al. (2012) suggested that cannabis may indirectly enhance sexual functioning by decreasing anxiety and increasing relaxation and sensory focus.

Frequency of cannabis use was unrelated to any sexual problems in women (Smith et al., 2010). In a 1980 study, daily cannabis users had intercourse 80% less often than the control group but female daily users had slightly more frequent sexual relations than nonusers (Kolodny, as cited in Cohen, 1984). The literature reviewed in this section will be related to sexual functioning by using the sexual response cycle as an organizational framework.

Desire. There have been many reports of cannabis having an aphrodisiac affect (Dawley et al., 1979; Halikas et al., 1982). Koff (1974) believed that it was the social condition of cannabis use that lead to it being considered an aphrodisiac, not the substance itself. The illegal status of cannabis may result in individuals secluding themselves from public to avoid legal

ramifications. Most users resort to using at home or in a private place and research has found that the mood, expectation, and setting were the sexually stimulating elements and not necessarily the cannabis use (Koff, 1974).

Historically, and among many different cultures, cannabis has been suspected to cause sexual arousal among individuals (Mayor's Committee, 1944). Kaplan (1974) suggested that individuals reported feeling more receptive to and more interested in sexual activity after using cannabis. Females have reported higher rates of increased desire from cannabis use compared to males (Androvicova, Horacek, Stark, Drago, & Micale, 2017; Koff, 1974). Robbins and Tanck (1973) found sexual desire to be more prevalent among a sample of graduate psychology students on days when they used cannabis than on days they did not. In a 1976 sample, almost 25% stated increased sexual drive (Chopra & Jandu, 1976). Kaplan (1974) has stated that cannabis enhanced sensuality and erotic feelings, facilitated the user to having sexually stimulating thoughts, as well as increased receptivity and interest in erotic activity.

After smoking one cannabis joint or less, 61% of a sample reported an increase in sexual desire; for the people who smoked two or more joints in one sitting, 34.5% of the males reported an increase in desire while 49.5% of females reported an increase (Koff, 1974). In contrast, a study has suggested that cannabis does not increase desire in males or sexual interest or arousal in females (Masters et al., 1979).

Excitement. The excitement phase is characterized by bodily changes such as the attainment of an erection in males and vaginal lubrication in females (Masters & Johnson, 1966). Excessive thirst and "cotton mouth" are common side-effects of using cannabis; these effects may also influence female lubrication (Small, 2017). However, cannabis is also a vasodilator and

because there are ECS receptors in the genital region (Small, 2017), cannabis may cause vasocongestion (i.e. lubrication) within female users (Masters & Johnson, 1966).

Foreplay could be considered an important part of the excitement stage and Palamar et al. (2018) found that cannabis use has been found to increase foreplay. Cannabis is a vasodilator, meaning it increases blood flow (Small, 2017); this would theoretically cause increase vasocongestion in the genital region, which causes an erection in males and lubrication within females. However, there is contradictory evidence on the influence of cannabis on female lubrication. Studies have reported cannabis causing no change in or a decrease in lubrication (Masters et al., 1979; Palamar et al., 2018).

Chopra and Jandu (1976) found that males who used cannabis reported increased desire but difficulty with performance (i.e. achieving and maintaining erection). Using cannabis has been reported to cause the inability to achieve and maintain an erection among men (Masters et al., 1979). Kolodny (as cited in Cohen, 1984) found that 19% of male daily cannabis users reported secondary impotence as compared with only 8% of non-cannabis-using controls. Aversa et al. (2008) found that habitual cannabis users had a higher likelihood of developing erectile dysfunction.

Plateau. The plateau stage occurs after excitement but before orgasm. During this stage, the vasocongestion response is at its peak in both males and females and the male's penis is at its full-potential erection (Masters & Johnson, 1966). Males more likely to report increased duration of intercourse when using cannabis compared to females (Dawley et al., 1979; Palamar et al., 2018; Weller & Halikas, 1984). However, research has also found that time was *perceived* to last longer when using cannabis (Palamar et al., 2018). Therefore, the altered time effect of

cannabis use might lead individuals to perceive sex to last longer (Chopra & Jandu, 1976; Kaplan, 1974) or this may be due to increased time spent during foreplay (Palamar et al., 2018).

During the plateau stage, individuals may engage in a variety of positions or activities. In a qualitative study, some individuals noted that they engaged in more sexual exploration when using cannabis and tried new behaviors due to feeling more creative and/or feeling an increase in emotion (Palamar et al., 2018). Contrasting data from the 1970's revealed that 76% reported no variation in sexual activities when using cannabis (Dawley et al., 1979).

Orgasm. Orgasm is the release of sexual tension. In males, this is seen with ejaculation and in females, orgasms are seen as involuntary vaginal muscular contractions (Masters & Johnson, 1966). Kaplan (1974) found that cannabis created more prolonged and pleasurable orgasms. Males and females also reported having an increase in number of orgasms when using cannabis (Androvicova, et al., 2017; Halikas et al., 1982).

However, cannabis has been reported to decrease the ability to control one's orgasm (Masters et al., 1979). Cannabis use revealed difficulties in men's ability to orgasm as desired (Smith, et al., 2010). Male's daily cannabis use was associated with inability to reach orgasm and reaching orgasm too quickly or too slowly (Smith et al., 2010). Gorzalka, Morrish, and Hill (2008) found that the cannabinoid CB1 receptor facilitates ejaculatory processes in rats; this information could be utilized in the future to better understand how cannabis could potentially be used as a treatment for sexual dysfunctions.

While research has suggested that cannabis has the capabilities of influencing one's ability to orgasm, it has also been shown that cannabis alters the intensity of one's orgasm as well. Those who are able to orgasm when using cannabis have also reported an increase in the quality of the orgasm, which was found to be especially apparent for males (Weller & Halikas,

1984; Halikas et al., 1982). Cannabis has been reported to enhance muscular contractions during one's orgasm (Kaplan, 1974) and increase the intensity of the orgasm (Dawley et al., 1979; Palamar et al., 2018). However, another study found contradictory evidence that reports the quality and frequency of orgasm not being impacted by cannabis use (Masters et al., 1979).

Resolution. Females have the physiological ability to be multi-orgasmic (have more than one orgasm before returning below the excitement phase), while men are physiologically required to enter into the resolution stage where they are unable to ejaculate again until their body allows (Masters & Johnson, 1966). In a 1982 study, the majority of the participants did not find an effect with cannabis on the ability to repeat intercourse (Weller & Halikas, 1982).

Cannabis has been found to be independently associated with increased sexual frequency (Dawley et al., 1979; Sun & Eisenberg, 2017). Female users have been found to have sex more often, despite how often they used cannabis; however, only weekly and daily usage (not monthly) was associated with higher sexual frequency (Sun & Eisenberg, 2017). It has also been reported that female and male daily and weekly users had significantly higher sexual frequency compared to never-users (Sun & Eisenberg, 2017). This shows a trend for both males and females that increased frequency of cannabis use is associated with increased sexual frequency.

Sexual Satisfaction and Cannabis. Cannabis use has been reported to enhance sexual enjoyment and pleasure (Dawley et al., 1979; Halikas et al., 1982; Traub, 1977). Studies show that over 80% of individuals report increased pleasure and satisfaction (Dawley et al., 1979; Halikas et al., 1982). The majority of men (83%) and women (81%) indicated that cannabis enhanced the enjoyment of sex for them (Masters et al., 1979). Compared to females, males reported enjoying sex more when cannabis was involved (Koff, 1974).

Cannabis has been found to increase pleasure and enjoyment during oral sex (Dawley et al., 1979). Over half of the participants (76%) reported increased sexual pleasure when both the partner and individual use cannabis before sex (Dawley et al., 1979). About 50% of experienced and non-experienced smokers stated that their partner's cannabis use has an increased effect on their sexual enjoyment (Dawley et al., 1979).

Sensuality. Sensuality involves the senses (taste, touch, smell, sound, and sight) and for the purpose of this study, is incorporated as an aspect of sexual satisfaction. Increased sensation and sensuality have been found to be related to cannabis use (Palamar et al., 2018; Kaplan, 1974). Cannabis use before sex has been associated with more tender, slower, and compassionate sexual acts (Palamar et al., 2018). Emotional closeness, physical closeness, and increased enjoyment of snuggling were all enhanced with cannabis (Weller & Halikas 1984). Over 50% of males and females reported enhanced physical closeness and over 50% of females reported enhanced snuggling (Halikas et al., 1982)

Cannabis use has been reported to intensify sexual experiences, possibly due to cannabis enhancing sensations (Cohen, 1982; Dawley et al., 1979; Kaplan, 1974; Palamar et al., 2018; Tart, 1971). Specific senses that are continuously reported to be enhanced by cannabis are taste and touch (Koff, 1974; Masters et al., 1979; Halikas et al., 1982; Weller & Halikas, 1984). However, cannabis has been reported to have less of an effect on hearing, smell, and sight (Halikas et al., 1982). Enhanced sensations were found to be more prevalent in non-experienced cannabis users (Dawley et al., 1979). Individuals report that cannabis increases sensitivity to touch or report feeling more relaxed on cannabis, which allowed sensations to feel more intense (Palamar et al., 2018). Enhanced sensations appear to be related to length and intensity of intercourse (Palamar et al., 2018).

There is limited research on the influences of cannabis and sexual functioning and satisfaction. The majority of existing literature is outdated and there is a need for updated research as cannabis use is becoming more prevalent due to legalization (SAMHSA, 2018). In addition to limited and outdated research, some of the literature is contradictory such as the physiological effects of cannabis on sexual functioning and satisfaction. There is conflicting evidence specifically regarding cannabis' influences on sexual desire (Halikas et al., 1982; Koff 1974), erectile functioning in males (Smith et al., 2010), and lubrication in females (Masters et al., 1979; Palamar et al., 2018).

CHAPTER 3: METHODS

This study was approved through the Institutional Review Board (Appendix A) and was a self-report survey through the online software “Qualtrics”. Consent was obtained through the first question of the survey and the researchers verified during the data cleaning process that all participants met all eligibility requirements (over 18 years old and have used cannabis in the past).

Recruitment was purposeful and used snowball sampling. Participants were recruited through social media and through cannabis organizations. A brief description of the research and the survey were posted on the lead investigator’s personal social media pages (Facebook, Twitter, Instagram, and Tumblr) with encouragement to share with others in order to increase the sample size (Appendix B). The lead investigator posted the description and survey within various Facebook groups related to cannabis, CBD, alternative medicine, and related groups and emailed various cannabis organizations (e.g., medical and legal advocacy organizations) asking them to share the study information on their webpages or through email listservs. The aim of recruiting through different approaches was to obtain a broad sample to reach the target sample size of 1,000 participants.

The study was completely voluntary and anonymous. Inclusion criteria included: (1) over the age of 18 and (2) used cannabis in the past. Age and previous cannabis use were the first two questions on the survey to verify inclusion criteria. A following question asked the participant’s primary intention of cannabis use, if the participant chose “neither, I do not use marijuana products”, they were directed to the end of the study and their data was not used for analysis. Data collection was open for about five weeks.

Measures

Study recruitment materials and questions in the survey used the term “marijuana” to refer to all forms of cannabis because it is a widely recognized term (See Appendix A for full survey). The survey included demographic questions followed by a scale created by the researchers to measure sexual functioning and satisfaction in relation to cannabis use. Basic demographic information collected included sex/gender, race, LGBTQI+ status, state of residency, education level, and relationship status. Socioeconomic status was measured using the participants’ occupation and annual income.

The questions regarding cannabis measured intentionality of use, benefits of use, where cannabis was obtained, forms used (e.g., flower, wax, etc.), frequency, and duration of use. Sensuality is a construct comprised of the five senses. Using a five-point Likert scale, participants rated their perceived influence of cannabis on their senses. Previous literature suggests that relaxation enhances sensuality; one item was included to measure relaxation during sex when using cannabis (Palamar et al., 2018).

Three questions were asked about masturbation: whether or not they masturbate, if they use cannabis before masturbating, and how cannabis affects their pleasure while masturbating. Masturbation questions were included to be able to measure sexual functioning and satisfaction with participants who use cannabis for self-pleasure purposes or may not have a sexual partner.

Sensuality was measured with five items with Likert scale response options ranging from *significantly decrease* to *significantly increase*. Other aspects of sexual functioning and satisfaction were measured with 14 items using the same response options. These items were influenced by the following empirical studies: Weller & Halikas, 1984; Dawley, Baxter, Winstead, Gay, 1974; & Koff, 1974.

Sexual Functioning and Satisfaction. A scale was created to measure the participants' sexual functioning and satisfaction based on the incorporated framework (desire, arousal, orgasm, resolution, satisfaction) to analyze how cannabis influences each stage. Sexual functioning has been found to influence sexual satisfaction (Herlbert, Apt, & Rabehl, 1993; Kontula & Miettinen, 2016) and can be categorized as the last stage of the sexual response cycle (Basson, 2001). Therefore, the researchers incorporated items to the scale that relate to sexual satisfaction. On the survey, arousal was measured with two questions for males (achieving and maintaining an erection) and one question for females (lubrication). In order to have a consistent number of items for both males and females, a new variable was created to measure arousal using one item measuring the ability to achieve an erection for males and one item measuring lubrication for females. The item on maintaining an erection was not used since lubrication and achieving an erection are analogous for the same functioning. The final scale included twelve items (see Table 2) with an internal reliability of .897.

Analysis

The research questions have been created to provide more explanation through an exploratory approach. Each hypothesis was formulated based on previous literature that has already reported these findings. The data analysis strategy is stated below each of the following research question and hypotheses.

R1: What effect does gender, age, duration of cannabis use, intentionality, frequency of cannabis use, and form have on predicting sexual functioning and satisfaction.

This research question was answered using regression analyses.

R2: How does cannabis use affect pleasure while masturbating?

This research question and following hypotheses will be answered using descriptive analyses.

H1: Males and females will report increased desire (Koff, 1974; Robbins & Tanck, 1973).

H2: Males will report decreased ability to achieve and maintain an erection (Kolodny, [as cited in Cohen, 1984]; Masters et al., 1979).

H3: Males and females will report increased orgasm intensity (Dawley et al., 1979; Palamar et al., 2018).

H4: Females will report increased orgasm frequency (Halikas et al., 1982; Weller & Halikas, 1984).

H5: Males and females will report increased sexual satisfaction (Dawley et al., 1979; Halikas et al., 1982; Traub, 1977).

H6: Males and females will report increased sensitivity to taste and touch (Halikas et al., 1982; Koff, 1974; Masters et al., 1979; Weller & Halikas, 1984).

CHAPTER 4: RESULTS

Sample Description

The original sample size was 1299 participants. Participants ($n = 488$) were deleted if they were under the age of 18, indicated that they had never used cannabis, or did not answer any of the dependent variable questions resulting in a final sample size of 811. Participant ages ranged from 18-85 years old ($M = 32.11$). The majority of the participants stated their sex/gender as female ($n = 536, 64.9\%$), but the sample also included males ($n = 277, 34.2\%$) and other ($n = 8, 1.0\%$). The majority of the participants stated being white/Caucasian ($n = 640, 78.9\%$) and had at least some college education ($n = 650, 80.1\%$) and almost 25% of the participants identified as LGBTQI+ ($n = 187, 23.1\%$). A variety of occupations were represented in this study, including police officers, professors, and stay at home moms. The sample included at least one individual from each state, except South Dakota or Wyoming, and also included individuals from D.C., Puerto Rico, and participants ($n = 104$) that indicated that they do not reside in the United States. Most of the participants reported being in a monogamous sexual relationship ($n = 598, 73.7\%$).

Cannabis Use

Over half of the participants reported using cannabis daily ($n = 509, 62.8\%$), for recreational and medicinal purposes ($n = 468, 57.7\%$), and intentionally using before engaging in sex ($n = 485, 59.8\%$). A majority of participants have used cannabis at least a few years (88%; $n = 714$). Almost all participants indicated using cannabis in the form of flower (i.e., pot, weed) (95.9%; $n = 778$). Other forms used by participants included edible (59.2%; $n = 480$), oil (48.0%; $n = 389$), wax (36.5%, $n = 296$), and topical (18.0%; $n = 146$). Participants could also check “other” and then write-in their own responses which included bath bombs, CBD only, and hash. The majority of participants (78.8%) stated that cannabis does not affect their sexual decision

making ($n = 639$) and that cannabis *slightly increases* or *significantly increases* relaxation during sex (87.7%; $n = 711$).

Sensuality

Many participants stated that cannabis *slightly increases* or *significantly increases* enhancement of sense of taste ($n = 583$, 71.9%) and 71.0% stated that cannabis *slightly increases* or *significantly increases* their sense of touch ($n = 576$). The majority of participants stated that the enhancement of the following senses does not change with cannabis use: smell (53.3%; $n = 432$), sight (57.2%; $n = 464$), and hearing (56.7%; $n = 460$). Table 1 provides mean scores for enhancement of the five senses.

Data Analysis

R1: What effect does gender, age, duration of cannabis use, intentionality, frequency of cannabis use, and form have on predicting sexual functioning and satisfaction?

Results of the Pearson correlation indicated that there was a strong positive association between age and duration of cannabis use ($r = .457$, $p = .000$), age and frequency of cannabis use ($r = .167$, $p = .000$), and frequency of cannabis use and duration of cannabis use ($r = .239$, $p = .000$).

The survey question measuring the form of cannabis used asked participants to “check all that apply”. To analyze how each form (flower, wax, oil, edible, topical) varied by scale score, each form selected was treated as a separate variable. A dichotomous variable for each of the five forms was created with 1 indicating that form was used by the participant and 0 indicating that it wasn’t used. The frequency of cannabis use question was as recoded to be in the same direction as the other questions with a higher score indicating greater frequency.

A multiple linear regression was calculated predicting participants' scores on the sexual functioning and satisfaction scale based on age, gender, duration of cannabis use, form (flower, wax, oil, edible, topical) and frequency of cannabis use. The regression equation was significant ($F(9,789) = 2.582, p = .006$) with a R^2 of .029. The forms wax and flower were significant predictors with topical forms approaching significance (Table 3).

A one-way ANOVA was conducted to compare the effect of intentionality and the sexual functioning and satisfaction scale. Intentionality was measured using one item asking if participants intentionally used cannabis before having sex which had two response options, "yes" or "no". There was a significant effect of intentionality on the scale at the $p < .05$ level [$F(1,806) = 4.938, p = .000$] with those intentionally using cannabis before sex having higher scores on the sexual functioning and satisfaction scale.

R2: How does cannabis use affect pleasure while masturbating?

The majority of the participants stated that they masturbate (88.3%; $n = 716$). Of the participants who stated that they masturbate, 76.4% reported using cannabis before masturbating ($n = 620$) and 62.5% indicated that cannabis *slightly increases* or *significantly increases* pleasure while masturbating ($n = 507$).

H1: Males and females will report increased desire when using cannabis.

Desire was measured using one item with five response options ranging from *significantly decrease* to *significantly increase*. Over 70% of males and females ($n = 601$) reported that cannabis slightly or significantly increases desire ($M = 4.05, SD = .962$). An independent-samples t -test was conducted to compare desire in males and females. The perceived influence of cannabis on sexual desire was significantly higher for females ($M = 4.10$,

$SD = .952$) as compared to males ($M = 3.95, SD = .963$); $t(799) = -2.187, p = .029$. Overall, this hypothesis was supported.

H2: Males will report decreased ability to achieve and maintain an erection when using cannabis.

The ability to achieve an erection was measured using one item with five response options ranging from *significantly decrease* to *significantly increase* and the ability to maintain an erection was measured using one item with identical response choice options. Each of these were male-only questions due to the physiological nature of the questions. This hypothesis was not supported as 255 males (93.4%) reported no change or an increased ability to achieve an erection ($M = 3.57, SD = .892$) and 254 (92.4%) males reported no change or an increase in maintaining an erection ($M = 3.60, SD = .928$).

H3: Males and females will report increased orgasm intensity when using cannabis.

Orgasm intensity was measured using one item with five response options ranging from *significantly decrease* to *significantly increase*. Over 70% of males and females ($n = 582$) did report that cannabis slightly or significantly increased orgasm intensity ($M = 4.05, SD = .884$). An independent-samples t -test was conducted to compare cannabis use and orgasm intensity in males and females. There was not a significant difference in the scores comparing males ($M = 4.12, SD = .822$) and females ($M = 4.01, SD = .914$); $t(798) = 1.586, p = .113$. However, this hypothesis was still supported.

H4: Females will report increased orgasm frequency when using cannabis.

Orgasm frequency was indicated by their ability to have multiple orgasms (multi-orgasmic) as measured by one item with response options ranging from *significantly decrease* to *significantly increase*. Over 40% of females ($n = 356$) did report increased ability to have more

than one orgasm per sexual encounter ($M = 3.67$, $SD = .901$); therefore, there is marginal support for this hypothesis.

H5: Males and females will report increased sexual satisfaction when using cannabis.

Using descriptive statistics of the scale, males and females reported increased sexual satisfaction ($M = 3.825$, $SD = .613$). *T*-test analysis indicated that there was a not significant effect based on gender, $t(801) = -.187$, $p = .852$. However, this hypothesis was still supported.

H6: Males and females will report increased enhancement to taste and touch when using cannabis.

Males and females reported increased enhancement to taste and touch. Taste was measured using one-item. Over 70% of males and females ($n = 583$) reported that taste was slightly or significantly enhanced when using cannabis ($M = 3.96$, $SD = .943$). Touch was measured using one-item. Over 70% of males and females ($n = 576$) reported that touch was slightly or significantly enhanced when using cannabis ($M = 4.02$, $SD = .906$).

CHAPTER 5: DISCUSSION

This nationwide study had a large sample size that reflects promise for those who choose to use cannabis, specifically before sex or for sexual purposes. This study found that the people who use cannabis are of a wide range of ages, from a variety of occupations, and have differing cannabis use preferences.

Sexual Functioning and Satisfaction

This study's framework incorporates sexual functioning with Kaplan's phase of desire, Masters and Johnson's model (excitement, plateau, orgasm, resolution), and sexual satisfaction as the final stage. The created scale used for this study was found to have high reliability ($\alpha = .897$), which supports this theory. The scale is comprehensive in nature as it moves beyond the physiological effects (e.g., achieving an erection) and incorporates overall sexual functioning and satisfaction. The scale created goes beyond the existing literature as it incorporates how cannabis specifically influences sexual functioning and satisfaction, as opposed to a scale that only measures sexual functioning and/or satisfaction.

Research Questions and Hypotheses

In contrast to the majority of the existing literature (Koff, 1974; Weller & Halikas, 1984), no gender differences were found in regard to cannabis use and overall sexual functioning and satisfaction. Results from this study indicated that both genders see benefits from using cannabis before sexual intercourse or masturbation. This aligns with the proposed framework and feminist theory by emphasizing sexual pleasure for both genders. However, T-tests reveal that there were gender differences with specific items such as cannabis use influencing desire, relaxation during sex, and ability to orgasm. Reduced desire and difficulty to orgasm are two common female sexual dysfunctions. Decreased ability to orgasm could influence both, reduced

desire and difficulty to orgasm. Therefore, this provides support for the sexual functioning and satisfaction framework used to guide this study and use of cannabis by women may increase quality of sexual functioning and satisfaction.

All of the hypotheses were supported and consistent with existing literature, except for males' ability to achieve and maintain an erection due to cannabis. Similar to existing literature (Koff, 1974; Weller & Halikas, 1984), both male and female participants perceived increased desire and orgasm intensity when using cannabis. Females reported increased ability to have more than one orgasm per sexual encounter, which is similar to previous findings (Weller & Halikas, 1984). These results align with the increased relaxation when using cannabis; those who use cannabis report being more relaxed, whether mental or physical, which would improve overall sexual functioning and pleasure. Previous literature stated that males would have a more difficult time achieving and maintaining an erection when using cannabis, possibly due to the muscle relaxation properties of cannabis (Masters et al., 1979). This study found that males did not report a decreased ability to achieve and maintain an erection. However, due to the self-report nature of this survey, social desirability may have prevented them from reporting erectile issues. Results from this study supports the previous evidence that cannabis is a vasodilator (Small, 2017), which would ultimately cause an erection within males.

There was no difference sexual functioning and satisfaction scale scores by age. This indicates that despite age, individuals still report sexual benefits from using cannabis. The age of the sample ranged from 18-85, suggesting that cannabis use may have benefits across the lifespan. The positive correlations between age and duration of cannabis use and between age and frequency of cannabis use further supports the idea of regular use throughout the lifespan. Additionally, the positive correlation between individuals who have used cannabis for a longer

amount of time (duration) and frequency of use means that those who use more cannabis more often were more likely to have been using cannabis for a longer period of time. However, neither duration or frequency of use influenced sexual functioning and satisfaction.

The scores of those who reported intentionally using cannabis before sex had significantly higher scale scores than those who reported not intentionally using cannabis before sex. This can be interpreted as those who intentionally use cannabis before sex, perceive a greater benefit to their sexual functioning and satisfaction compared to those who do not intentionally use cannabis before sex. These results may be because of the mental mindset that using cannabis will increase pleasure due to the aphrodisiac notions of cannabis (Touw, 1981). With the relaxation effects of cannabis, one may be more likely to use cannabis to help them relax and increase desire prior to engaging in sexual acts to purposely increase their sexual functioning and satisfaction. Individuals may also intentionally use cannabis before sex knowing that cannabis use helps with any sexual issues that they have, therefore, increasing their sexual functioning and satisfaction. In contrast, participants may have been using cannabis before sex, but it wasn't intentional. The lack of intentionality might indicate that they were not experiencing any sexual issues and had high sexual functioning and satisfaction regardless of cannabis use. Therefore, there would be no change to their sexual functioning and satisfaction.

While dosage could not be measured, the forms that are used can give an indication of dosage, which has been found to have an impact on sexual functioning (Palamar et al., 2018). Although duration and frequency of cannabis use was not significant, results indicated certain forms (i.e. wax and flower) can be used to predict sexual functioning and satisfaction. This may be due to the high potency of concentrates. While there is no literature on specific cannabinoid

profiles regarding sexual functioning and satisfaction, higher THC products may have a greater influence on the physiological effects and overall satisfaction of sex.

Sensuality is an important aspect of sexual intercourse as it relates to the five senses. During sex, one uses many, if not all, of their senses. Males and females reported increased enhancement to touch and taste when using cannabis, which is consistent with previous literature (Weller & Halikas, 1984). This could increase overall sexual functioning and satisfaction through the enhancement of taste and touch, which are two senses that are heavily used during sexual intercourse. Results indicate that cannabis enhances these senses, which implies that cannabis' enhancement of taste and touch intensifies sexual acts as well.

Implications

Implications for this study have the potential to impact policy, medicine, and practice. Results from this study may provide support for policy change and legalization advances for cannabis use. Increased access to cannabis may facilitate more research on its effects. Medical implications of this study include the possible use of cannabis for treating sexual dysfunctions, especially within females. Females with vaginismus may benefit from cannabis use due to the muscular relaxation and increased sexual functioning, while females with decreased desire would also see possible benefits. The vasodilator properties of cannabis together with endocannabinoid receptors in the genital region (Small, 2017) suggest that cannabinoid-infused lubricants could be beneficial as a muscular relaxant and stimulant to a specific source (i.e. the genital region).

Finally, in regard to practice, results from this study suggest that cannabis can potentially close the orgasm inequality gap (Mintz, 2018). The orgasm inequality gap states that males statistically are more likely to orgasm per sexual encounter compared to females (Kontula, 2009). This study suggests that females might be more likely to orgasm when using cannabis

before sexual encounters, which could contribute to equity in the amount of sexual pleasure and satisfaction experienced by both females and males.

Limitations

While this study had a large sample size and was able to report evidence that has not been found in the literature, there were some limitations. One major limitation is the self-report survey design. An experimental design would better detect actual effect rather than perceived effect. Dosage was unable to be measured as many individuals are unaware of the amount and potency of cannabis that they are consuming. This is especially true for individuals who do not live in a state where cannabis has been legalized and all products bought from a regulated dispensary are labeled. Social desirability may be another limitation to this study because of the sensitive nature of the survey questions. Participants may have answered in a desirable manner, particularly related to questions related to erection. Finally, several of the variables were measured using single items and although the scale created had high reliability, it does not have established validity.

Future Research

Cannabis has not been studied extensively, partly because of legalization barriers. This is especially true regarding the intersection of cannabis and sexual functioning and satisfaction. This study found that duration of cannabis use or frequency of cannabis use does not predict sexual functioning. However, previous literature indicates that daily and habitual users reported erectile difficulties in males (Aversa et al., 2008). Future research should focus on male frequency and duration of use in regard to their sexual functioning. Additionally, age was positively correlated with both duration of cannabis use and frequency of cannabis use and the interaction between these three variables should be researched further.

Future cannabis research should focus on specific cannabinoid profiles, methods, and forms to indicate which has greatest sexual impact and implications. Clinical research to study this would be most accurate due to the social desirability effect of self-report surveys. Future research would also benefit from reviewing the endocannabinoid system and its impact on sexual functioning and satisfaction.

Conclusion

This study extended the limited literature regarding the influence of cannabis on sexual functioning and satisfaction. Results help to update the literature on cannabis and sexuality and contribute to implications for advancing policy, medicine, and practice. Expanding the sexual response cycle (Masters & Johnson, 1995) to include desire (Kaplan, 1979) and sexual satisfaction (Basson, 2001) provided a useful framework for this study and results supported this expanded model. Overall, cannabis use tends to have a positive influence on perceived sexual functioning and satisfaction for individuals despite gender or age and cannabis might help to decrease sexual pleasure disparities by gender.

Table 1

Mean Scores of Cannabis use and Effect on Sensuality by Gender

Sense	Males	Females	Overall
Taste	4.02 (.928)	3.93 (.949)	3.96 (.943)
Touch	4.00 (.905)	4.03 (.911)	4.02 (.906)
Smell	3.33 (.895)	3.28 (.849)	3.30 (.865)
Sight*	3.12 (.817)	2.97 (.791)	3.02 (.803)
Hearing*	3.42 (.889)	3.22 (.797)	3.29 (.832)

Notes: Means range from 1 (significantly decreases) to 5 (significantly increases) with 3 being “does not change”. * $p < .05$.

Table 2

Sexual Functioning and Satisfaction Scale

Item	Male	Female	Overall
How does using marijuana affect your <i>relaxation</i> during sex?*	4.30 (.830)	4.45 (.778)	4.39 (.801)
How does using marijuana influence your <i>desire</i> to have sex (libido, sex drive)?*	3.95 (.963)	4.10 (.952)	4.05 (.962)
How does using marijuana influence your <i>intimacy/emotional closeness</i> during sex?	4.06 (.844)	4.08 (.930)	4.07 (.898)
How does using marijuana influence your <i>physical pleasure</i> ?	4.36 (.803)	4.31 (.844)	4.33 (.830)
How does using marijuana influence your <i>frequency of sex</i> (how often you engage in sex)?	3.55 (.865)	3.54 (.862)	3.54 (.860)
How does using marijuana influence your <i>variety of sexual activities</i> (i.e. locations, positions, times)?	3.63 (.813)	3.56 (.877)	3.58 (.859)
How does using marijuana influence your <i>ability to orgasm</i> ?*	3.48 (1.00)	3.86 (.978)	3.72 (1.00)
How does using marijuana influence your <i>intensity of orgasm</i> (how strong the orgasm is)?	4.12 (.822)	4.01 (.914)	4.05 (.884)
How does using marijuana influence your ability to have <i>more than one orgasm</i> per sexual encounter (multi-orgasmic)?*	3.45 (.819)	3.67 (.901)	3.59 (.879)
How does using marijuana influence the <i>duration of sex</i> (how long sex lasts)?*	3.89 (.928)	3.59 (.856)	3.69 (.894)
How does using marijuana influence your <i>ability to repeat sex</i> after orgasm?	3.48 (.837)	3.43 (.873)	3.45 (.858)
Arousal			3.45 (1.01)
Males – How does cannabis influence your ability to <i>achieve an erection</i> (boner)?	3.57 (.892)		
Females – How does using marijuana influence your <i>vaginal lubrication</i> (wetness of vagina)?		3.39 (1.05)	

Notes: Means range from 1 (significantly decreases) to 5 (significantly increases) with 3 being “does not change”.

* $p < .05$.

Table 3

Linear Regression Model Predicting Sexual Functioning and Satisfaction

Predictor	B	SE B	β	<i>t</i>	<i>P</i>
Constant	3.518	.144		24.503	.000
Gender	.021	.046	.016	.451	.652
Age	.003	.002	.061	1.462	.144
Duration of Cannabis Use	-.027	.022	-.050	-1.229	.219
Frequency of Cannabis Use	-.001	.016	-.003	-.083	.934
Form - Flower	.235	.111	.077*	2.126	.034
Form - Wax	.131	.053	.103*	2.484	.013
Form - Oil	-.013	.049	-.010	-.261	.794
Form - Edible	.050	.048	.040	1.039	.299
Form - Topical	.107	.061	.067	1.767	.078
<i>R</i> ²		.029			
<i>F</i>		2.582*			

Notes: **p* < .05

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APPENDIX A: INSTITUTIONAL REVIEW BOARD APPROVAL

EAST CAROLINA UNIVERSITY
University & Medical Center Institutional Review Board
4N-64 Brody Medical Sciences Building · Mail Stop 682
600 Moye Boulevard · Greenville, NC 27834
Office **252-744-2914** · Fax **252-744-2284** ·
www.ecu.edu/ORIC/irb

Notification of Exempt Certification

From: Social/Behavioral IRB
To: [Amanda Moser](#)
CC: [Sharon Ballard](#)
Date: 12/11/2018
Re: [UMCIRB 18-002472](#)
The Influence of Cannabis on Sexual Functioning and Satisfaction

I am pleased to inform you that your research submission has been certified as exempt on 12/11/2018. This study is eligible for Exempt Certification under category #2.

It is your responsibility to ensure that this research is conducted in the manner reported in your application and/or protocol, as well as being consistent with the ethical principles of the Belmont Report and your profession.

This research study does not require any additional interaction with the UMCIRB unless there are proposed changes to this study. Any change, prior to implementing that change, must be submitted to the UMCIRB for review and approval. The UMCIRB will determine if the change impacts the eligibility of the research for exempt status. If more substantive review is required, you will be notified within five business days.

The Chairperson (or designee) does not have a potential for conflict of interest on this study.

IRB00000705 East Carolina U IRB #1 (Biomedical) IORG0000418
IRB00003781 East Carolina U IRB #2 (Behavioral/SS) IORG0000418

APPENDIX B: RECRUITMENT MESSAGE

Marijuana and Sex Research Study!

For my master's thesis, I am conducting a research study to analyze how marijuana affects your sexual functioning and satisfaction.

If you have ever used marijuana and are 18 years or older, you are eligible to participate in this research study!

This survey should only take 10-15 minutes and is completely *anonymous* and *voluntary*.

Please feel free to share with others!

The online survey can be found here:

https://ecu.az1.qualtrics.com/WRQualtricsControlPanel/?Section=SV_2fB1a7MMBwx10xf&SubSection=&SubSubSection=&PageActionOptions=&TransactionID=1&Repeatable=0&ContextSection=EditSection

APPENDIX C: SURVEY

Q1: What is your age (in years)? (For example, 23)

*write-in

***If under 18, END OF SURVEY**

Q2: Have you ever used marijuana?

- Yes
- No

***If No, END OF SURVEY**

Q3: What is your sex/gender?

- Male
- Female
- Other

Q4: What is your race/ethnicity?

- White/Caucasian
- Black/African American
- Hispanic
- Asian
- Native American
- Pacific Islander
- Biracial
- Other

Q5: Do you identify as LGBTQI+ (Lesbian, Gay, Bisexual, Transgender, Queer/Questioning, Intersex, or other)?

- Yes
- No
- Prefer not to answer

Q6: In which state do you currently reside?

*drop down menu

Q7: What is your highest level of education?

- Less than high school diploma or GED

- High school diploma or GED
- Some college
- Associate Degree
- Bachelor's Degree
- Master's Degree
- Ph.D./Doctorate

Q8: What is your occupation? (For example: accountant, police officer, etc.)

*textbox

Q9: What is your annual income? (For example: \$70,000)

*textbox

Q10: What is your current sexual relationship status?

- In a monogamous sexual relationship with one person
- Engaging in sex with more than one partner
- Not engaging in sex with anybody

Q11: What is the primary reason you use marijuana?

- Recreational
- Medicinal
- Both, recreational and medicinal
- Neither, I do not use marijuana products ***If chosen, END OF STUDY**
- Textbox

Q12: What are the effects that you experience from marijuana?

*Textbox

Q13: Do you intentionally use marijuana before having sex?

- Yes
- No

Q14: If yes, please explain.

For example, do you use specific forms or methods (smoking, vaping, edibles, etc.) to enhance your sexual experience?

Q15: Does the *amount /dosage* of marijuana affect your sexual functioning (lubrication, erection, etc.)

*Please explain [textbox]

Q16: Do you think that using marijuana affects your sexual decision making (i.e. using a condom, getting consent, etc.)?

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

Q17: Where do you get your marijuana product? (Check all that apply)

- Dealer
- Buy from a friend
- Dispensary
- Grow it myself
- Other, please describe:

Q18: What forms of marijuana do you use? (Check all that apply)

- Flower (pot, weed, etc.)
- Wax (dabs, shatter, etc.)
- Oil (tinctures, etc.)
- Edible (foods or drinks)
- Topical (lotions, lubricants, etc.)
- Other, please describe:

Q19: What do you typically look for when choosing marijuana products? (Check all that apply)

- CBD only/high CBD
- High THC only
- Combination of both THC and CBD
- I don't know/I don't care

Q20: How often do you use marijuana?

- Daily
- Few times a week (3-5 times)
- Once a week
- Few times a month

- Few times a year
- I have only used marijuana once or a few times
- I have never used marijuana ***If chosen, END OF SURVEY**

Q21: How long have you been using marijuana?

- Less than 6 months
 - About a year
 - A few years
 - More than 5 years
 - More than 10 years
-

Q22: How does using marijuana influence your sensitivity to *taste*?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q23: How does using marijuana influence your sensitivity to *touch*?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q24: How does using marijuana influence your sensitivity to *smell*?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q25: How does using marijuana influence your sensitivity to *sight*?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q26: How does using marijuana influence your sensitivity to *hearing*?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q27: How does using marijuana affect your state of *relaxation* during sex?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q28: Do you and your partner use marijuana together before sexual activity (e.g. foreplay)?

- Yes
- No
- Sometimes
- I don't have a sexual partner

Q29: How does using marijuana influence your *desire* to have sex (libido, sex drive)?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q30: How do using marijuana influence your intimacy and emotional closeness during sex?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q31: How does using marijuana influence your physical pleasure?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q32: How does using marijuana affect your *frequency* of sex (how often you engage in sex)?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q33: How does marijuana affect the *variety* in your sexual activities (i.e. locations, positions, times)?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q34: How does using marijuana affect your *ability* to orgasm during sex (how likely you are to climax)?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q35: How does using marijuana affect your *intensity* of orgasm (how strong the orgasm is)

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q36: How does using marijuana affect your ability to have *more than one orgasm* per sexual encounter (multi-orgasmic)?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q37: How does using marijuana influence the *duration* of sex (how long sex lasts)?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q38: How does marijuana affect your ability to *repeat sex* after orgasm?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q39: How does your **partners** use of marijuana influence intimacy and emotional closeness during sex?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q40: How does your **partners** use of marijuana influence your physical pleasure?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q41: How does your **partner's** use of marijuana influence your partner's performance?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

FEMALES ONLY

Q42: How does using marijuana alter your *vaginal lubrication* (wetness of vagina)?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

MALES ONLY

Q43: How does using marijuana influence your ability to *achieve* an erection?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q44: How does using marijuana influence your ability to *maintain* an erection?

1.....2.....3.....4.....5
Decrease.... Does not Change.... Increase

Q45: Do you masturbate (self-stimulation)?

- Yes
- No

Q46: If yes, have you ever used marijuana before masturbating?

- Yes
- No

Q47: If yes, how does marijuana affect pleasure while masturbating?

1.....2.....3.....4.....5

Decrease.... Does not Change.... Increase

Q48: Marijuana affects people in many different ways. Please elaborate on how marijuana affects your sexual experiences (can include sex with partners or during masturbation). You can expand on previous questions asked or provide other details. Feel free to be as detailed as you would like, as this survey is *completely anonymous*.

*textbox

