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Psychoeducational module to promote knowledge and reduce stigma towards recreational marijuana users

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PSYCHOEDUCATIONAL MODULE TO PROMOTE KNOWLEDGE AND REDUCE STIGMA TOWARDS RECREATIONAL MARIJUANA USERS

An Abstract of a Thesis

Submitted

In Partial Fulfillment

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Master of Arts

Stephanie J. Strong

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ABSTRACT

Stigma can affect many aspects of life for those who are subject to stigmatization. As contact with stigmatized groups increases, less stigmatization occurs. Marijuana is one of the most commonly used illegal substances and is growing in popularity. Relatively few studies have examined the relations between stigma and specific substance use or particular characteristics of non-users that may influence stigma. Additionally, current anti-stigma interventions targeted at the general population have been largely unsuccessful in the reduction of stigma. The current study assesses a 25-minute online psychoeducational module designed to increase knowledge and reduce the stigma of recreational marijuana users in a more efficient, practical, engaging, and cost-effective way which can be easily applied to any anti-stigma intervention program. The module surveyed 201 college students from a public Midwestern university where participants were randomly assigned to one of two groups; a module group (*N = 104*) and a control group (*N = 97*). Specifically, the module was shown to increase knowledge regarding marijuana, however, there was little to no impact on stigma (i.e., preferred social distance, perceived dangerousness, negative emotions regarding marijuana use). Additionally, findings indicate strong associations between the level of familiarity, the level of contact, and stigma. Specifically, as the level of familiarity or level of contact increases, less stigmatization occurs. In addition, limited support was found for the moderating role of gender, past marijuana use, and age on the established association between the level of familiarity and level of contact on stigma levels. Furthermore, we explored the relationship between the level of familiarity, the level of contact, and the

likelihood of future use. After establishing this strong relationship, we examined whether sex, any past marijuana use, and age would moderate this potential relationship. Results indicate that when familiarity is high, individuals will have a higher likelihood of future use if they already have a prior history of marijuana use. However, there were little to no differences in the likelihood of future use when familiarity was low, even with a prior history of marijuana use. No other characteristics seemed to impact this relationship. Findings have implications for anti-stigma interventions.

Keywords: Stigma, Substance use, Marijuana, Psychoeducation, Intervention

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has been approved as meeting the thesis requirement for the

Degree of Master of Arts

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DEDICATION

I dedicate this thesis to my family and best friend. This work would not have been possible without their patience, understanding, support, and love. Thank you for always encouraging me to follow my dreams.

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INTRODUCTION

Overview

Marijuana is the most commonly used drug today across varied age and demographic groups with nearly 19.8 million Americans reporting marijuana use in the past month (Substance Abuse and Mental Health Services Administration [SAMHSA], 2014). However, members of the wider public often view marijuana use as aberrant (Bottorff et al., 2013), despite rapid shifts in public opinion towards the legalization of marijuana in recent years (Pew Research, 2015). Currently, the majority of Americans (53%) support marijuana legalization. However, not everyone is supportive towards legalization efforts which can leave room for stigmatization towards those who currently use or want to legalize marijuana (Pew Research, 2015). These negative societal views which deem illicit drug use as unacceptable behavior can create more negative opinions about users which, in turn, can promote stigma (Ahern, Stuber, & Galea, 2007).

Exposure to stigma poses a risk to the health and well-being of those who are subject to stigmatization (Feldman & Crandall, 2007), as well as significant economic impacts on a societal level and adverse effects on employment opportunities for the stigmatized (Sharac, McCrone, Clement, & Thornicroft, 2010). Mental illness stigma has been broadly researched and mainly focuses on the impact of stigma on severe mental disorders (Link, Struening, Neese-Todd, Asmussen, & Phelan, 2001; Rusch, Angermeyer, & Corrigan, 2005), with particular emphasis on schizophrenia, major depression, and substance use (Corrigan, Edwards, Green, Diwan, & Penn, 2001;

Griffiths et al., 2006; Holmes, Corrigan, Williams, Canar, & Kubiak, 1999; Link, Phelan, Bresnahan, Stueve, & Pescosolido, 1999; Stuart & Arboledo-Florez, 2001). Substance use, in particular, has been found to be associated with varying degrees of stigma, with illicit drug users among the most stigmatized groups (Ahern et al., 2007; Corrigan, Sachiko, & O'Shaughnessy, 2009). Research on substance use has broadly provided a wealth of information regarding the perceived causes and impact of stigma towards those with mental illness. However, there is still a noticeable gap in the literature examining stigma of specific substance use (Brown, 2011; Livingston, Milne, Fang, & Amari, 2011) and particular characteristics of non-users that may influence stigma (Palamar, Kiang, & Halkitis, 2012). Identification of characteristics that could influence the relation between stigma and specific substance use is an essential step toward implementing targeted anti-stigma intervention programs. Research in this area is crucial given that relatively few anti-stigma interventions for substance use disorders have been shown to work in the reduction of stigma for the general public (Livingston et al., 2011). Reducing stigma through education has had limited success specific to substance use stigma (Livingston et al., 2011), however, providing factual information focusing on common misconceptions has had success in past mental health stigma research (Mayville & Penn, 1998; Penn & Martin, 1998).

The current study focuses on pilot-testing a psychoeducational intervention module to increase knowledge and reduce stigmatized views towards recreational marijuana users. First, the study assessed whether the psychoeducational module about marijuana reduces stigma by increasing knowledge and familiarity with marijuana and its

uses. Next, we examined the relations between the level of contact and the level of familiarity with recreational marijuana users and the accompanying stigma level (i.e., preferred social distance, perceived dangerousness, and negative affect). Finally, this study investigated certain characteristics (i.e., sex, age, and current marijuana use) that may account for differences in the relation between the level of contact or level of familiarity and stigma.

Defining Stigma and Strategies for Change

Stigma is a socially constructed concept defined as a process where an individual (or group of people) are perceived negatively to the point of being considered defective because of a disparaging attribute (Goffman, 1963; Link, Yang, Phelan, & Collins, 2004) which symbolizes deviance from societal values (Jones et al., 1984). Stigma ultimately dehumanizes the person targeted by this form of discrimination (Link et al., 2004), and mental-health-related stigma has been described as having worse consequences than the mental health condition itself (Thornicroft, Deb, & Henderson, 2016). Broadly, stigma depends on the context of a particular social situation (Janulis, Ferrari, & Fowler, 2013; Major & O'Brien, 2005). Specifically, individuals may be subject to stigmatization in certain situations but not in others. For example, a person may experience stigmatization because of their disorder when going to see a doctor for alcoholism, but may not experience stigma when they go to a bar with friends. Thus, previous research indicates that stigma can be context-specific, and is the product of a particular social situation (Janulis et al., 2013). While stigma is context-specific, several categories of stigma also exist; for instance, some of the more researched forms of stigma are self-stigma and

public stigma (Corrigan, Markowitz, Watson, Rowan, & Kubiak, 2003). Self-stigma refers to an individual's internalized loss of self-esteem and self-efficacy that makes the stigmatized foster dislike toward themselves. In contrast, public stigma refers to members of society having negative attitudes towards individuals from stigmatized groups (Corrigan & Watson, 2002; Janulis et al., 2013).

Currently, researchers are starting to apply information learned about prejudice and stereotypes to public stigma related to mental illness which aids in the understanding of how public stereotypes have been translated into discriminatory behavior (Corrigan & Watson, 2002). Three components of public stigma exist (i.e., stereotypes, prejudice, and discrimination) that build on one another. Stereotypes are mutually held notions about members of a particular social group. Prejudice goes beyond stereotypes by ultimately producing negative emotional reactions due to the support of negative stereotypes. Finally, discrimination takes this one step further by making individuals act on their prejudices, resulting in harm towards those from a particular group (Corrigan et al., 2003). For example, people who perceive mental illness as dangerous or aggressive behavior are more willing to discriminate against this target group (Angermeyer & Matschinger, 1996; Corrigan, Green, Lundin, Kubiak, & Penn, 2001), indicating the major role perceived dangerousness plays in public stigma. Identifying the antecedents of public stigma is essential for the design of intervention programs that target the reduction of stigma.

Several strategies have been suggested to change public stigma including protest, education, and contact (Corrigan & Penn, 1999). The efforts of groups who challenge

stigma by protesting incorrect and hostile depictions of mental illness send messages to the media and the public (Corrigan & Watson, 2002). The message the protesters send to the media is to stop reporting incorrect depictions while the message they send to the public is to stop believing the primarily negative opinions about mental illness (Corrigan & Penn, 1999). However, there is very little research assessing the impact of protest campaigns on discrimination and stigma, suggesting an avenue for future research efforts (Corrigan & Watson, 2002). Reducing stigma through education, on the other hand, attempts to promote more positive attitudes supported by facts (Corrigan & Watson, 2002). Successful reduction of stigma and improved attitudes about person with these problems through education has received greater empirical support (Corrigan, River et al., 2001; Holmes et al., 1999; Keane, 1990; Link & Cullen, 1986; Morrison, Cocozza, & Vanderwyst, 1980; Penn et al., 1994) and seem to be effective for a wide range of participants (Corrigan & Watson, 2002). Additionally, increasing contact with people from a stigmatized group is related to a decrease in the level of stigma (Corrigan & Watson, 2002). Specifically, less stigmatization occurs when contact with stigmatized groups increases (Corrigan & Watson, 2002; Feldman & Crandall, 2007). While it is important to understand these various ways stigma can be changed in the mental health field as it aids in the development of successful, anti-stigma interventions, researchers must also understand the impact stigma can have on an individual's life.

Mental Illness, Stigma, and its Effects

Past research has primarily focused on the impact of stigma on mental illness in general (Corrigan, Green et al., 2001; Griffiths et al., 2006; Link et al., 1999; Link et al.,

2001; Rusch et al., 2005). Mental illness is a very serious issue and is highly prevalent in the adult population of the United States, estimated to affect about 26% of the population (Kessler, Chiu, Demler, & Walters, 2005). Although some cases are milder than others, about 14% of the estimated 26% are considered to be serious (Kessler et al., 2005), making mental illness a prominent issue in the United States. Mental illness can be harmful to those suffering from it in two ways. First, there are tangible and direct effects that occur because of the disorder itself, whether it be cognitive, emotional, or behavioral difficulties. These effects can be detrimental to the individual. Secondly, those suffering from mental illness may also experience stigma.

Mental illness stigma has been examined on a national level using the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is an established health survey issued by the Centers for Disease Control in all 50 states, the District of Columbia, Puerto Rico, the U.S. Virgin Islands, and Guam. The vast majority of adults (> 80%) surveyed in the US agreed that treatment is effective for individuals who have a mental illness, but fewer adults (35-67%) agreed that others are caring and sympathetic to persons living with mental illness (Kobau et al., 2012). Respondents who had already been receiving mental health services and who reported mental illness symptoms more often strongly disagreed that others are caring and sympathetic to individuals living with mental illness (Kobau et al., 2012). These findings show that the majority of people who experience mental illness symptoms do not believe others to be caring or sympathetic to their situation which is only one example of the many consequences of stigma.

Stigma has far-reaching psychological, social, and financial consequences at both the individual and societal level. When individuals are branded as belonging to a particular group (e.g., marijuana user), nonusers devalue their defining qualities and traits based on this tarnished identity (Brown, 2011; Hinshaw, 2007). Hence, those suffering from stigmatization receive automatic judgment and discrimination that might be based primarily on being part of a particular group. So, not only do these individuals have to suffer through the struggles that accompany being involved with a particular group or having a mental disorder, but they also receive unfair treatment as a consequence.

The psychological and social consequences of stigma are extensive (Agnew & South, 2014; Baumeister, Twenge, & Nuss, 2002; Cukrowicz & Poindexter, 2014; DeWall & Bushman, 2011; Feldman & Crandall, 2007; Leary, 2010), and may result in unfair treatment of those who are subject to stigmatization (Feldman & Crandall, 2007). This stigmatization may impact many aspects of life and may be expressed through family discord, job discrimination, social rejection, interpersonal disruption, or a faulty social identity (Corrigan, Watson, & Miller, 2006; Feldman & Crandall, 2007). Specifically, individuals who are stigmatized experience interpersonal disruption where they have difficulty starting or maintaining interpersonal relationships (Agnew & South, 2014). According to the interpersonal theory of suicide, trouble maintaining these interpersonal relationships puts them at an increased risk for suicidal ideation (Cukrowicz & Poindexter, 2014). Additionally, stigmatized individuals may experience either social rejection (i.e., others try to exclude them from a relationship or social group) or faulty social identity (i.e., inconsistency between virtual and actual social identity; Leary, 2010;

Goffman, 1963). This experience of rejection and faulty identity has detrimental effects on an individual's psychological well-being (Corrigan, 2004; Link & Phelan, 2006). In addition, social rejection can influence both cognitions and emotions of the stigmatized individual (DeWall & Bushman, 2011). It also increases negative emotions such as hurt feelings (DeWall & Bushman, 2011), as well as anger, anxiety, depression, sadness, and jealousy (Leary, 2010). Stigma can even impact cognitive performance on challenging intellectual tasks (Baumeister et al., 2002). Furthermore, mental illness stigma is a major barrier to finding and receiving psychological treatment (Corrigan, 2004; Link et al., 2001).

Additionally, the financial consequences of stigma and mental disorders are considerable and can impact society financially in a variety of ways (Kessler et al., 2008). For instance, there are direct costs that are associated with mental disorders which include medication, hospitalization, and clinic visits, however, there are also indirect costs that occur such as lost earnings which are estimated to cost the nation nearly $193 billion annually (Kessler et al., 2008). This may even be an underestimate of the potentially lost earnings because very few participants had chronic illnesses (e.g., autism, schizophrenia, etc.) and the study did not assess people in hospitals or prisons (Kessler et al., 2008). The negative, wide-ranging impacts resulting from stigma at both a societal and individual level makes anti-stigma intervention research particularly important. Although past research most often focused on stigma related to mental illness broadly, in more recent years, researchers focus more on stigma related to specific mental illnesses such as major depression, anxiety, schizophrenia, and substance use (Alonso et al., 2008;

Holmes et al., 1999; Latalova, Kamaradova, & Prasko, 2014; Stuart & Arboledo-Florez, 2001). Substance use, in particular, is a vastly underexplored topic, especially when considering the broad range of substances available.

Substance Use Stigma

Relatively few studies have addressed the impact of stigma on specific psychological disorders. Fewer studies still have explored substance use disorders, although illegal drug use is often subject to stigma all over the world (Palamar et al., 2012), and substance use disorders are among the most dangerous psychological disorders (Link et al., 1999). Substance use disorders are fairly common, affecting approximately 21.6 million Americans nationwide (SAMHSA, 2014). Furthermore, drug-related emergency department visits seem to be on the rise. Over 125 million total visits were made to emergency departments in 2011 (SAMHSA, 2013). The Drug Abuse Warning Network estimates the number of drug-related emergency department visits to be over 5 million of the total visits; this represents a 29% increase from the 2009 number of emergency department visits (SAMHSA, 2013). Of these 5 million emergency visits, about 2.5 million visits involved drug misuse or abuse, indicating a 19% increase since 2009 alone (SAMHSA, 2013). The increase in visits takes a toll financially on society. Furthermore, there are a number of serious consequences to society due to substance use disorders (Rasinski, Woll, & Cooke, 2005), including the potential to generate extremely high costs for individuals with the disorder, their family, and society in general (Luoma, Kulesza, Hayes, Kohlenberg, & Larimer, 2014).

Other health conditions tend to be less stigmatized than substance use disorder (Corrigan et al., 2005; Rao et al., 2009; Ronzani, Higgins-Biddle, & Furtado, 2009; Room, 2005; Schomerus et al., 2011). Greater stigmatization of substance use disorders could be due to the unique stigma associated with the disorders where individuals view it as both a crime and a disease. Society has criminalized substance-using behaviors to deter others from using these drugs (Livingston et al., 2011). However, criminalizing substance use only exacerbates stigma by making people more prone to exclude individuals who use illegal substances. For instance, stigma is often used to deter (Janulis et al., 2013) and marginalize unhealthy behaviors (Livingston et al., 2011); however, this has an added consequence of devaluing and marginalizing certain social groups, which can be detrimental to those already using the drugs (Room, 2005). Substance use stigma lowers societal support for intervention programs (Capitanio & Herek, 1999) and discourages individuals from seeking treatment (Fortney et al., 2004; Kushner & Sher, 1991). Furthermore, stigma increases embarrassment and decreases expectations for substance users (Luoma et al., 2007; Semple, Grant, & Patterson, 2005) and their family members (Corrigan et al., 2006). These consequences hinder the stigmatized individual's ability to receive adequate treatment for their disorder, potentially impacting their life even further. Research on the detrimental consequences of substance use stigma highlights the need for successful, specifically targeted anti-stigma intervention programs.

Current Anti-Stigma Interventions in the Substance Stigma Field

Current stigma research has provided a better understanding of the magnitude of the problems associated with stigma and its harmful effects (Livingston & Boyd, 2010;

Logie & Gadalla, 2009; Mak, Poon, Pun, & Cheung, 2007), however, research has been relatively limited on anti-stigma intervention strategies (Dalky, 2011; Schachter et al., 2008). Livingston and colleagues (2011) conducted a systematic review empirically evaluating thirteen wide-ranging studies (e.g., target groups, methods) to get a better understanding of which anti-stigma intervention approaches have been used thus far. The type of stigma varied across studies and included self-stigma (i.e., individual with substance use disorder attitudes), social stigma (i.e., general public's attitudes), and structural stigma (i.e., medical student, police officer, and substance use counselor attitudes; Livingston et al., 2011).

Many different types of intervention approaches were used across each type of stigma. For instance, the interventions used to reduce self-stigma included an Acceptance and Commitment Therapy (ACT) group (Luoma, Kohlenberg, Hayes, Bunting, & Rye, 2008), a surgical procedure to remove needle track marks from injection drug users (Shuster & Lewin, 1968), and a skills training and vocational counseling program (National Institute on Drug Abuse [NIDA], 1978). Additionally, most structural stigma interventions comprised of a variety of techniques aimed at structured education, including direct contact with substance users (Bland et al., 2001; Meng, Rayburn, Ramirez-Cacho, & Rayburn, 2007; Ramirez-Cacho, Strickland, Beraun, Meng, & Rayburn, 2007; Silins, Conigrave, Rakvin, Dobbins, & Curry, 2007) and educational critical reflection techniques (Ballon & Skinner, 2008). The remaining structural stigma interventions used a Crisis Intervention Team program (Bahora, Hanafi, Chien, & Compton, 2008) and multi-cultural training (Hayes et al., 2004). Furthermore, social

stigma intervention approaches included educational factsheets (Luty, Umoh, Sessay, & Sarkhel, 2007), motivational interviewing (Luty, Umoh, & Nuamah, 2009), and positive recovery/remission story leaflets (Luty, Rao, Arokiadass, Easow, & Sarkhel, 2008).

The results from the social stigma studies are of particular importance for the current study (Luty et al., 2007; Luty et al., 2009; Luty et al., 2008) which focuses on reducing stigma through education. Findings indicate only small effects when presenting individuals with factsheets and asking them to read through them or having individuals go through extensive education courses (Luty et al., 2009; Mayville & Penn, 1998; Penn & Martin, 1998). However, providing factual information focusing on common misconceptions about those suffering from mental illness have been reported to reduce stigma, regardless of the method of delivery (Mayville & Penn, 1998; Penn & Martin, 1998). Currently, time commitment for successful interventions for mental illness stigma tend to last several days (Bahora et al., 2008) to weeks (Bland et al., 2001), and are not typically targeted at the general public, but rather persons providing services to stigmatized individuals such as police officers or healthcare professionals. While targeting these individuals for anti-stigma interventions is of vital importance, targeting the general public could potentially address stigma on a larger scale rather than an individual level.

Unfortunately, Livingston and colleagues (2011) were unable to make any conclusive remarks about what kind of intervention strategies are effective for reducing self, social, and structural stigma, given the wide range of studies and approaches as well as the overall lack of research in this area. Their systematic review highlights several

inconsistencies in the anti-substance use stigma intervention literature (Livingston et al., 2011). For instance, this review emphasizes the noticeable gap in the literature of anti-stigma interventions aimed at child and youth populations, which may be a frontline preventative measure against stigma (Livingston et al., 2011; Schachter et al., 2008). Additionally, very few studies assessed stigma outcomes beyond the immediate post-intervention period, therefore, it remains unclear whether these effects would carry over in the medium- to long-term (Livingston et al., 2011). Furthermore, there is a noticeable gap in the literature on shorter anti-stigma interventions, with the shortest spanning over several days (Livingston et al., 2011). These findings suggest a need for more research aimed at anti-stigma interventions in the substance use stigma field. One step towards this may be through the identification of characteristics and traits of individuals who are more likely to stigmatize others (Palamar et al., 2012). Researchers may be able to better target individuals who need anti-stigma programs the most by examining specific characteristics and traits of individuals who are likely to stigmatize.

Predictors and Potential Moderators of Marijuana Use Stigma

The most extensively researched predictors of stigma are the level of familiarity and contact which play a significant role in regards to stigma. Several studies have explored the level of familiarity and contact in predicting stigma in mental illness, and more specifically, substance use (Brown, 2011; Feldman & Crandall, 2007). As mentioned above, exposing individuals to people from a stigmatized group is related to a decrease in the level of stigma (Corrigan & Watson, 2002). Specifically, as contact with stigmatized groups increases, less stigmatization occurs (Corrigan & Watson, 2002;

Feldman & Crandall, 2007). This could be due to the fact that increasing familiarity or contact with people from the stigmatized group helps to address any common misconceptions an individual may have, which has been successful in the reduction of stigma (Mayville & Penn, 1998; Penn & Martin, 1998). These findings indicate an important link between the level of familiarity and contact with stigma, which should be targeted in the development of successful anti-stigma intervention programs.

In addition to the level of familiarity and the level of contact predicting stigma, other individual characteristics have also been examined as predictors of stigma. For instance, Palamar et al. (2012) found some support for demographic characteristics as predictors of stigma towards the use of different types of illicit drugs in New York City. Specifically, findings indicate that lifetime drug use of marijuana is a significant predictor in the stigmatization of marijuana, powder cocaine, ecstasy, opioids, and amphetamine use (Palamar et al., 2012). Additionally, findings indicate that age is a significant predictor in the stigmatization of powder cocaine, ecstasy, opioids, and amphetamine use (Palamar et al., 2012). Furthermore, findings indicate additional support for exposure to users as a predictor of stigma (Palamar et al., 2012). These factors contribute to the overall understanding of stigma and what specific characteristics may influence how stigma relates to other factors. This can help target specific groups for anti-stigma interventions.

Although Palamar and colleagues (2012) did not find biological sex as a predictor of stigma, pilot study results conducted by the author and colleagues indicate that sex differences in stigma may exist towards substance users as well, although in a

different way (Strong, Guajardo, & Arsiwalla, 2015). Research in the substance use stigma field indicates sex differences exist in the attitudes towards substance use, such that females typically use illegal substances less than males and are more likely to disapprove of substance use (Maricic, Sucic, & Sakic, 2013). In the pilot study, researchers took this a step further and examined biological sex as a moderator variable between the levels of familiarity/contact with stigma (Strong et al., 2015). Findings indicate support for biological sex as a moderator; specifically, females have greater preferred social distance when the level of contact and level of familiarity are low, but when the level of contact and level of familiarity are high, there is virtually no difference between males and females (Strong et al., 2015). This study seeks to expand on the pilot study findings as there is currently a gap in the literature examining moderator variables that may impact the relationship between the level of familiarity or the level of contact and stigma.

Introducing Marijuana and its Current Status in the United States

The commonality of marijuana use and increased use within the United States makes it an important area of interest in the substance use stigma field. Marijuana is the most commonly used psychoactive substance in the United States (American Psychological Association [APA], 2013). The 2013 National Survey on Drug Use and Health (NSDUH) sponsored by the Substance Abuse and Mental Health Services Administration found that 19.8 million Americans had reported using marijuana in the past month as compared to only 14.5 million in 2007 (SAMHSA, 2014), indicating an upward trend in use.

Furthermore, an estimated 2.6 million individuals are legal medical marijuana patients ("Number of Legal Medical Marijuana Patients," 2016). The term medical marijuana refers to using marijuana to treat symptoms of an illness or other condition ("Drug Facts: Marijuana," 2016) whereas recreational marijuana is a term that refers to the use of marijuana for its psychoactive effects rather than for any medicinal benefits. Currently, it is unclear whether individuals who use marijuana for medical purposes differ from individuals who use marijuana recreationally (Roy-Byrne et al., 2015). However, preliminary evidence suggests that medical and recreational users show significant overlaps, with many individuals indicating they use marijuana both recreationally and medically (Furler, Einarson, Millson, Walmsley, & Bendayan, 2004). Additionally, a longitudinal study conducted in the state of Washington examining the similarities and differences between recreational and medical marijuana users suggests that there are very few distinct differences (Roy-Byrne et al., 2015). Hence, given that the differences between recreational and medicinal marijuana users remain ambiguous (Roy-Byrne et al., 2015), it is imperative to distinguish between recreational and medicinal marijuana use in case future research reveals distinct characteristics between these groups.

Marijuana derives from the *Cannabis sativa* or *Cannabis indica* hemp plant and is typically green, brown, or gray in color ("Drug Facts: Marijuana," 2016). It is a blend of dried and shredded leaves, flowers, seeds, and stems of the plant ("Drug Facts: Marijuana," 2016). There is a third species of marijuana, known as *Cannabis ruderalis*, however, is not commonly grown for industrial, recreational, or medicinal use as it only

has trace amounts of the chemical responsible for the mind-altering effects of the substance (Small & Cronquist, 1976). Marijuana has approximately 489 distinct compounds within 18 chemical classes which contain at least 100 different phytocannabinoid compounds that have been identified so far in the limited research that has been permitted on marijuana (Elsohly & Slade, 2005; Hill, Williams, Whalley, & Stephens, 2012). Of these 489 chemical compounds, delta-9-tetrahyrocannabinol (THC) is arguably the most well-known and is responsible for many of the psychotropic or mind-altering effects of this substance (Julien, 2013). In addition to THC, another common chemical found in marijuana is Cannabidiol (CBD; see Medical/Therapeutic Benefits of Marijuana section; Julien, 2013).

There are a variety of ways marijuana can be consumed. The most common route of administration is through smoking marijuana by a variety of methods including pipes, hollowed-out cigars (blunts), water pipes (bongs or hookahs), and cigarettes (joints or reefers; APA, 2013). When users smoke marijuana, the psychoactive chemical THC enters the lungs and rapidly passes the bloodstream, carrying it to organs throughout the body, including the brain (Julien, 2013). The effects of marijuana begin almost immediately when smoked and can last for one to three hours (Julien, 2013). Additionally, marijuana can be vaporized, mixed in with foods or brewed as a tea (known as an edible), smoked in concentrated resins, or taken in a pill form for medical purposes (APA, 2013). When marijuana is consumed in foods or beverages, however, the effects of THC appear later, usually in 30 minutes to 1 hour, and can last over 4 hours (“Drug Facts: Marijuana,” 2016).

Effects on the Brain

THC binds to specific cannabinoid receptors found within the endocannabinoid system in the body which is located throughout the brain [cannabinoid-1 receptors] and the peripheral nervous system [cannabinoid-2 receptors] (Julien, Advokat, & Comaty, 2011). THC can bind to these receptors because it mimics the actions of an endogenous cannabinoid, a fatty acid called anandamide (Julien et al., 2011). There are highly concentrated areas of cannabinoid receptors in several areas of the brain, including the hippocampus, cerebellum, basal ganglia, and cerebral cortex (Julien, 2013). These areas would be the most affected by marijuana, given the high volume of cannabinoid receptors found in those brain regions. Therefore, marijuana use would result in impairments to coordination, movement, sensation, the perception of time and space, appetite, pleasure, judgment, learning, and memory for the user (Julien, 2013). These impairments typically outlast the high and are present for up to three days after use (Julien et al., 2011). The half-life of marijuana (the time required for the concentration of marijuana to decrease by half) is about 30 hours, and regular users may test positive for marijuana for as much as 30 days after use (Julien, 2013).

Other Health Effects

Similar to alcohol, THC can interfere with attention mechanisms, analgesia, short-term memory, motor movements, postural control, and sensory awareness (Julien et al., 2011). However, unlike alcohol, high doses of THC do not produce depressive respiratory functioning and are not lethal (Julien et al., 2011). Some of the common physical effects that accompany marijuana use include red eyes, droopy eyelids, dry

mouth and throat, impaired coordination, mixed bronchial effects (i.e., dilation of blood vessels and irritation), increased heart rate, blood pressure, and muscle relaxation, as well as decreased reflexes, body temperature, and sex hormones (i.e., sperm count and ovulation; Julien, 2013).

Marijuana use may also pose risks to an individual's circulatory and respiratory health. For instance, using marijuana is typically accompanied by an increase in both heart rate and blood pressure (Julien, 2013). Normally, the resting heart rate of a healthy individual is between 70 to 80 beats per minute (Spodick, Raju, Bishop, & Rifkin, 1992). When marijuana is used, however, typical increases in heart rate can range anywhere from 20 to 50 beats more per minute and can last up to 3 hours after use ("Drug Facts: Marijuana," 2016). If heart rate reaches over 100 beats per minute, this is considered too fast, and the person is exhibiting tachycardia (Spodick et al., 1992). Similarly, blood pressure also increases, which can be intensified if additional drugs are taken (Julien, 2013). This increase in heart rate and blood pressure forces the heart to work harder, placing a greater strain on the circulatory system. Additionally, smoking marijuana may impact respiratory health ("Drug Facts: Marijuana," 2016). Specifically, individuals may experience similar breathing and lung issues (e.g., daily cough, increased lung infection risk) as tobacco smokers because marijuana smoke irritates the lungs as well. However, it should be noted that, unlike tobacco, marijuana use has not currently been associated with an increased risk for lung cancer ("Drug Facts: Marijuana," 2016).

Additionally, there are some risks associated with using marijuana while pregnant. Specifically, THC can pass through the placental barrier to the fetus which

means that the fetus is also affected by marijuana every time the mother uses (Julien, 2013). This effect of the substance on the fetus is potentially problematic because the mother may risk changing the developing brain of the fetus which could potentially impact the child's attention, memory, and problem-solving abilities later in life ("Drug Facts: Marijuana," 2016).

In addition, previous research indicates a link between marijuana use and numerous mental health outcomes including substance use disorders, mood disorders, and anxiety (Gerra, Zaimovic, & Gerra, 2010; Johns, 2001; Malone, Hill, & Rubino, 2010; Moore et al., 2007). However, an issue with this past research is that it is unclear whether there is a causal relationship between marijuana use and these disorders or if common contributing factors are shared between those who typically use marijuana and have these disorders. A new study analyzed data from a recent large-scale longitudinal dataset (i.e., the National Epidemiological Survey on Alcohol and Related Conditions) which sheds new light on this issue, by controlling for common underlying sociodemographic factors (e.g., age) that may predict marijuana use (Blanco et al., 2016). This study used data taken from nearly 35,000 participants in two waves (wave 1, 2001 – 2002; wave 2, 2004 – 2005) and initially found similar associations with a wide range of psychiatric disorders. However, after controlling for sociodemographic characteristics, the only significant associations left were with Substance Use Disorders (e.g., Alcohol use, Nicotine Dependence, Cannabis Use Disorder, etc.; Blanco et al., 2016). These findings make the link between marijuana use and various mental health outcomes somewhat unclear, requiring further investigation.

Addiction and Dangerousness

Marijuana is considered an addictive substance with an estimated 1 out of 11 marijuana users becoming addicted (Anthony, Warner, & Kessler, 1994; Robson, 2011). However, this proportion is relatively low when compared to other substances such as alcohol (15%), cocaine (17%), and heroin (23%; Robson, 2011). Genetic, interpersonal, and environmental factors can play a role in whether a person becomes addicted to marijuana ("Drug Facts: Marijuana," 2016). In addition to addiction, individuals who use marijuana may experience withdrawal symptoms when they stop using the drug which can last for several days to a few weeks after quitting (APA, 2013). Many are prone to relapse during this time because people crave the drug to relieve symptoms. These symptoms include irritability, restlessness, sleeplessness, anger or aggression, lack of appetite, depressed mood, weight loss, and anxiety (APA, 2013).

Despite the physical health consequences of marijuana, it is very unlikely that an individual could overdose from using marijuana ("Drug Facts: Marijuana," 2016). However, marijuana does impact judgment, perception, and coordination which can increase the likelihood of individuals partaking in riskier behaviors (e.g., driving under the influence of the drug) possibly resulting in injury or death ("Drug Facts: Marijuana," 2016). Driving or riding with someone who is using marijuana is unsafe because it may impair alertness, concentration, coordination, and reaction time, making it difficult to judge distances and react to sounds or signals on the road (Lenne et al., 2010; Hartman & Huestis, 2013). In fact, marijuana is the most common illegal drug involved with impaired drivers (Hartman & Huestis, 2013). A meta-analysis by Li and colleagues

(2012) on the impact of marijuana on driving examined nine epidemiologic studies which indicated that marijuana users were 2.66 times more likely to be involved in an auto crash than non-users. However, it should be noted that individuals were given a urine screening or self-report to detect drug use which means that individuals who tested positive were marijuana users generally, not necessarily someone who had used marijuana just prior to driving (Li et al., 2012). In a large case-control study, Compton and Berning (2015) sought to investigate this further and looked into other factors that may account for this increased risk of auto crashes. Similar to Li and colleagues (2012), they found that marijuana users have a 25% higher risk of car accidents than drivers who show no evidence of having marijuana in their systems, however, after controlling for other factors (i.e., age, gender, ethnicity, and alcohol use) this increased risk was significantly reduced (Compton & Berning, 2015). Another study examined the effects of alcohol use in combination with marijuana use; they found the most intense effects on performance when it was combined with alcohol, which can be observed in both driving and non-driving tasks (Ronen et al., 2010).

Additionally, people may experience extreme anxiety (e. g., panic attacks) or psychotic reactions after using marijuana (“Drug Facts: Marijuana,” 2016). Although the likelihood of dying from marijuana is low, approximately 461,028 emergency room visits in 2011 involved the use of marijuana as stated in the medical record. Thus, Marijuana accounted for about 39.4% of the total amount of emergency room visits involving illicit drugs in 2011 (SAMHSA, 2013). This number is roughly a 21 percent increase since 2009 alone (SAMHSA, 2013), however, it is unclear that marijuana played a role in these

visits because mentioning marijuana in the medical records does not necessarily mean these emergencies were directly related to marijuana intoxication.

Legality of Marijuana Use

Under Federal law, it is illegal to buy, sell, or carry marijuana because it has been classified as a Schedule 1 controlled substance (Controlled Substances Act of 1970, 2012). This means that the Federal Government considers marijuana to have no medicinal uses and has a high risk for abuse ("Drug Facts: Marijuana," 2016). With marijuana being classified as a Schedule 1 controlled substance, there have been many roadblocks to researching its potential medicinal effects. The challenges to scientific research on this substance are especially disappointing given the 489 chemical compounds that are found in marijuana that could have potential therapeutic benefits (Baron, 2015; Elsohly & Slade, 2005; Hill et al., 2012). However, as mentioned above, the attitudes and state laws for adult marijuana use are changing. As of the 2016 November election, twenty-nine states and the District of Columbia have legalized marijuana in some capacity. Seven of those states (i.e., Alaska, California, Colorado, Maine, Massachusetts, Nevada, Oregon, and Washington) and the District of Columbia have more progressive laws which allow for both medical and recreational use of marijuana for any adult over the age of 21 (Steinmetz, 2016). The legalization of marijuana within a few US states means that nearly one-quarter of people in the U.S. live in a location that allows adult recreational marijuana use (Steinmetz, 2016).

Shifts in Public Opinion of Marijuana Legalization

Marijuana use is often perceived as being deviant on a societal level (Bottorff et al., 2013). However, there has been a favorable shift in public opinion on marijuana legalization in recent years (Pew Research, 2015). The Pew Research Center (2015) conducted a national survey of 1,500 adults examining public perceptions regarding marijuana legalization. Findings indicate the majority of Americans (53%) are in support for marijuana legalization, showing a 21% increase in favorability since 2006 alone (Pew Research, 2015). Nevertheless, not all groups are equally as supportive towards the legalization of marijuana. For instance, nearly every generation has shown sharp rises in support for legalization over the past decade, with the exception of the Silent Generation (born 1925-1945). Millenials (born 1982-2004) are the most supportive of marijuana legalization with over two-thirds (68%) reporting positive views on legalization (Pew Research, 2015). However, only 29% of individuals from the Silent Generation (born 1925-1945) share this positive view of legalization. Additionally, a little under a two-thirds of Republicans (61%) and Hispanics (60%) would prefer that marijuana remains illegal for sale or use within the United States.

Additionally, researchers took this a step further and asked individuals to describe in their own words why they either opposed or favored legalization (Pew Research, 2015). Medical benefits (41%) and the belief that marijuana is no worse than other drugs (36%) are the most frequently cited reason for supporting marijuana legalization (Pew Research, 2015). Opponents, on the other hand, most often cite the belief that marijuana hurts society and is dangerous for individuals as their primary objection to legalization

(Pew Research, 2015). Finding the reasoning behind why each side holds these different perspectives could be helpful in determining what information would be useful within the psychoeducational module.

Medical/Therapeutic Benefits of Marijuana

The use of marijuana for medicinal purposes is becoming more prevalent in industrialized nations (Szaflarski & Bebin, 2014), although using marijuana medicinally is not a new concept (Deitch, 2003). Currently, marijuana has been found to have medicinal properties when prescribed in THC pill form. The two FDA-approved medications for the treatment of nausea in cancer patients (Green, Nathwani, Goldberg, & Kennedy, 1989) and appetite enhancement for patients with human immunodeficiency virus/acquired immunodeficiency syndrome (HIV/AIDS; Einhorn, Nagy, Furnas, & Williams, 1981; Lane et al., 1991) include dronabinol (Marinol®) and nabilone (Cesamet®). Another common chemical found in marijuana that has sparked recent research interests in the applicability of marijuana for medicinal purposes is cannabidiol (CBD; Julien 2013). This chemical does not have any mind-altering effects and has shown promising results in the treatment of seizures for children with severe epilepsy (Hussain et al., 2015; Maa & Figi, 2014). Additionally, several countries outside of the United States have started using a combination of THC and CBD as part of an oral spray in treating the symptoms of multiple sclerosis (Novotna et al., 2011).

Problematic Marijuana Use

However, marijuana use can have negative effects as well, especially for individuals with problematic marijuana use. The American Psychiatric Association

Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-5) outline five marijuana-related disorders; these include marijuana use disorder, marijuana intoxication, marijuana withdrawal, other marijuana-induced disorder, and unspecified marijuana-related disorder (APA, 2013). Marijuana use disorder is characterized by an individual presenting "a troublesome pattern of use that leads to impairments or hardships of clinical significance happening within a 12-month period" (APA, 2013). The adversity experienced by the individual must manifest itself through at least two of eleven criteria to be considered clinically significant. The DSM-V criteria include (i) increasing marijuana use or use over a longer period than what was initially planned, (ii) reoccurring urge or unsuccessful attempts at cutting back use, (iii) increasing amounts of time used trying to get more, use, or recover from marijuana, (iv) stronger cravings or urges to use marijuana, (v) reoccurring use of marijuana interfering with executing a major role obligation, (vi) continuing use despite ongoing or reoccurring social or interpersonal issues due to or intensified by use, (vii) previously important activities abandoned or greatly decreased because of marijuana use, (viii) repeatedly using marijuana in potentially physically harmful situations, (ix) continuing marijuana use despite knowing the impact of use on physical or mental health likely caused by use, (x) exhibiting tolerance of marijuana, and (xi) displaying withdrawal syndrome (APA, 2013). This withdrawal can cause significant distress in the patient and can add to the difficulty in quitting or relapsing. It may be difficult to distinguish between nonproblematic marijuana use and cannabis use disorder because of social, behavioral, or psychological problems

(APA, 2013), but this distinction is important when considering the effects of recreational marijuana use.

Focus of the Current Study

Although the rates of problematic use apply to a small percentage of the population, there are still a significant number of individuals consuming marijuana regularly in the United States who may be subject to public stigmatization impacting their lives, making it a prominent issue in our society. Addressing the reduction of stigma through anti-stigma intervention programs will help in the reduction of negative consequences associated with stigma for these individuals. Additionally, it is important to distinguish between recreational and medicinal marijuana use because the differences between these users remain unclear (Roy-Byrne et al., 2015). Given this, assessing problematic use is out of the scope of the current study which will instead focus on general recreational use. The current study will focus on recreational marijuana use, specifically because of the prevalence rates of use for this drug as compared to other illegal substances and the current climate of legalization in the United States.

Current Study

In the current study, we focus on expanding current anti-stigma research by pilot-testing a psychoeducational module designed to reduce public stigma surrounding recreational marijuana use. This module seeks a balance of providing factual information while still maintaining a brief time commitment. As mentioned above, there is currently a huge gap for successful anti-stigma intervention programs for substance use stigma. The 25-minute interactive psychoeducational module could contribute to a reduction in stigma

by increasing knowledge and familiarity with marijuana and its uses. This module was adapted, with permission (NIDA Info, personal communication, May 29, 2015), from information about marijuana use provided by the National Institute of Drug Abuse (NIDA) website for teens ("Drug Facts: Marijuana," 2015). The treatment group received the module, while the control group viewed a neutral nature documentary similar to documentaries used in prior research as controls (Medalia, Aluma, Tyron, & Merriam, 1998). Secondly, we examined the relationship between the levels of contact or familiarity with recreational marijuana users and their stigma level (i.e., preferred social distance, perceived dangerousness, and negative affect). Furthermore, we examined whether certain characteristics (i.e., sex, age, and current marijuana use) moderated the relationship between the level of contact or level of familiarity and stigma. Finally, we assessed the potential impacts this education could have on the likelihood of future recreational marijuana use of the participant.

Stigma is measured using preferred social distance, perceived dangerousness, and negative affect, all of which have been used in previous mental illness stigma research (Feldman & Crandall, 2007; Link, Cullen, Frank, & Wozniak, 1987) and substance use stigma research (Brown, 2011; Mackert, Mabry, Hubbard, Grahovac, & Holleran Steiker, 2014). Preferred social distance refers to the willingness of an individual to interact with another person in different situations. Perceived dangerousness addresses the extent to which people perceive others as threatening to them. People are more willing to reject an individual if they perceive them to be more dangerous (Corrigan & Watson, 2002; Feldman & Crandall, 2007). Negative affect refers to a person's negative feelings and

aversive mood states (i.e., anger, contempt, disgust, nervousness, fear, guilt; Watson, Clark, & Tellegen, 1988) towards users of the substance (i.e., marijuana).

This study has two unique components adding to the literature. First, the use of a short, interactive module that provides information regarding marijuana is unique to the substance use stigma field. The psychoeducational module was developed in an attempt to devise a simple, practical, and cost-effective technique that can be easily applied to any anti-stigma intervention program. The module is meant to be fun and informative for the audience and is aimed at engaging participants by providing pop quizzes, educational videos, and a variety of pictures, ultimately, promoting active learning (Bonwell & Eison, 1991; Prince, 2004). Promoting active learning may help individuals become more engaged, making them more familiar with the information, and more likely to remember the information later (Bonwell & Eison, 1991). A second unique contribution is the examination of individual differences factors in the form of moderator variables (i.e., sex, current marijuana use, and age) of the relationship between levels of contact/familiarity and stigma; these moderators can shed light on specific groups to target for future anti-stigma intervention programs. Identification of such characteristics could aid future research and help anti-stigma intervention programs target specific groups that may be more subject to stigmatization. Examining specific characteristics and components that vary the level of stigma is an essential step toward implementing targeted anti-stigma intervention programs.

Hypothesis 1

We hypothesized that individuals receiving the psychoeducational module about marijuana would report increased knowledge regarding marijuana and less stigmatized views (i.e., less preference for social distance, less perceived dangerousness, and fewer negative affect) toward marijuana use. Specifically, we expected to find (1a) an increase in the pre- to post-knowledge score for the experimental group (that receives the psychoeducational module) and no increase in post-test score for knowledge among participants in the control group. We also expected to find (1b) a decrease in pre- to post-test preferred social distance for the experimental group and no decrease for the control group and (1c) a decrease in pre- to post-test perceived dangerousness for the experimental group and no decrease for the control group. Finally, we expected (1d) a decrease in pre- to post-test negative affect for the experimental group and no decrease for the control group. A 2 x 2 mixed factorial analysis of variance (ANOVA) with one within-person repeated measures factor (i.e., pre- and post-stigma) and one between person factor (i.e., experimental group vs. control group) was used with SPSS. We expected a significant interaction, such that knowledge and stigma would be the same for the control group from pre- to post- measure. However, the experimental group would show an increase in knowledge and a decrease in stigma.

Hypothesis 2

We expected to find a relationship between the level of contact, the level of familiarity, and stigma measures, such that there would be less stigmatized views (i.e., preference for social distance, perceived dangerousness, and negative affect) toward

marijuana use for individuals who have had higher levels of contact or familiarity with marijuana users. Specifically, regardless of the group (i.e., experimental or control), we expected that individuals who have had higher levels of contact with marijuana users would predict lower pre- and post-test ratings for (2a-1; 2a-2) preferred social distance, (2b-1; 2b-2) perceived dangerousness, and (2c-1; 2c-2) negative affect regarding recreational marijuana users. Similarly, regardless of group (i.e., experimental or control), we expected individuals who are more familiar with marijuana users would predict lower pre- and post-test ratings of (2d-1; 2d-2) preferred social distance, (2e-1; 2e-2) perceived dangerousness, and (2f-1; 2f-2) negative affect regarding recreational marijuana users. Additionally, regardless of group (i.e., experimental or control), individuals with more knowledge about marijuana would predict lower pre- and post-test ratings for (2g-1; 2g-2) preferred social distance, (2h-1; 2h-2) perceived dangerousness, and (2i-1; 2i-2) negative affect regarding recreational marijuana users. A regression analysis was conducted to examine the relationships between the level of familiarity, the level of contact, the degree of knowledge about marijuana, preferred social distance, perceived dangerousness, and negative affect regarding marijuana users.

Hypothesis 3

We also expected to find that sex, current marijuana use, and age differences would moderate the relationship of contact/familiarity with stigma. Specifically, we expected females in the control group would have greater levels of pre- and post-test (3a-1; 3a-2) preferred social distance, (3b-1; 3b-2) perceived dangerousness, and (3c-1; 3c-2) negative affect regarding marijuana users when the level of contact is low. However,

females in the experimental group would have greater levels of pre- and post-test (3a-3; 3a-4) preferred social distance, (3b-3; 3b-4) perceived dangerousness, and (3c-3; 3c-4) negative affect regarding marijuana users when the level of contact is low. Similarly, we expected females in the control group would have greater levels of pre- and post-test (3d-1; 3d-2) preferred social distance, (3e-1; 3e-2) perceived dangerousness, and (3f-1; 3f-2) negative affect regarding marijuana users when the level of familiarity is low. However, females in the experimental group would have greater levels of pre- and post-test (3d-3; 3d-4) preferred social distance, (3e-3; 3e-4) perceived dangerousness, and (3f-3; 3f-4) negative affect regarding marijuana users when the level of familiarity is low. Additionally, we expected non-users in the control group would have greater levels of pre- and post-test (3g-1; 3g-2) preferred social distance, (3h-1, 3h-2) perceived dangerousness, (3i-1; 3i-2) negative affect regarding marijuana users when the level of contact is low. Non-users in the experimental group, on the other hand, would have greater levels of pre- and post-test (3g-3; 3g-4) preferred social distance, (3h-3; 3h-4) perceived dangerousness, and (3i-3; 3i-4) negative affect regarding marijuana users when the level of contact is low. Similarly, we expected non-users in the control group would have greater levels of pre- and post-test (3j-1; 3j-2) preferred social distance, (3k-1, 3k-2) perceived dangerousness, (3l-1; 3l-2) negative affect regarding marijuana users when the level of familiarity is low. Non-users in the experimental group, on the other hand, would have greater levels of pre- and post-test (3j-3; 3j-4) preferred social distance, (3h-k; 3k-4) perceived dangerousness, and (3l-3; 3l-4) negative affect regarding marijuana users when the level of familiarity is low. Furthermore, we expected 18-year-olds in the control

group would have greater levels of pre- and post-test (3m-1; 3m-2) preferred social distance, (3n-1; 3n-2) perceived dangerousness, and (3o-1; 3o-2) negative affect regarding marijuana users when the level of contact is low. However, 18-year-olds in the experimental group would have greater levels of pre- and post-test (3m-3; 3m-4) preferred social distance, (3n-3; 3n-4) perceived dangerousness, and (3o-3; 3o-4) negative affect regarding marijuana users when the level of contact is low. Similarly, we expected 18-year-olds in the control group will have greater levels of pre- and post-test (3p-1; 3p-2) preferred social distance, (3q-1; 3q-2) perceived dangerousness, and (3r-1; 3r-2) negative affect regarding marijuana users when the level of familiarity is low. 18-year-olds in the experimental group, on the other hand, would have greater levels of pre- and post-test (3p-3; 3p-4) preferred social distance, (3q-3; 3q-4) perceived dangerousness, and (3r-3; 3r-4) negative affect regarding marijuana users when the level of familiarity is low. We used linear moderated regression analysis (Champoux & Peters, 1987; Shieh, 2009) using SPSS, fitting each moderation into separate models.

Research Question 1

Additionally, we explored whether there was a significant difference on the likelihood of future use across the experimental versus the control group. We explored this possible relationship by comparing the means of the two independent groups (i.e., experimental vs. control group) to determine whether the means were significantly different from one another.

Research Question 2

Furthermore, we explored whether there was a relationship between the level of familiarity, the level of contact, and the likelihood of future use. After establishing this relationship, we examined whether sex, any past marijuana use, and age would moderate this potential relationship. Again, we used linear moderated regression analysis (Champoux & Peters, 1987; Shieh, 2009) in SPSS to fit each model separately.

CHAPTER 2

METHODS

Design

The current study employed an experimental research design. For the ANOVA-based analyses, a 2 X 2 mixed factorial ANOVA with one within-subjects factor and one between subjects factor was conducted for each outcome. The time of measurement was the within-subjects (repeated measures) factor (assessed at pre and post), and the group (intervention and control) was the between-subjects factor. The independent variables are the groups (i.e., psychoeducational module group versus control group) and time of measurement (pre and post assessment); the dependent variables are the knowledge and level of stigma (i.e., preferred social distance, perceived dangerousness, and negative emotions). For all regression-based analyses, the predictor variables were the level of contact and level of familiarity and the outcome variables were all stigma measures (i.e., preferred social distance, perceived dangerousness, and negative emotions). Additionally, the likelihood of future use was also explored as a dependent variable. Furthermore, we examined the moderating role of participant sex, any past marijuana use, and age in the relation between the level of contact, the level of familiarity, and the level of stigma. Furthermore, we conducted exploratory analyses examining the same moderators in the relation between the level of contact, the level of familiarity, and the likelihood of ever using marijuana in the future.

Participants

An a priori power analysis was conducted with G*Power statistical software (Faul, Erdfelder, Lang, & Buchner, 2007), using an expected medium effect size (f^2 = .15), alpha = .05, and power = .95 for each statistical test. The projected sample size needed for conducting a two-way repeated measures, within-between group interaction ANOVA with this effect size, alpha, and power is approximately N = 54 per group (Appendix N). The projected sample size needed for conducting a two-way repeated measures, between factors ANOVA with this effect size, alpha, and power is approximately N = 158 overall (Appendix N). The projected sample size needed for conducting a linear multiple regression with one number of tested predictors and five total number of predictors with this effects size, alpha, and power is approximately N = 89 per group (Appendix N). Based on this power analysis, we proposed to collect a sample of 180 participants to ensure adequate analyses for each test.

The sample consisted of 201 undergraduate students (ages 18-25 years) from the University of Northern Iowa. The participants were predominately female (66% female), 18 years old (51%), freshman (75%), and primarily of Caucasian descent (92%). Approximately 37% of participants (N = 75) have used marijuana at some point in the past, and approximately 27% of those individuals who have used in the past have used marijuana in the last 30 days. Participants were recruited using SONA (an online participant recruiting website), from a variety of introductory psychology courses and were issued the survey using Qualtrics in a computer lab on campus. Upon completion, students received 1.0 credit toward fulfilling the psychology department's course

research requirement in return for their participation. No other exclusion criteria were employed.

Measures

Demographics

Researchers created a demographics measure consisting of 8 questions for this study (Appendix B). We assessed sex, age, race/ethnicity, major, grade level, household income level, use of marijuana in the last 30 days, and whether or not participants sought substance use treatment in their life. Researchers defined drug use in terms of usage over the last 30 days before the survey because the National Survey on Drug Use and Health (NSDUH) often defines current drug use in these terms (SAMHSA, 2014). Additionally, participants were provided with a description of marijuana use (Appendix C). This description included a picture and brief description of marijuana, its short-term effects, and how it is typically used; this was used to ensure that all participants were familiar with the specific substance in question.

Level of Familiarity Questionnaire

The level of familiarity questionnaire (Corrigan et al., 2003; see Appendix D) determines the level of familiarity an individual has with marijuana users by asking participants whether they have experienced any of the 11 levels of familiarity with users of marijuana. We used a modified version of the Level of Familiarity Questionnaire targeted at mental illness (Corrigan et al., 2003). In the current measure, "a severe mental illness" was replaced with "a person who uses marijuana." Levels range from 1 = "*I have never observed a person who used marijuana*" to 11 = "*I have used marijuana*."

Typically, the highest level indicated based on the ordinal ranking system is documented as that individual's level of familiarity. However, in the current study, we took a sum of the total number of instances the individual endorsed with higher scores indicating a higher level of familiarity. In a pilot study, we found acceptable reliability for using the measure in this way ($\alpha = .73$; Strong et al., 2015). The current study found acceptable reliability for the measure as well ($\alpha = .70$).

Substance Use Contact Scale (SUCS)

The Substance Use Contact Scale (SUCS; Brown, 2011; Appendix E) is a two-part measure: the first section uses a 4-point Likert scale measuring the amount of previous contact an individual has had with a marijuana user in the last year in various settings (e.g., "where you live"), and the second section has a 5-point Likert scale measuring whether their overall impression was favorable. Responses on the first section range from 0 = "*never*" to 3 = "*often*". Responses to the second section range from 1 = "*very unfavorable*" to 5 = "*very favorable*". The items in the first section were averaged to obtain a scale score. The items in the second section were averaged to obtain a favorability score. Pilot study results indicated acceptable reliability ($\alpha = .78$; Strong et al., 2015). The current study found acceptable reliability for the measure as well ($\alpha = .75$).

Pre-/Post-Test Knowledge Regarding Marijuana

The pre-/post-test knowledge regarding marijuana (see Appendix F) is a self-created test examining current knowledge regarding marijuana based on the information presented directly in the psychoeducational module; the module was adapted from information found on the NIDA marijuana drug facts website for teens ("Drug Facts:

Marijuana," 2015). The knowledge test consisted of 25 questions and included information regarding what marijuana is, how it is used, what effects it has on the brain, body, health, and driving, whether someone can become addicted or die from marijuana use, and medical uses of marijuana. This knowledge test included multiple-choice and true/false type questions. To ensure that participants would not memorize correct answers to the questions, we did not provide feedback to participants about correct responses to the pre-test measure. However, participants received feedback about their scores from both tests after completing the post-test of knowledge. All the content used in the test was covered in the psychoeducational module that half of the participants received. The number of correct responses were added together to create a total knowledge sum score. All questions from this test were given to undergraduate research assistants to ensure clarity and readability. The current study found a reliability score of $\alpha = .27$ before receiving the module or video and acceptable reliability after having received the module or video for the measure ($\alpha = .78$).

Likelihood of Future Use

To determine likelihood of future use (see Appendix F), participants answered four questions before and after the module which related to how likely they would be to use marijuana in the next week, month, year, or ever. This 6-point Likert scale has responses ranging from 1 = "*very unlikely*" to 6 = "*very likely*", with higher scores indicating greater likelihood of future use. The single responses to these questions were used for exploratory analyses.

Affect Scale-Substance Use

The Affect Scale-Substance Use (AS-SU; adapted from Penn et al., 1994; Appendix G) is a 7-point Likert scale measuring how people would feel if they interacted with someone who smokes marijuana heavily; higher scores indicated more negative emotions. Individuals were presented with 10 pairs of bipolar dimensions (e.g., "empathetic—angry", "supportive—resentful"), and asked to rate them. Items 1, 4, 6, 7, and 8 were recoded. The items scores were averaged to obtain a scale score. In past research, the AS-SU displayed excellent reliability (α=*.92*; Brown, 2011). Pilot study results indicated excellent reliability as well (α=*.97*; Strong et al., 2015). The current study found excellent reliability for the measure, both before (α = *.97*) and after (α = *.98*) receiving the module or video.

Social Distance Scale

The Social Distance Scale (SDS-SU; adapted from Link et al., 1987; Appendix H) is a standardized measure for substance use stigma measuring an individual's willingness to interact with a marijuana user across seven different situations (e.g., "How would you feel having someone like John as a neighbor?") on a 4-point Likert scale. This type of scale has been used in the past in conjunction with hypothetical vignettes in the mental illness stigma field (Feldman & Crandall, 2007; Link et al., 1999). Responses ranged from 1 = "*definitely willing*" to 4 = "*definitely unwilling*" with higher scores indicating a greater preferred social distance. The items scores were averaged to obtain a scale score. An example item is, "How would you feel about renting a room in your home to someone like John?" In past research, the SDS-SU displays good reliability (α=*.85*) and good

construct validity when compared to the adapted version of the level of familiarity questionnaire taken from the mental illness stigma research (Brown, 2011). This comparison also helps in addressing issues of convergent validity because these are both constructs that we would expect to be related and results indicate that they are related. Pilot study results indicated excellent reliability as well (α=*.95*; Strong et al., 2015). In the current study, we found excellent reliability for the measure both before (α = *.92*) and after (α = *.93*) receiving the module or video.

Dangerousness Scale

The Dangerousness Scale (DS-SU; adapted from Link, et al., 1987; Appendix I) measures the extent to which people perceive marijuana users as threatening to them (e.g., "One important thing about someone like John is that you cannot tell what they will do from one minute to the next") on a 6-point Likert scale. This type of scale has been used in the past in conjunction with hypothetical vignettes in the mental illness stigma field (Feldman & Crandall, 2007; Link et al., 1999). Adaptations for the mental illness stigma version include changing the terms, "former patients with a severe mental illness," "patients with a severe mental illness", and "severe mental illness" were substituted for the name of the person depicted in the vignette, as marijuana use disorder is implied in the vignettes. Responses ranged from 1 = "*strongly agree*" to 6 = "*strongly disagree*". Items 1, 3, 4, 6, and 7 are to be recoded. Higher scores indicated a greater preferred social distance. An example item is, "If someone like John lived nearby, I would not allow my children to go to the movie theater alone." The items scores were averaged to obtain a scale score. In past research, the DS-SU displays acceptable reliability (α=*.71*) and good

construct validity when compared to the adapted version of the level of familiarity questionnaire taken from the mental illness stigma research (Brown, 2011). This comparison also helps in addressing issues of convergent validity. Pilot study results indicated good reliability as well (α=*.91*; Strong et al., 2015). The measure had good reliability in the current study both before (α = *.86*) and after (α = *.87*) receiving the module or video.

Procedure

The study was submitted to the University Institutional Review Board (IRB) for their approval prior to data collection. Participants recruited on the SONA program were invited to a computer lab on campus to control the setting in which they completed the survey. Participants were randomly assigned to one of two groups before beginning the study. The first group was the experimental group. Participants in the experimental group received a psychoeducational module, designed to increase knowledge about marijuana and reduce stigma toward recreational marijuana users. This module was pilot-tested on undergraduate research assistants to ensure readability/clarity and determine the average completion time (*M* = 21 minutes). Findings indicated that the module did not exceed 30 minutes. The second group was the control group. Participants in the control group watched a 25-minute neutral video clip from Episode 10: Seasonal Forest taken from the Planet Earth TV series produced by the British Broadcasting Corporation (BBC) Natural History Unit (Fothergill, 2006). This video depicts seasonal forests and wildlife from around the world. It should be noted that the video does not have any extreme acts of violence between animals, and humans only appear twice in the video climbing a tree.

Permission to use the clip was requested and approved by BBC (BBC Worldwide Learning, personal communication, June 11, 2015).

The study session was approximately 45-60 minutes and began with participants reviewing and signing an informed consent form (Appendix A). All individuals began the session answering demographic questions (Appendix B) and the description of marijuana (Appendix C), followed by the level of familiarity questionnaire (adapted from Corrigan et al., 2003; Appendix D), the Substance Use Contact Scale (Brown, 2011; Appendix E), pre-test knowledge measure (Appendix F), and the Likelihood of Future Use Questions (Appendix G). Participants then answered questions taken from the Social Distance Scale-Substance Use (adapted from Link et al., 1987; Appendix I), the Dangerousness Scale-Substance Use (adapted from Link et al., 1987; Appendix J), and the Affect Scale-Substance Use (Appendix H; adapted from Penn et al., 1994). After completing these measures, those in the first group were given a website link to the psychoeducational module (Appendix K) and asked to spend 20-30 minutes on the site. However, those in the second group watched an embedded 25-minute neutral video clip (Fothergill, 2006). Following the module and the video clip all participants completed the post-test stigma and post-test knowledge measures.

All participants were provided with contact information at the end of the survey for the primary investigator and the UNI counseling center, in the event that the participant felt distressed at the end of the survey. Additionally, no specific identifiers were requested from participants beyond basic demographic information (such as age, gender, race, and year in school) that are necessary to determine key hypotheses.

However, even if any identifying information was accidently collected, researchers deleted it before any data were analyzed or disseminated in scholarly conferences and publications.

Initial Data Checks and Attention Checks

A codebook was created that detailed the variable names, descriptions, and formats of study variables. Furthermore, to ensure easy readability and understanding, the researchers had undergraduate research assistants review the questionnaire before data collection. Additionally, any missing values in the data, which could be due to participants being told they are free to skip any question they do not want to answer, were assigned the specific value of 99. If more than 10% of the cases were missing data and the data were missing at random (MAR) or missing completely at random (MCAR), another program (AMOS) would be used, since it uses Full Information Maximum Likelihood (FIML) to handle missing cases (Enders & Bandalos, 2001; Graham, 2003; Little, 1988). However, a small proportion of cases were missing (6%), hence listwise deletion was used for analyses, and the AMOS program was not required.

To ensure quality data, Peer, Vosgerau, and Acquisti (2014) recommend the use of attention check questions (ACQ's). ACQ's ensure that participants are paying attention to items within the survey. This study included three ACQ's (Appendix K). The first was an instructional manipulation (adapted from Oppenheimer, Meyvis, & Davidenko, 2009), inserted directly after the description of marijuana giving instructions within a lengthy text asking participants to ignore the response options pertaining to sports within the question and simply click 'Next.' The second ACQ was presented after the

psychoeducational module or neutral video clip depending on the participant's group. Here, participants will be asked to respond to the question “While watching TV, have you ever had a fatal heart attack?” The correct response to this item is “Never.” The last ACQ (adapted from Peer et al., 2014), prior to completion of the study, required participants to answer the question, “What was this survey about?” The instructions provided here ask participants not to mark “Marijuana use” or “Perceptions,” but instead to choose “Other” and type in “Psychology” in the text box. Again, this is to ensure participants are paying attention throughout the study. If participants answered any of these attention check questions incorrectly, their data was deleted from the dataset and not used for analysis as it was unclear whether or not they paid attention throughout the rest of the study.

Data Coding and Plan of Analysis

All scales were coded where higher numbers imply a more negative outcome (e.g. a 1 for preferred social distance is positive, whereas a 4 is negative and implies participants have more stigma). Researchers first cleaned the data and calculated how much data was missing in order to determine whether another program (AMOS) would be needed to analyze the data. However, the use of this program is unwarranted given the low number of missing data (6%). Next, researchers deleted cases with incorrect responses to the Attention Check Questions. After deleting the cases with incorrect responses to the Attention Check Questions, researchers computed frequencies to examine patterns in the data and probed for outliers. If outliers existed beyond 3 standard deviations, those cases were not included in our analyses. Next, descriptive statistics were

computed to analyze the characteristics of the obtained sample. Following this, specific analyses were run for each hypothesis.

Hypothesis 1

We expected to find pre- to post-test differences in knowledge about marijuana and stigma (i.e., preferred social distance, perceived dangerousness, and negative emotionality) between those who received the psychoeducation module and those in the control group. We utilized a two-way repeated measures, within-between groups interaction ANOVA for each outcome using SPSS. The significant interaction for the ANOVA would indicate that the control group will report no change on the outcome measures (i.e., knowledge and stigma). However, we expected that the experimental group that receives the psychoeducational module would report an increase in knowledge and decrease in stigma.

Hypothesis 2

We expected to find a relationship between the level of contact/familiarity and stigma; specifically, there would be less stigmatized views (i.e., preference for social distance, perceived dangerousness, and negative emotionality) toward marijuana use for individuals who have had higher levels of contact with marijuana users. A regression analysis was conducted to examine the relationships between the level of familiarity, the level of contact, the degree of knowledge about marijuana, preferred social distance, perceived dangerousness, and negative emotions regarding marijuana users. The unstandardized and standardized beta, n value, significance level, confidence intervals, and effect sizes were reported.

Hypothesis 3

We also expected to find that sex, current marijuana use, and age differences would moderate the relationship between contact/familiarity with stigma. We used linear moderated regression analysis (Champoux & Peters, 1987; Shieh, 2009) with SPSS. Each moderation test was fit into separate models. This process utilized centered predictors entered in the first step, centered moderators entered in the second step, and the interaction term of centered predictors and moderator in the final step. The Aiken and West (1991) procedure for simple slopes tests was conducted to determine the main and interaction effects. Specifically, we assessed whether the relationship between the predictors and the outcomes are significant at both low (-1SD) and high levels (+1SD) of the moderator. Beta values, significance levels, adjusted R-squares, significance of the slopes, confidence intervals, and overall model statistics were reported.

Research Question 1

Additionally, we also wanted to explore whether there was a significant difference in the likelihood to ever use marijuana in the future across the experimental versus the control groups. We explored this possible relationship using independent samples t-tests for each model. This procedure compared the means of the two independent groups (i.e., experimental vs. control group) to determine whether the population means were significantly different from one another. T-values, significance levels, means, and standard deviations were reported.

Research Question 2

Furthermore, we explored whether there was a relationship between the level of familiarity, the level of contact, and the likelihood of future use. After establishing this relationship, we examined whether sex, any past marijuana use, and age would moderate this potential relationship. Using the same linear moderated regression analysis (Champoux & Peters, 1987; Shieh, 2009) and Aiken and West (1991) procedure mentioned above, each moderation test was fit into separate models. This procedure utilized centered predictors entered in the first step, centered moderators in the second step, and the interaction term of centered predictors and moderator in the final step. Beta values, significance levels, adjusted R-squares, the significance of the slopes, confidence intervals, and overall model statistics were reported.

Validity

There are many potential threats to internal and construct validity that could occur due to the design of this study. However, researchers tried to address many of these threats before implementing the study. These threats include response styles (i.e., acquiescence bias, demand characteristics, extreme responding, and social desirability bias), mortality, attrition, testing, and maturation threats as well as the high potential for missing data. There will always be limitations and threats to the validity of any study; researchers just need to consider these threats and find ways minimize their impact.

Understanding how each of these common method biases can influence validity may help to minimize the impact of their effects (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In order to understand the influence of response styles on validity, it is

essential to understand the differences in the four main response styles. For instance, acquiescence bias response style occurs when a respondent tends to agree (or disagree) with most questionnaire items, despite the content (Podsakoff et al., 2003). Researchers may try to combat this bias by reverse coding certain items. Additionally, demand characteristics response style may also play a role in an individual's response style. Demand characteristics are subtle cues that could alert participants to what the experimenter expects to find or how they are expected to behave resulting in the participant altering their response or behavior (Morling, 2012). In addition, extreme responding response style occurs when respondents use the more extreme values on the edges of a rating scale rather than clustering around midpoint values, creating more dichotomized responses (Podsakoff et al., 2003). These differences in scores between participants might reflect something other than what the questionnaire was designed to measure. Furthermore, an individual may try to respond in a way that is socially desirable meaning an individual unconsciously or consciously "fakes good" because they are too shy, embarrassed, or worried about giving an unpopular opinion (Morling, 2012).

In the current study, we addressed many of these biases by including an appropriate comparison group (i.e., control group receiving neutral video clip), however, other biases required a more specific plan to help control their impact. For instance, certain response styles (i.e., acquiescence bias, demand characteristics, extreme responding, and social desirability) required more than just including a comparison group. Specifically, response style biases were addressed using multiple methods which included reverse scoring on particular measures, telling respondents answers would be

kept strictly confidential, and placing attention checks throughout the survey to determine if the participants were susceptible to patterned responding (Morling, 2012).

Additionally, the post-test knowledge response options were automatically randomized to reduce the likelihood of order-effects as well as threats to mortality, maturation, and attrition. Mortality, maturation, and attrition threats would be more likely in this study because participants are asked to remain focused throughout the entire 45-60 minute appointment. Specifically, maturation may occur if the experimental group improves over time due to either spontaneous or natural development (Morling, 2012). Mortality threat, on the other hand, occurs when participants may experience boredom or fatigue effects due to the length of the survey which could influence the accuracy of their responses (Morling, 2012). Similarly, attrition occurs when an individual drops out of the study before completing all components of the study (Morling, 2012). Researchers tried to address the issue of mortality by implementing a brief psychoeducational module that was designed to last no more than 30 minutes (Morling, 2012). Researchers tried to address maturation and attrition threats to validity by utilizing a comparison group and scheduling both the pre- and post-test knowledge and stigma measures to be completed on the same day (Morling, 2012). Attrition rates were very low (2%), with roughly 5 individuals not completing the entire study. The individuals who did drop out did not do so systematically and their responses were removed from the study so it is unlikely that the attrition rates effected the internal validity of the study. Furthermore, testing threats may also be an issue for this study and can occur when an individual's scores change over time because they have taken the test multiple times (Morling, 2012). Researchers

tried to address this threat by not providing feedback on the correct responses to the knowledge questions until after the post-test was completed. The question order and response-option order were also randomized on the post-test in order to reduce some of these practice effects. Lastly, there is a potential for missing data because participants may also skip any questions that make them feel uncomfortable or may stop at any time (Morling, 2012). However, there was only a small proportion of cases that were missing (6%).

Researchers should try to address most threats to validity before starting a study, however, common method bias is unavoidable. For instance, there may be common method bias that occurs from external biases of an individual's response options based on the measurement method (e.g., self-report) rather than the constructs the measure represents (Podsakoff et al., 2003). This study, for instance, only employs the use of self-report measures. This may bias the data to a certain degree because using self-report questionnaires relies on an individual answering the questions honestly. The degree to which individuals are honest on a questionnaire may relate to the topic of the questionnaire, their introspective ability, and their understanding or interpretation of particular questions (Morling, 2012). Additionally, almost all self-report measures produce ordinal data which tells you the order of the units but not the distance between them (Wilcox, 2012). The issue with using ordinal data is that it is common practice to use parametric statistical techniques that are based on assumptions about the distribution of the data. However, these assumptions cannot always be met with ordinal data (Wilcox, 2012). Incorrect interpretations of the data may then occur because of the deviations from

these assumptions (Wilcox, 2012). Even with these issues, using self-reporting was the most efficient way to collect this data and is commonly used in behavioral research (Morling, 2012). Researchers determined that the benefits of using self-report outweigh the potential limitations. However, these limitations of self-reporting should still be kept in mind when interpreting the current studies findings.

Low external validity is expected, due to the use of a convenience sampling method. The actual sample may be unrepresentative of the theoretical population of college students in the U.S., as this study only examines students from one medium-sized, public Midwestern university. Participation in the study was voluntary, and not everyone who met the inclusion criteria on campus were sampled. However, steps were taken to ensure as much as external validity as possible, by employing data collection at different times throughout the week and semester so that data collection timing would not influence the results. Furthermore, to help minimize dropout rates, participants received compensation (1.0 research credits) for participating.

Ethics

Participants were recruited from introductory psychology courses at the university and had no relationship to the principal investigator. This recruiting strategy minimized the threats of coercion, undue influence, and unjustifiable pressure. Sign-up was completely confidential for participants. In the informed consent and start of the study, participants were reminded that the study is voluntary, and they had the right to withdraw their participation at any time without penalty. Responses were anonymous as all identifying information, if any, was deleted before starting data analysis and blinders

were used around the computer stations to help ensure more anonymity in responding. Additionally, participants were randomly assigned a participant number that was not linked to their identity. Completed data and informed consents have been stored in the faculty advisor's locked research lab.

An ethical concern about this investigation must be addressed in regards to asking participants about their marijuana use. We asked participants whether or not they have used marijuana in the last 30 days to determine whether or not the participant is a current marijuana user. This question may have produced discomfort or distress in some individuals since we are asking about illegal activities. This could be seen as going against Standard 3.04 in the American Psychological Association Ethics Code regarding avoiding harm (2010). However, participants used blinders at their workstations to maintain anonymity and were informed multiple times that they are free to skip any question or withdraw their participation at any time during the survey. Additionally, participants were provided with information about UNI Student Counseling Center services in the informed consent, and again, at the end of the study, if they experienced distress after the study. Furthermore, a research assistant was present in the lab with the participants at all times so they could ask them any questions or get additional helping information if needed. Thus, researchers ensured that the benefits of this study outweighed any associated risks to participants.

CHAPTER 3

RESULTS

Overview

An extensive review of the literature revealed no existing experimental findings on the investigation of interactive knowledge-based internet modules and their effect on the stigma associated with recreational marijuana use and knowledge regarding marijuana. The purpose of this study was to pilot test a brief psychoeducational module designed to increase knowledge and reduce stigma towards recreational marijuana users. Additionally, this study sought to reestablish the link between the level of familiarity and the level of contact with stigma while also examining the moderating role of gender, age, and past personal use of marijuana. Furthermore, exploratory analyses were conducted to examine the relation between the level of contact and the level of familiarity with the likelihood of future use, as well as the role of moderators discussed above.

Preliminary Analysis

Various descriptive and inferential analyses were performed prior to analysis. Specifically, descriptive statistics were run for each group together (Table 2) and then separately (Table 3-4) which were examined to see how much they differed from one another and the overall means. Additionally, correlations between the key study variables were examined with the merged data (Table 5) and for each group separately (Table 6-7). As expected, the merged data suggests strong positive associations with the level of familiarity and level of contact ($r = .55$, $p < .01$; see Table 5). Similarly, in the psychoeducational module ($r = .63$, $p < .01$; see Table 6) and control group ($r = .46$, $p <$

.01; see Table 7) there were positive associations as well between the level of familiarity and level of contact.

Additionally, the merged data indicated strong positive associations between pre- and post-test preferred social distance ($r = .94$, $p < .01$; see Table 5), pre- and post-test perceived dangerousness ($r = .92$, $p < .01$; see Table 5), and pre- and post-test negative emotionality ($r = .95$, $p < .01$; see Table 5). Similarly, the psychoeducational module indicated strong positive associations between pre- and post-test preferred social distance ($r = .94$, $p < .01$; see Table 6), pre- and post-test perceived dangerousness ($r = .93$, $p < .01$; see Table 6), and pre- and post-test negative emotionality ($r = .94$, $p < .01$; see Table 6). Likewise, the control group indicated strong positive associations between pre- and post-test preferred social distance ($r = .96$, $p < .01$; see Table 7), pre- and post-test perceived dangerousness ($r = .92$, $p < .01$; see Table 7), and pre- and post-test negative emotionality ($r = .97$, $p < .01$; see Table 7).

In addition, the merged data findings indicate negative associations between the level of contact and all stigma measures with the Pearson-r correlation values ranging from -.28 to -.46 ($p < .01$; see Table 5). Likewise, the psychoeducational module group findings indicate negative associations between the level of contact and all stigma measures with the Pearson-r correlation values ranging from -.43 to -.60 ($p < .01$; see Table 6). Similarly, the control group findings indicate negative associations between the level of contact and all stigma measures with the Pearson-r correlation values ranging from -.09 to -.30 (see Table 7). Furthermore, the merged data findings indicate negative associations between the level of familiarity and all stigma measures with the Pearson-r

correlation values ranging from -.46 to -.58 ($p < .01$; see Table 5). Similarly, the psychoeducational module group findings indicate negative associations between the level of familiarity and all stigma measures with the Pearson-r correlation values ranging from -.47 to -.61 ($p < .01$; see Table 6). Likewise, the control group findings indicate negative associations between the level of familiarity and all stigma measures with the Pearson-r correlation values ranging from -.44 to -.56 ($p < .01$; see Table 7).

Assumptions of ANOVAs and Moderated Regressions

Although the sample size was large, preliminary data screening was still conducted to assess violations of the assumptions to the ANOVAs. An examination of a histogram for the pre- and post-test knowledge scores in the overall sample showed that the distribution was symmetric enough. Additionally, we examined the histogram for the pre- and post-test knowledge scores by the experimental and control groups. The pre-test experimental and control groups, as well as the post-test control groups, were quite symmetric. However, the distribution for the experimental group post-test knowledge measure was slightly negatively skewed as indicated by the histogram, the P-P plot, the Q-Q plot, and the skewness values (-1.48). We also examined the Z-scores and the boxplots of the four groups of the knowledge measure. The results revealed slightly extreme values for the post-test experimental group. However, upon further examination of the Z-scores, there were no values greater than 3.29. This suggests that there were no outliers. The Levene's test showed that the variances were equal across the two groups for the pre-test knowledge scores, $F(1, 199) = 0.62$, $p = .43$, whereas the variances were not equal for the post-test scores across the two groups, $F(1, 199) = 4.79$, $p = .03$.

However, the Levene's test is usually violated when sample sizes are large (Zimmerman, 2004). Based on Keppel's (1991) guidelines for assessing equality of variances (the largest variance was divided by the smallest variance), we found that this ratio was less than three (pre-test = 1.36; post-test = 1.49). This suggests that the variances were not unequal based on the criteria mentioned above.

Additionally, an examination of the histograms for the pre- and post-test stigma (i.e., preferred social distance, perceived dangerousness, and negative emotions regarding marijuana) scores in the overall sample showed that the distribution was sufficiently symmetric. Additionally, we examined the histogram for the pre- and post-test stigma scores by the experimental and control groups. The pre- and post-test experimental and control groups were quite symmetric as indicated by the histograms, the P-P plots, the Q-Q plots, and the skewness values. We also examined the Z-scores and the boxplots of the groups. The results revealed the majority of stigma measures fell within a normal range, with the exception of one post-test perceived dangerousness score from the control group having a slightly extreme value. However, upon further examination of the Z-scores, these values did not exceed 3.29. This suggests that there were no outliers.

Additionally, the Levene's test was used to assess the homogeneity of the variance in each stigma measure. Looking specifically at preferred social distance, the Levene's test showed that the variances were equal across the two groups for both the pre-test ($F(1, 198) = 0.10$, $p = .75$) and post-test scores ($F(1, 198) = 0.06$, $p = .81$). In addition, the Levene's test for perceived dangerousness revealed that the variances were equal across the two groups for the pre-test dangerousness scores, $F(1, 198) = 0.27$, $p =$

.61 whereas the variances were not equal for the post-test scores across the two groups, $F(1, 199) = 4.63$, $p = .03$. However, again, the Levene's test is often violated when sample sizes are large (Zimmerman, 2004). We found that the suggested guidelines for assessing equality of the variances (dividing the largest variance by the smallest variance) provided a value less than three (pre-test = 1.33; post-test = 1.45) indicating that the variances were not unequal based on the criteria mentioned above. Furthermore, the Levene's test for negative emotions regarding marijuana showed equal variances across the two groups for both pre-test ($F(1, 199) = 0.38$, $p = .54$) and post-test scores ($F(1, 199) = 0.07$, $p = .79$).

Further preliminary data screening was also conducted to assess violations of the assumptions for Regressions. Outliers were tested for by plotting the standardized residuals from the regression against the standardized predicted values. However, the graphs showed no indication of outliers, patterns, trends, or heteroscedasticity. This suggests that the assumptions required for linear and moderated regressions (i.e., linearity, independence of errors, homoscedasticity, normally distributed errors, and multicollinearity of predictors) have been reasonably well met.

Impact of the Psychoeducational Module

Given the general lack of existing experimental findings on the investigation of interactive knowledge-based internet modules and their effect on the stigma associated with recreational marijuana use and knowledge regarding marijuana, this study is primarily exploratory in nature. Researchers are mainly interested in possible interactions that may occur due to exposure to the psychoeducational module. Four 2x2 mixed-

factorial ANOVAs were performed using SPSS GLM to assess whether there was a change in knowledge or stigma regarding marijuana or stigma from pre- to post-test across the experimental and control groups.

Hypothesis 1a

Based on our hypothesis, it was expected that the control group would show little to no increase in knowledge from pre- to post-test, whereas the experimental group would show a substantial increase in pre- to post-test knowledge. As expected, there was a statistically significant time (pre- vs. post-test) by experimental condition (experimental vs. control group) interaction: F_{aXb} = (1, 199) = 421.39, $p < .001$. The corresponding partial eta square (0.68) indicated a strong effect. The Table of cell means (see Table 8) indicated that the post-test knowledge scores for the experimental group were much higher than the other three groups (M = 22.39, SD = 2.20);this was a significant increment in knowledge scores from the pre-test of the module group (M = 15.12, SD = 2.43). In contrast, the control group did not show any change in knowledge from pre- (M = 14.93, SD = 2.84) to post-test (M = 15.05, SD = 2.68).

We conducted planned contrasts to assess whether the module group differences were significant for the pre- and post-test separately. For the pre-test, there was not a statistically significant difference in means between the experimental and control groups: t (189.63) = 0.50, p = .62. For the post-test, however, there was a statistically significant difference in knowledge across the module groups as indicated by the t-statistic (t (185.86) = 21.15, $p < .001$). These findings were consistent with the hypotheses such that there was no initial difference in knowledge for the experimental and control groups at

pre-test. However, there was a significant difference in the post-test knowledge scores with the module group showing a much higher level of understanding the effects of marijuana than the control group.

Hypothesis 1b-1d

In addition to increased knowledge, researchers hypothesized that there would be a reduction in stigma (i.e., preferred social distance, perceived dangerousness, and negative emotionality) from pre- to post-test for the individuals who received the psychoeducational module as compared to the control group. Three additional 2x2 mixed factorial ANOVA were performed using SPSS GLM to assess whether there was a change in preferred social distance, perceived dangerousness, and negative emotions from pre- to post-test across the experimental and control groups.

Based on our hypothesis, it was expected that the control group would show little to no decrease in preferred social distance from pre- to post-test, whereas the experimental group would show a substantial increase in pre- to post-test preferred social distance. Despite our predictions, there was not a statistically significant time (pre- vs. post-test) by experimental condition (experimental vs. control group) interaction: F_{aXb} = (1, 197) = 3.16, p = .08, although it was trending toward significance. The corresponding partial eta square (0.02) indicated minimal effects, however. Similarly, we assessed both perceived dangerousness and negative emotions regarding marijuana. Specifically, we hypothesized there would be substantial decreases for the experimental group in pre- to post-test perceived dangerousness or negative emotions whereas the control group would show little to no change in perceived dangerousness or negative emotions. However,

upon examination there was not a statistically significant time (pre- vs. post-test) by experimental condition (experimental vs. control group) interaction: F_{aXb} = (1, 197) = 0.25, p = .62 and F_{aXb} = (1, 197) = 0.63, p = .43 respectively.

We also conducted planned contrasts to assess whether the module group differences were significant for the pre- and post-test separately for each stigma measure. For both the pre-test and post-test scores on preferred social distance, there was not a statistically significant difference in means across the experimental and control groups: t (197.36) = -0.84, p = .40 and t (197.97) = -0.22, p = .83. Similarly, scores for the perceived dangerousness on both the pre- and post-test were not significantly different in means across the experimental and control groups: t (196.96) = -1.12, p = .27 and t (198.42) = 0.53, p = .60. Furthermore, both the pre-test and post-test scores on negative emotions regarding marijuana were not significantly different in means across the experimental and control groups: t (198.99) = -1.04, p = .30 and t (198.25) = -1.28, p = .20. These findings were inconsistent with the hypotheses that there would be a reduction in stigma (i.e., preferred social distance, perceived dangerousness, and negative emotionality) from pre- to post-test for the individuals who received the psychoeducational module as compared to the control group. Specifically, results indicate that there was little to no change in stigma for the experimental and control groups at pre- and post-tests.

Stigma related to the Level of Contact and the Level of Familiarity

Hypothesis 2a-1 – 2i-2

It was hypothesized that regardless of what group participants were in, relations exist between the level of contact, level of familiarity, level of knowledge and each aspect of stigma. Specifically, there would be less stigmatized views (i.e., preference for social distance, perceived dangerousness, and negative emotions) toward marijuana use for individuals who have a higher level of knowledge regarding marijuana, or for those individuals who had higher levels of contact or higher levels of familiarity with marijuana users. Using standard regression analysis, statistically significant associations ($p < .05$) between all predictor variables (i.e., level of familiarity, level of contact, and degree of knowledge) and all outcome variables (i.e., preferred social distance, perceived dangerousness, and negative emotions regarding marijuana users) were determined, with the exception of increased knowledge predicting lower pre-test negative emotionality (see Tables 12-14). Specifically, the level of contact functioned as a significant predictor of pre- and post-test preferred social distance ($\beta = -.43$, $p < .001$, $R^2 = 0.19$ and $\beta = -.46$, $p < .001$, $R^2 = 0.21$ respectively), perceived dangerousness ($\beta = -.28$, $p < .001$, $R^2 = 0.08$ and $\beta = -.29$, $p < .001$, $R^2 = 0.09$), and negative emotionality ($\beta = -.37$, $p < .001$, $R^2 = 0.14$ and $\beta = -.36$, $p < .001$, $R^2 = 0.13$). Similarly, the level of familiarity functioned as a significant predictor of pre- and post-test preferred social distance ($\beta = -.57$, $p < .001$, $R^2 = 0.32$ and $\beta = -.58$, $p < .001$, $R^2 = 0.34$ respectively), perceived dangerousness ($\beta = -.47$, $p < .001$, $R^2 = 0.23$ and $\beta = -.46$, $p < .001$, $R^2 =0.21$), and negative emotionality ($\beta = -.51$, $p < .001$, $R^2 = 0.26$ and $\beta = -.50$, $p < .001$, $R^2 =0.25$).

Furthermore, analyses were performed to examine the predictive role of knowledge regarding marijuana on each stigma measure. Findings indicate knowledge regarding marijuana functioned as a significant predictor of both pre-and post-test preferred social distance (β = -.16, $p < .05$, $R^2 = 0.03$ and β = -.14, $p < .05$, $R^2 = 0.02$) and perceived dangerousness (β = -.19, $p < .01$, $R^2 = 0.04$ and β = -.14, $p < .05$, $R^2 = 0.02$). However, knowledge regarding marijuana functioning as a predictor for negative emotionality was only significant at post-test (β = -.17, $p < .05$, $R^2 = 0.03$) but was still trending toward significance at the pre-test (β = -.13, $p = .08$, $R^2 = 0.02$).

Exploratory Analyses

Additional exploratory analyses were performed to examine the role of the level of familiarity and the level of contact in predicting knowledge regarding marijuana. Results suggest limited support for the level of familiarity or the level of contact accurately predicting knowledge with the only significant result occurring with the level of familiarity predicting the degree of knowledge regarding marijuana at pre-test (β = 0.18, $p < .05$, $R^2 = 0.03$; see Table 12-13).

The Moderating Role of Gender, Current Use, and Age

It was also hypothesized that sex, any past personal marijuana use, and age would moderate the relation between the level of contact, level of familiarity, and stigma such that females, non-users, and 18-year-olds would have higher levels of stigma. Using linear moderated regression analysis (Champoux & Peters, 1987; Shieh, 2009) in SPSS, each moderation was fit into separate models utilizing centered predictors entered in the first step, centered moderators entered in the second step, and the interaction term of

centered predictors and moderator in the final step. The Aiken and West (1991) procedure for simple slopes tests was conducted to determine the main and interaction effects. Specifically, we assessed whether the relationship between the predictors and the outcomes are significant at both low (-1SD) and high levels (+1SD) of the moderator.

Hypotheses 3a-1 – 3r-4

Findings indicate that there was relatively limited support for sex, any prior personal marijuana use, and age as moderators for the relation between the level of familiarity and stigma (i.e., preferred social distance, perceived dangerousness, and negative emotions; see Tables 26-28). Results show there was only one path analysis model for the control group that displayed a significant interaction between the level of familiarity with marijuana users and participant gender in the prediction of stigma (i.e., post-preferred social distance; β = -0.18, $p < .05$; see Table 15). Specifically, there was a significant negative association between the level of familiarity and post-preferred social distance for females ($p < .001$; see Figure 6). This suggests that the females who reported higher levels of familiarity with marijuana users tended to report lower preferred social distance at the post-test for those in the control group. However, the control group females who had reported lower levels of familiarity tended to report higher preferred social distance at the post-test. The overall model explained 40% percent of the variance while the interaction accounted for 3% in the outcome. All other models for the control group and the experimental group did not indicate any significant interactions between the level of contact (see Appendix O Tables 1-12) or level of familiarity (see Appendix O Tables 13-23) and participant gender in the prediction of stigma (i.e., preferred social

distance, perceived dangerousness, negative emotions) at either pre- or post-test and, thus, will not be discussed further.

Participant age was also examined as a moderator variable between the level of familiarity and stigma (i.e., preferred social distance, perceived dangerousness, and negative emotions). Findings indicate there were two path analysis models for the control group that displayed a significant interaction between the level of familiarity with marijuana users and participant age in the prediction of preferred social distance at both pre- and post-test ($\beta = 0.23$, $p < .05$, see Table 16; $\beta = 0.23$, $p < .05$, see Table 17). Specifically, the control groups showed there was a significant negative association between the level of familiarity and preferred social distance for participants who were over 18 years of age at both pre-test ($p < .001$; see Figure 7) and post-test ($p < .001$; see Figure 8). The overall pre- and post-test model explained 43% percent of the variance. The interaction itself for the pre-test accounted for 4% in the outcome, and the interaction for the post-test accounted for 3% in the outcome. This suggests that when an individual is over 18 years old, they tend to report higher levels of preferred social distance when their level of familiarity with marijuana users is low. However, when their level of familiarity is high, there are virtually no differences. Additionally, there were no associations found among individuals who were 18 years old. They reported a low/high preferred social distance irrespective of the level of familiarity. All other models for the control group and the experimental group did not indicate any significant interactions between participant age and the level of contact (see Appendix O Tables 48-59) or level of familiarity (see Appendix O Tables 60-69) in the prediction of stigma (i.e., preferred

social distance, perceived dangerousness, negative emotions) at either pre- or post-test and, thus, will not be discussed further.

Likewise, any past personal use was also analyzed as a moderator variable between the level of familiarity and each stigma measure. However, there were no significant interactions found at pre- or post-test for either the experimental or control groups (see Appendix O Tables 36-47). Furthermore, the association between the level of contact and each stigma measure with the same moderator variables (i.e., sex, any past personal use, and participant age) was also tested; however, no significant interactions were found (see Appendix O Tables 24-35). These results will not be discussed further due to the lack of significant findings.

Additional Analyses: Likelihood of Future Use

Research Questions 1 and 2

Additional analyses were performed to determine whether there was a significant difference on the likelihood of future use across the experimental versus the control group. This was determined using an independent samples t-test. Furthermore, we explored whether there was a relationship between the level of familiarity, the level of contact, and the likelihood of future use. After establishing this relationship, we examined whether sex, any past marijuana use, and age would moderate this potential relationship. Using moderated regression analysis, the role of gender and participant age as moderator variables were assessed between the level of contact and each stigma measure and the level of familiarity and each stigma measure. However, no significant

interactions were found. These results will not appear in the appendices nor be discussed further.

Any past marijuana use was also examined as a moderator variable between the level of contact, the level of familiarity, and each stigma measure in each group (i.e., experimental vs. control) with more success. Findings indicate that there was a significant interaction between the level of contact and the likelihood of using marijuana recreationally in the future at both pre-test ($\beta = 0.15$, $p < .05$, see Table 18) and post-test ($\beta = -0.14$, $p < .05$, see Table 20) for those in the experimental group who have a past history of marijuana use. The pre- and post-test interaction explained 2% of the variance in the likelihood of future use (the pre-test total model explained 58% of the variance and the post-test total model explained 65% of the variance). However, among individuals who had never reported past marijuana use, there was no association. They reported a low likelihood of future usage regardless of the level of contact. This suggests that at both pre- and post-test individuals who have used marijuana in the past tend to report a higher likelihood of future marijuana use when contact is high as compared to those who had a low level of contact or had high contact but reported no past usage.

In addition to significant interactions being found for the level of contact, there were also significant associations between the level of familiarity and pre-test likelihood of future recreational marijuana use ($p < .001$; see Figures 11 and 15) for those who had ever used marijuana recreationally in the past in both the experimental ($\beta = -0.20$, $p < .001$, see Table 19) and control groups ($\beta = 0.31$, $p < .001$, see Table 22). However, among individuals who had never reported past marijuana use, there was no association.

They reported a low likelihood of future usage irrespective of the level of familiarity. The overall model for the experimental group explained 71% percent of the variance while the interaction accounted for 4% in the outcome. The overall model for the control group, on the other hand, explained 48% percent of the variance while the interaction accounted for 7% in the outcome. A similar pattern was identified at post-test as well ($p < .001$, see Figures 12 and 16) for both the experimental ($\beta = -0.21$, $p < .001$, see Table 21) and control groups ($\beta = 0.29$, $p < .001$, see Table 23). This indicates that individuals with a high level of familiarity and had used marijuana at some point in the past reported the highest likelihood of using marijuana recreationally in the future as compared to those who had a low level of familiarity or had high familiarity but reported no past usage. The post-test total model for the experimental group explained 67% of the variance while the interaction explained 4% of the variance. The post-test total model for the control group, however, explained 52% of the variance while the interaction explained 7% of the variance in the likelihood of future use.

CHAPTER 4

DISCUSSION

Summary

The extensive review of the literature revealed no existing experimental findings on the investigation of interactive knowledge-based internet modules and their effect on the stigma associated with recreational marijuana use and knowledge regarding marijuana. To try to address this gap, the current study focused on pilot-testing a psychoeducational module designed to increase knowledge and reduce stigma towards recreational marijuana users.

Findings indicate partial support for the first hypothesis regarding the use of the psychoeducational module to increase knowledge and reduce the stigma of recreational marijuana users. Specifically, the module was shown to increase knowledge regarding marijuana. However, there was little to no impact on stigma (i.e., preferred social distance, perceived dangerousness, negative emotions regarding marijuana use). These findings are somewhat consistent with the literature on substance use stigma as relatively few anti-stigma interventions for substance use disorders have been shown to work in the reduction of stigma for the general public (Livingston et al., 2011). This could signify that the construct of stigma is more difficult to change and the presentation of knowledge may not be enough to reduce stigma given the study's findings. Using educational information to reduce stigma of people with mental illness has been used in the past by presenting individuals with factsheets and asking them to read though them or through extensive education courses, however, this has only produced small effects (Luty et al.,

2009; Mayville & Penn, 1998; Penn & Martin, 1998). In the current study, we attempted to take the implementation of this type of educational or factual information a step further by providing multiple sources, colorful representations, and easily readable information which was meant to make it more enjoyable to the participant. Making the information more enjoyable, yet maintaining a brief time commitment, promotes active learning (Bonwell & Eison, 1991; Prince, 2004). Promoting active learning may help individuals become more engaged, making them more familiar with the information, and more likely to remember the information later (Bonwell & Eison, 1991). The increase in knowledge at post-test indicates that active learning was occurring for those who went through the module, but it was not enough to change the more ingrained stigmatizing attitudes. Future research may instead target the specific negative attitudes and perceptions regarding users and include personal narratives from recreational marijuana users recounting their life experiences. These personal narratives do not necessarily have to be done in-person either; they could be videotaped and easily added to the current psychoeducational module. This could help non-users discount any misconceptions that may have about recreational marijuana users (Mayville & Penn, 1998; Penn & Martin, 1998) and could incorporate areas such as how recreational marijuana use has impacted their life or how they think using marijuana impacts their mind and body.

Additionally, findings indicate support for hypothesis two which examined the association of the level of familiarity and level of contact with stigmatized views towards recreational marijuana users. Consistent with past substance use stigma research (Brown, 2011; Corrigan & Watson, 2002; Feldman & Crandall, 2007), findings indicate strong

associations between the level of familiarity, the level of contact, and stigma. Specifically, as the level of familiarity or level of contact increases, less stigmatization occurs. Reestablishing this important relationship is an essential step in the development of successful anti-stigma interventions as prior research lacks an understanding of whether this relationship holds across specific substances (e.g., marijuana) and it provides a focus area for the intervention research. Again, the next steps in the development of a successful intervention may be to expose individuals to people from the stigmatized group as this has been shown to decrease the level of stigma (Corrigan & Watson, 2002). As mentioned above, perhaps the best way to incorporate this idea into an online module would be to create videotaped testimonials that depict a recreational marijuana user. An incorporation of multiple avenues for changing stigma (i.e., protest, more education, and contact) could be the best option for reducing stigma. Future research should focus on integrating these more when developing anti-stigma interventions.

While incorporating multiple avenues for change is one idea for improving anti-stigma interventions, researchers should also identify specific individual characteristics that may impact stigma so they can target anti-stigma interventions to those individuals who need it most. The current study attempted to address this in hypothesis 3 by identifying several specific characteristics (i.e., gender, past marijuana use, and age) that had the potential to impact stigma. However, limited support was found for hypothesis three examining the moderating role of gender, past marijuana use, and age on the established association between the level of familiarity and level of contact on stigma levels. Specifically, we expected that females, non-users, and older emerging adults

would have greater levels of stigma when contact/familiarity are low, but when they are high we expected no differences. Although there was limited support for these factors on the relationship between the level of familiarity and level of contact on stigma, this should not discourage future researcher from trying to identify other factors that may impact this well-established connection. Anti-stigma interventions may work better if we use a preventative model and specifically target them to a particular population or subgroup that may hold more stigma towards the outgroup members.

Furthermore, given the controversial topic of marijuana use in general, exploratory analyses were performed examining the extent to which the psychoeducational module may impact the likelihood of future recreational marijuana use. Specifically, the study explored whether there was a significant difference on the likelihood of future use across the experimental versus the control group. Additionally, we explored whether there was a relationship between the level of familiarity, the level of contact, and the likelihood of future use. After establishing this relationship, we examined whether sex, any past marijuana use, and age would moderate the established relationship. Findings indicate limited support for the moderating role of sex and age in the relationship between the level of familiarity and the level of contact on the likelihood of future use. However, a history of past marijuana use does appear to moderate this relationship. Specifically, when the level of familiarity is high, individuals rated their likelihood to use marijuana in the future higher when they have a history of marijuana use. However, when their level of familiarity is low, there are little to no differences in the likelihood of future use, even with a past history of marijuana use.

Strengths

The current study is unique in three ways and contributes to the substance use stigma literature by providing information about specific aspects that may need to be included for successful, specifically targeted anti-stigma intervention programs. First, this study seeks to examine whether an interactive psychoeducational module is effective in increasing knowledge and reducing the stigma of recreational marijuana use. Using a module that is internet based may also be an efficient intervention medium because many people are familiar with the internet and use it often. The boundless use of technology in daily life makes it a potentially powerful agent of change for clinical psychology science and practice (Dimeff, Paves, Skutch, & Woodcock, 2010). We have seen shifts towards the use of technology in many areas of clinical psychology research (Caspar, 2004). For instance, an evidence-based treatment for anxiety disorders in youth and adolescents incorporates the use of a CD-ROM version of Coping Cat as a computer-assisted Cognitive-Behavioral Therapy (CBT; Khanna & Kendall, 2008); this would not be a standalone treatment, but, rather, an enhancement of the skills already learned during therapy (Khanna & Kendall, 2008). Its purpose is to reduce the costs of traditional CBT, make data collection easier for researchers and patients, and include a wide variety of stimuli (Khanna & Kendall, 2008). These were also the goals with the psychoeducational module; devising a simple, practical, cost-effective technique that can be easily applied to any anti-stigma intervention program. The module is also meant to be fun and interactive for the audience by providing pop quizzes after every section, keeping them engaged with the information.

Additionally, providing information in an interactive manner that does not require extensive educational courses is also unique to the substance use stigma literature. Using educational information to reduce stigma of people with mental illness has been used in the past by presenting individuals with factsheets and asking them to read through them or through extensive education courses, however, this has only produced small effects (Luty et al., 2009; Mayville & Penn, 1998; Penn & Martin, 1998). Also, testing this psychoeducational module may help in identifying how time intensive the program must be to reduce stigma. Current, successful interventions for mental illness stigma often last multiple days (Bahora et al., 2008) to weeks (Bland et al., 2001) and are not typically targeted at the general public, but rather persons providing services to stigmatized individuals, whereas the current module takes less than 30 minutes, and is aimed to impact a larger audience. However, given our findings, we know that the 25-minute psychoeducational module has had limited success in the reduction of stigma and, therefore, may need to be adjusted to a larger time commitment. The amount of time needed to change the negative attitudes and perceptions that have been ingrained remains unclear and is a limitation of the current study. However, it may be that the psychoeducational module cannot be used as a standalone treatment option, similar to the Coping Cat CD-ROM used for the treatment of anxiety (Khanna & Kendall, 2008). Instead, future researchers could try using the psychoeducational module in conjunction with a current anti-stigma intervention program as an additive component of treating stigma. Additional research is needed to determine the simplest, most practical, and cost-effective method for reducing the stigma surrounding recreational marijuana users.

Future research may want to branch out beyond psychoeducation about marijuana and include more avenues for change (i.e., protest, more education, and contact; Corrigan & Penn, 1999) that have worked well in past research (Luty et al., 2009; Mayville & Penn, 1998; Penn & Martin, 1998). Also, the best way to determine how long the effects of the anti-stigma interventions last or the lasting effects on knowledge, researchers should include a 6-month or 12-month follow-up.

Furthermore, this study is unique in that we examine specific characteristics or traits that may impact the level of stigma, highlighting the need for intervention programs targeted at public stigma of marijuana users. Examining specific characteristics and components that vary the level of stigma is an essential step toward implementing targeted anti-stigma intervention programs. Even though our findings did not indicate that these particular characteristics are moderators (i.e., gender, past marijuana use, and age), other characteristics such as sex or race/ethnicity of the marijuana user or race/ethnicity of the participant could be examined. Identifying these characteristics would be an important stepping stone in the investigation of substance use stigma.

Limitations

All research has its limitations; this study is no different. One limitation of this study resulted from how the study itself was designed to only encompass recreational marijuana use specifically. Given that this study only focuses on stigma surrounding recreational marijuana use, the results can only be interpreted for recreational marijuana use exclusively as it is singularly featured in the current study. However, previous findings indicate that marijuana may be stigmatized less than other illegal substances

(Palamar et al., 2012). It may be harder to find results regarding stigma levels if levels of stigma towards marijuana users has a floor effect. However, if this is the case, future research should still focus on identifying characteristics and traits of individuals who are more likely to stigmatize towards individuals who use other illegal substances instead.

Another limitation is relying on self-report measures from the same person. This brings up several issues. First, self-report does not always give us the most accurate representation of an individual's actions due to social desirability or inaccurate accounts. Social desirability occurs when individuals fake good, thereby making themselves "look better" than they are and is a common issue with self-report measures because it can decrease the construct validity of the survey (Morling, 2012). Individuals who are "faking good" may not be consciously aware of what they are doing either so it is difficult to gauge this issue in the study (Morling, 2012). Future research may want to include questions like "My table manners at home are as good as when I eat out in a restaurant" or "I am always a good listener, no matter who I am talking to" to better gauge whether individuals are responding in a more positive way because people who agree with these questions are assumed to respond in a highly socially desirable manner (Crowne & Marlowe, 1960). Implementing a more objective method such as an Implicit Association Test (IAT; Greenwald, Nosek, & Mahzarin, 2003) could also help address this issue. However, due to the limited scope of the current project, this is not feasible.

Also, the generalizability of the study must be considered. Given that the sample consisted of young adults in introductory to psychology courses at a moderately sized public Midwestern university in the United States, results can only be generalized to this

subset population. Generalizability to different populations such as private institutions, or other regions is not feasible due to the limited sample tested. Additionally, given that we sampled college students, this may be impacting the level of reported stigma towards marijuana use because college students often hold more liberal and positive views towards use. Given the limited sample, the study's results are only generalizable to young adults in public universities in a Midwestern region of the United States. Future research should try to focus on sampling individuals from a variety of backgrounds to ensure more generalizable findings to a larger subset of individuals. Additionally, due to how this study was designed, it is unclear how long effects on knowledge or stigma would last. Future research may want to include a 6-month or 12-month follow-up to discover how lasting these effects on stigma or knowledge may be.

Implications

Research on the detrimental consequences of substance use stigma highlights the need for successful, specifically targeted anti-stigma intervention programs. Substance using behaviors have been criminalized at a societal level as a deterant of use (Livingston et al., 2011), however, criminalizing substance use only exacerbates stigma by making people more prone to devalue and exclude individuals who use illegal substances (Room, 2005). Additionally, substance use stigma lowers societal support for much needed intervention programs (Capitanio & Herek, 1999) and often discourages individuals from seeking treatment for their substance use (Fortney et al., 2004; Kushner & Sher, 1991). These consequences hinder the stigmatized individual's ability to receive adequate treatment for their disorder, potentially impacting their life even further. As substance use

disorders are one of the most stigmatized health conditions (Corrigan et al., 2005; Rao et al., 2009; Ronzani et al., 2009; Room, 2005; Schomerus et al., 2011), it is important to understand how a reduction in stigma through an intervention program could improve the overall quality of life and ability to receive treatment services for marijuana users. The current psychoeducational module is a stepping-stone for future anti-stigma interventions aimed at the reduction of stigma towards marijuana users which may greatly improve their overall quality of life and ability to seek treatment services.

Future Directions

Thus, more research is needed in the substance use stigma field, especially research surrounding anti-stigma intervention programs. The next logical step for future research may be trying to incorporate more ways of changing stigma into the module itself (i.e., protest, more education, and contact; Corrigan & Penn, 1999). As noted in the literature review, protesting has had very little research assessing the impact of protest campaigns on discrimination and stigma (Corrigan & Watson, 2002) which could make it harder to implement. However, this does not mean we should deter from using this strategy and is a suggested avenue for future research efforts (Corrigan & Watson, 2002). Adding more education about marijuana and addressing common misconceptions through facts could potentially strengthen the psychoeducational module (Corrigan & Penn, 1999). However, overburdening participants with too much information may only serve to confuse or fatigue them (Morling, 2012), therefore, researchers should seek to find a balance. Another option is for researchers to include trying to expose individuals to people from the stigmatized group as this has been shown to decrease the level of stigma

(Corrigan & Watson, 2002). This known link between level of familiarity and level of contact in predicting stigma may play an interesting role in the future of marijuana use stigma as marijuana is one of the most commonly used illegal substances. This commonality may indicate a greater chance of previous contact and familiarity with marijuana users more so than other illicit substance. Additionally, it should also be highlighted that findings from the 2013 NSDUH survey indicate an upward trend in marijuana use from 2007-2013. These findings suggest a greater chance of contact with marijuana users, potentially reducing stigma towards marijuana use. As mentioned above, perhaps the best way to incorporate this idea into an online module would be to create videotaped testimonials that depict a recreational marijuana user. There are many options for improvements to the current module. Each of these options may add to the length of the overall module itself but seems like a logical next step, especially because the module does seem to be increasing knowledge of the participants but has not significantly improved the reduction of stigma. Therefore, including more ways to increase protesting, education, or contact in the anti-stigma intervention may propel participants to have a greater understanding of substance users, producing a reduction of stigma.

Furthermore, future research should seek to examine other potential characteristics that may influence the relationship between the level of familiarity and contact with stigma levels such as other age groups and education levels. Another area for future research should assess substance use stigma at the individual level for each substance to increase the generalizability of the findings. Additionally, researchers may find it beneficial to branch out to other illicit substances beyond recreational marijuana

use that are also largely stigmatized by society. Each substance is different and using psychoeducation to increase knowledge and reduce the stigma surrounding a particular substance may vary for across substances.

Additionally, there is currently a huge gap in the literature for interventions targeted at kids and adolescents (Livingston et al., 2011). One of the biggest challenges to the legalization of marijuana is the perceived consequence of what these new laws would do for the likelihood of future marijuana use, especially for youth, and how it may impact stigma. Recently, researchers found evidence of stigma reduction amongst eighth- and 10^{th}-grade students in Washington, after the legalization of recreational marijuana (Cerda et al., 2016). However, they also found an increase in the likelihood of using amongst these youth as well (Cerda et al., 2016). Another study by Mason and colleagues (2015) examined a similar issue examining perceptions, knowledge, and parent-child discussions for low-income families in the state of Washington since the legalization of recreational marijuana. Findings indicate that the participant's attitudes and behaviors regarding marijuana changed little and many were still unclear about what was legal and illegal in their state (Mason, Hanson, Fleming, Ringle, & Haggerty, 2015). This emphasizes the importance of developing anti-stigma interventions aimed at youth. Earlier detection for those at-risk for stigmatization and identification of the best, most efficient practices for the reduction of stigma could promote more of a preventative model. A preventative model is not a new concept to the field of clinical psychology, however. Autism Spectrum Disorder (ASD) is a childhood developmental disorder where prior research has shown that interventions before the age of five have promising results and better

overall outcomes for these individuals across the lifespan (Smith & Iadarola, 2015). Although proposing an anti-stigma intervention aimed at kids before the age of five may not be feasible yet, targeting individuals early and providing them with facts about marijuana and its use can allow them to make an informed decision and hopefully reduce stigmatization of the substance.

Furthermore, given the unique and controversial issue of marijuana use in the U.S. today, it might be interesting to examine how recreational marijuana use stigma in Iowa compares to other states that have already legalized marijuana for recreational use. However, very little research has compared stigma across different states. The most recent research is trending towards the idea that stigmatization of marijuana is becoming less in many states, especially amongst those that have already legalized marijuana (Cerda et al., 2016). For example, Cerda and colleagues (2016) assessed the perceived harmful effects and self-reported marijuana use before and after legalization in Washington and Colorado. Findings indicate eighth- and 10th-grade students in the state of Washington perceived that harm has significantly decreased since the enactment of recreational marijuana laws. However, there was no decrease in perceived harm amongst similar grade in the state of Colorado (Cerda et al., 2016). These findings indicate that numerous differences in stigma may exist across states and regions and what works effectively for the reduction of stigma in one area, may not work in another. This emphasizes the importance of working with people from a diverse background and how important it would be to develop targeted anti-stigma interventions.

Concluding Remarks

Substance use stigma and successful anti-stigma interventions are a vastly underexplored topic. By pilot testing a psychoeducational module about marijuana, the study aims to devise a simple, practical, cost-effective technique that can be easily applied to an anti-stigma intervention program and easily replicated to other substances or disorders. It can be concluded that the psychoeducational module increased knowledge regarding marijuana and its uses but had limited impact on stigma itself. Although this study produced limited support for changing stigma after receiving the psychoeducational module, researchers should not be discouraged from contributing to this ever-growing field. Livingston and colleagues (2011) highlighted the limited research on anti-stigma interventions in the substance use stigma field and sounded a call to action for further research. Integration of multiple avenues for change in stigma (i.e., protest, more education, and contact) may help with targeting the more ingrained attitudes and behaviors that accompany stigma. Additionally, exploring what factors influence change in stigma and developing successful, specifically targeted anti-stigma interventions is paramount to the progress of the field and an essential next step in reducing public stigma associated with substance use. Findings from the current study have implications for future intervention development that seeks to target anti-stigma knowledge, attitudes, and perceptions.

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Table 1
Demographic Characteristics of Participants

Variables	*Merged Sample (N = 201)*		*Module Group (N = 104)*		*Control Group (N = 97)*	
	%	*M (SD)*	*%*	*M (SD)*	*%*	*M (SD)*
Age		18.81(1.25)		18.73(0.90)		18.90(1.54)
18 years old	51.2		51.0		51.5	
19 years old	30.8		30.8		30.9	
20 years old	11.4		12.5		10.3	
21+ years old	6.5		5.8		7.8	
Ethnicity		1.18(0.71)		1.30(0.91)		1.05(0.33)
White	91.5		86.5		96.9	
Black	4.0		5.8		2.1	
Asian/Pacific Islander	1.0		1.9		1.0	
Hispanic/ Latino	3.0		4.8		--	
Other	0.5		1.0		--	
Sex		0.66(0.48)		0.66(0.47)		0.65(0.48)
Males	34.3		33.7		35.1	
Female	65.7		66.3		64.9	
Year in School		1.39(0.77)		1.44(0.85)		1.34(0.69)
Freshman	75.1		74.0		76.3	
Sophomore	13.9		12.5		15.5	
Junior	7.5		8.7		6.2	
Senior	3.5		4.8		2.1	
Ever Used Marijuana		1.63(0.49)		1.59(0.50)		1.67(0.47)
Yes	37.3		41.3		33.0	
No	62.7		58.7		67.0	
Current use of Marijuana in Past 30 days (*N = 75; N = 43; N = 32*)		1.73(0.45)		1.70(0.47)		1.78(0.42)
Yes	26.7		30.2		21.9	
No	73.3		69.8		78.1	

Note. Standard deviation is presented in parentheses.

Table 2
Descriptive Statistics of Study Measures in Merged Sample

Merged Sample	N	Range	Minimum	Maximum	M	SD
Level of Familiarity	201	0.73	0.09	0.82	0.44	0.20
Level of Contact	201	2.67	0.00	2.67	1.10	0.62
Preferred Social Distance						
Pre-	200	2.86	1.14	4.00	2.90	0.76
Post-	200	3.00	1.00	4.00	2.91	0.76
Perceived Dangerousness						
Pre-	200	4.57	1.00	5.57	3.06	1.03
Post-	201	5.00	1.00	6.00	3.16	1.09
Negative Emotions						
Pre-	201	6.00	1.00	7.00	3.99	1.47
Post-	201	6.00	1.00	7.00	3.99	1.47
Knowledge						
Pre-	201	15.00	7.00	22.00	15.02	2.63
Post-	201	19.00	6.00	25.00	18.85	4.41
Likelihood of Future Use						
Pre-	201	5.00	1.00	6.00	2.34	1.84
Post-	200	5.00	1.00	6.00	2.25	1.79

Table 3
Descriptive Statistics of Study Measures in Psychoeducational Module Sample

Module Sample	N	Range	Minimum	Maximum	M	SD
Level of Familiarity	104	0.73	0.09	0.82	0.44	0.22
Level of Contact	104	2.67	0.00	2.67	1.07	0.63
Preferred Social Distance						
Pre-	104	2.86	1.14	4.00	2.86	0.77
Post-	103	3.00	1.00	4.00	2.91	0.78
Perceived Dangerousness						
Pre-	104	4.57	1.43	6.00	4.02	1.03
Post-	104	5.00	1.00	6.00	3.81	1.15
Negative Emotions						
Pre-	104	6.00	1.00	7.00	3.88	1.52
Post-	104	6.00	1.00	7.00	3.86	1.48
Knowledge						
Pre-	104	11.00	10.00	21.00	15.12	2.43
Post-	104	11.00	14.00	25.00	22.39	2.20
Likelihood of Future Use						
Pre-	104	5.00	1.00	6.00	2.46	1.98
Post-	104	5.00	1.00	6.00	2.34	1.89

Table 4
Descriptive Statistics of Study Measures in Control Sample

Control Sample	N	Range	Minimum	Maximum	M	SD
Level of Familiarity	97	0.73	0.09	0.82	0.43	0.18
Level of Contact	97	2.67	0.00	2.67	1.13	0.62
Preferred Social Distance						
Pre-	96	2.57	1.43	4.00	2.95	0.75
Post-	97	2.57	1.43	4.00	2.93	0.75
Perceived Dangerousness						
Pre-	96	4.43	1.57	6.00	3.85	1.02
Post-	97	4.71	1.29	6.00	3.89	1.02
Negative Emotions						
Pre-	97	6.00	1.00	7.00	4.10	1.41
Post-	97	6.00	1.00	7.00	4.13	1.46
Knowledge						
Pre-	97	15.00	7.00	22.00	14.93	2.84
Post-	97	15.00	6.00	21.00	15.05	2.68
Likelihood of Future Use						
Pre-	97	5.00	1.00	6.00	2.22	1.67
Post-	96	5.00	1.00	6.00	2.16	1.68

Table 5
Correlations Between Key Study Variables in Merged Sample

Merged Sample (N = 201)		Level of Familiarity	Level of Contact	Preferred Social Distance		Perceived Dangerousness		Negative Emotions		Knowledge		Likelihood of Future Use	
				Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
Level of Familiarity		--											
Level of Contact		.55**	--										
Preferred Social Distance	Pre-	-.57**	-.44**	--									
	Post-	-.58**	-.46**	.94**	--								
Perceived Dangerousness	Pre-	-.47**	-.28**	.75**	.74**	--							
	Post-	-.46**	-.30**	.72**	.75**	.92**	--						
Negative Emotions	Pre-	-.51**	-.37**	.77**	.77**	.72**	.67**	--					
	Post-	-.50**	-.36**	.78**	.78**	.73**	.70**	.95**	--				
Knowledge	Pre-	.18	.08	-.16	-.12	-.19**	-.15	-.13	-.12	--			
	Post-	.06	-.04	-.14	-.11	-.14	-.04	-.15	-.17	.32**	--		
Likelihood of Future Use	Pre-	.63**	.24**	-.62**	-.61**	-.57**	-.54**	-.55**	-.58**	.24**	.16	--	
	Post-	.65**	.29**	-.62**	-.60**	-.56**	-.51**	-.56**	-.58**	.15	.10	.92**	--

Note. **. Correlation is significant at the 0.01 level (2-tailed).

Table 6
Correlations Between Key Study Variables in Psychoeducation Module Sample

Module Sample (N = 104)		Level of Familiarity	Level of Contact	Preferred Social Distance		Perceived Dangerousness		Negative Emotions		Knowledge		Likelihood of Future Use	
				Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
Level of Familiarity		--											
Level of Contact		.63**	--										
Preferred Social Distance	Pre-	-.58**	-.56**	--									
	Post-	-.61**	-.60**	.94**	--								
Perceived Dangerousness	Pre-	-.50**	-.46**	-.78**	-.77**	--							
	Post-	-.47**	-.43**	-.73**	-.77**	.93**	--						
Negative Emotions	Pre-	-.48**	-.51**	.74**	.73**	-.71**	-.64**	--					
	Post-	-.47**	-.48**	.76**	.77**	-.73**	-.70**	.94**	--				
Knowledge	Pre-	.18	.20	-.08	.01	.11	.08	-.06	-.04	--			
	Post-	-.01	.00	-.14	-.15	.07	.02	-.18	-.20*	.13	--		
Likelihood of Future Use	Pre-	.72**	.40**	-.59**	-.57**	.54**	.51**	-.47**	-.50**	.18	.05	--	
	Post-	.70**	.43**	-.55**	-.55**	.50**	.49**	-.46**	-.50**	.10	.02	.93**	--

Note. **. Correlation is significant at the 0.01 level (2-tailed).

Table 7
Correlations Between Key Study Variables in Control Sample

Control Sample (N = 97)		Level of Familiarity	Level of Contact	Preferred Social Distance		Perceived Dangerousness		Negative Emotions		Knowledge		Likelihood of Future Use	
				Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-	Pre-	Post-
Level of Familiarity		--											
Level of Contact		.46**	--										
Preferred Social Distance	Pre-	-.56**	-.30**	--									
	Post-	-.55**	-.30**	.96**	--								
Perceived Dangerousness	Pre-	-.44**	-.09	-.72**	-.71**	--							
	Post-	-.44**	-.13	-.72**	-.74**	.92**	--						
Negative Emotions	Pre-	-.55**	-.21	.82**	.82**	-.74**	-.73**	--					
	Post-	-.54**	-.23	.79**	.79**	-.73**	-.72**	.97**	--				
Knowledge	Pre-	.18	-.03	-.24	-.24	.27**	.24	-.19		--			
	Post-	.18	-.01	-.20	-.21	.21	.24	-.14	-.15	.83**	--		
Likelihood of Future Use	Pre-	.48**	.05	-.66**	-.66**	.60**	.58**	-.67**	-.67**	.31**	.33**	--	
	Post-	.57**	.12	-.70**	-.66**	.63**	.54**	-.69**	-.68**	.19	.18	.91**	--

Note. **. Correlation is significant at the 0.01 level (2-tailed).

Table 8
Pre-/Post- Mean and Standard Deviation Differences for Knowledge and Stigma Measures

Variable		*M*		*SD*	
		Pre-	Post-	Pre-	Post-
Knowledge	Module Group	15.12	22.40	2.43	2.20
	Control Group	14.93	15.05	2.84	2.68
Preferred Social Distance	Module Group	2.87	2.91	0.77	0.78
	Control Group	2.95	2.93	0.75	0.75
Perceived Dangerousness	Module Group	3.15	3.11	1.02	1.02
	Control Group	2.98	3.19	1.03	1.15
Negative Emotions	Module Group	3.88	3.86	1.52	1.48
	Control Group	4.10	4.13	1.41	1.46

Table 9

Greenhouse-Geisser Two-way Repeated Measures, Within-Subjects Effects ANOVAs

Variable		*Mean Square*	*Sum of Squares*	*df*	*F*	*p*	η_p^2
Knowledge	Time	1375.13	1375.13	1.00	451.04	.000**	0.70
	Time*Group	1284.74	1284.74	1.00	421.39	.000**	0.68
	Error(Time)	3.05	606.71	199.00	--	--	--
Preferred Social Distance	Time	0.01	0.01	1.00	0.22	.64	0.01
	Time*Group	0.10	0.10	1.00	3.16	.08	0.02
	Error(Time)	0.03	6.31	197.00	--	--	--
Perceived Dangerousness	Time	0.14	0.14	1.00	1.56	.21	0.01
	Time*Group	0.02	0.02	1.00	0.25	.62	0.00
	Error(Time)	0.09	17.29	197.00	--	--	--
Negative Emotions	Time	0.01	0.01	1.00	0.06	.81	0.00
	Time*Group	0.06	0.06	1.00	0.63	.43	0.01
	Error(Time)	0.10	19.99	199.00	--	--	--

Note. **. XXXX is significant at the 0.01 level (2-tailed).

Table 10

Two-way Repeated Measures, Between-Subjects Effects ANOVAs

Variable		*Mean Square*	*Sum of Squares*	*df*	*F*	*p*	η_p^2
Knowledge	Intercept	114299.67	114299.67	1.00	11593.24	.000**	0.98
	Group	1422.97	1422.97	1.00	144.33	.000**	0.42
	Error	9.86	1961.98	199.00	--	--	--
Preferred Social Distance	Intercept	3372.99	3372.99	1.00	2980.29	.000**	0.94
	Group	0.30	0.30	1.00	0.26	.61	0.01
	Error				--	--	--
Perceived Dangerousness	Intercept	1019.23	1019.23	1.00	503.22	.000**	0.72
	Group	0.16	0.16	1.00	0.08	.79	0.00
	Error	2.03	399.01	197.00	--	--	--
Negative Emotions	Intercept	6402.50	6402.50	1.00	1516.47	.000**	0.88
	Group	5.80	5.80	1.00	1.37	.24	0.01
	Error	4.22	840.17	199.00	--	--	--

Note. **. XXXX is significant at the 0.01 level (2-tailed).

Table 11
Two-way Repeated Measures, Within-Between Group Interaction ANOVAs

Variable			M	Standard Error	95% Confidence Interval	
					Lower Bound	Upper Bound
Knowledge	Module Group	Pre-	15.12	0.26	14.61	15.63
		Post-	22.39	0.24	21.92	22.87
	Control Group	Pre-	14.93	0.27	14.40	15.46
		Post-	15.05	0.25	15.46	15.54
Preferred Social Distance	Module Group	Pre-	2.87	0.08	2.72	3.01
		Post-	2.91	0.08	2.76	3.05
	Control Group	Pre-	2.95	0.08	2.80	3.11
		Post-	2.93	0.08	2.78	3.08
Perceived Dangerousness	Module Group	Pre-	2.98	0.10	2.79	3.17
		Post-	3.19	0.10	2.99	3.40
	Control Group	Pre-	3.15	0.10	2.95	3.35
		Post-	3.11	0.11	2.89	3.32
Negative Emotions	Module Group	Pre-	3.88	0.14	3.60	4.39
		Post-	3.86	0.14	3.58	4.42
	Control Group	Pre-	4.10	0.15	3.80	4.17
		Post-	4.10	0.15	3.84	4.15

Table 12

Hypothesis 2a to 2c: Linear Regression Models for the Level of Contact Predicting All Stigma and Knowledge Measures.

Outcome			*Unstndrd Coefficients*		*Coefficients*	*95% Confidence Interval*		*t-value*	*p-value*	*Total R^2 Change*
			β	*Std. Error*	*Beta*	*Lower*	*Upper*			
Preferred Social Distance	Pre-	(Constant)	3.48	0.10	--	3.29	3.68	35.47	.001***	0.19
		SUCS	-0.09	0.01	-0.43	-0.11	-0.06	-6.78	.001***	
	Post-	(Constant)	3.53	0.10	--	3.34	3.72	36.32	.001***	0.21
		SUCS	-0.09	0.01	-0.46	-0.12	-0.07	-7.26	.001***	
Perceived Dangerousness	Pre-	(Constant)	3.56	0.14	--	3.28	3.84	25.16	.001***	0.08
		SUCS	-0.08	0.02	-0.28	-0.12	-0.04	-4.05	.001***	
	Post-	(Constant)	3.71	0.15	--	3.42	4.09	24.87	.001***	0.09
		SUCS	-0.09	0.02	-0.29	-0.12	-0.05	-4.31	.001***	
Negative Emotions	Pre-	(Constant)	4.95	0.20	--	4.56	5.33	25.29	.001***	0.14
		SUCS	-0.15	0.03	-0.37	-0.20	-0.10	-5.66	.001***	
	Post-	(Constant)	4.92	0.20	--	4.53	5.31	24.96	.001***	0.13
		SUCS	-0.14	0.03	-0.36	-0.19	-0.09	-5.41	.001***	
*Knowledge	Pre-	(Constant)	14.69	0.38	--	13.94	15.43	39.05	.001***	0.01
		SUCS	0.05	0.05	0.07	-0.05	0.15	1.04	.300	
	Post-	(Constant)	19.20	0.63	--	17.95	20.44	30.37	.001***	0.00
		SUCS	-0.05	0.08	-0.05	-0.22	0.11	-0.63	.529	

Note. *. Exploratory analyses—not in original hypotheses; ***. XXXX is significant at the 0.001 level (2-tailed).

Table 13

Hypothesis 2d to 2f: Linear Regression Models for the Level of Familiarity Predicting All Stigma and Knowledge Measures.

Outcome			*Unstandardized Coefficients*		*Standardized Coefficients*	*95% Confidence Interval*		*t-value*	*p-value*	*Total R^2 Change*
			β	*Std. Error*	*Beta*	*Lower*	*Upper*			
Preferred Social Distance	Pre-	(Constant)	3.86	0.11	--	3.65	4.07	35.94	.001***	0.32
		LOF	-0.20	0.02	-0.57	-0.24	-0.16	-9.74	.001***	
	Post-	(Constant)	3.89	0.11	--	3.68	4.10	36.58	.001***	0.34
		LOF	-0.20	0.02	-0.58	-0.24	-0.16	-10.01	.001***	
Perceived Dangerousness	Pre-	(Constant)	4.13	0.16	--	3.83	4.44	26.65	.001***	0.23
		LOF	-0.22	0.03	-0.47	-0.28	-0.17	-7.58	.001***	
	Post-	(Constant)	4.25	0.17	--	3.92	4.58	25.61	.001***	0.21
		LOF	-0.23	0.03	-0.46	-0.29	-0.17	-7.24	.001***	
Negative Emotions	Pre-	(Constant)	5.62	0.22	--	5.19	6.05	25.86	.001***	0.26
		LOF	-0.34	0.04	-0.51	-0.42	-0.26	-8.25	.001***	
	Post-	(Constant)	5.61	0.22	--	5.18	6.04	25.70	.001***	0.25
		LOF	-0.34	0.04	-0.50	-0.42	-0.26	-8.14	.001***	
*Knowledge	Pre-	(Constant)	14.01	0.44	--	13.14	14.89	31.61	.001***	0.03
		LOF	0.21	0.08	0.18	0.05	0.38	2.51	.013*	
	Post-	(Constant)	18.25	0.75	--	16.76	19.73	24.20	.001***	0.00
		LOF	0.13	0.14	0.06	-0.16	0.41	0.88	.380	

Note. *. Exploratory analyses—not in original hypotheses; ***. XXXX is significant at the 0.001 level (2-tailed).

Table 14

Hypothesis 2g to 2i: Linear Regression Models for Knowledge Predicting All Stigma Measures.

Outcome			*Unstandardized Coefficients*		*Standardized Coefficients*	*95% Confidence Interval*		*t-value*	*p-value*	*Total R^2 Change*
			β	*Std. Error*	*Beta*	*Lower*	*Upper*			
Preferred Social Distance	Pre-	(Constant)	16.62	0.71	--	15.22	18.03	23.32	.001***	0.03
		Know	-0.54	0.24	-0.16	-1.01	-0.07	-2.26	.025*	
	Post-	(Constant)	21.27	1.20	--	18.90	23.64	17.69	.001***	0.02
		Know	-0.81	0.40	-0.14	-1.60	-0.02	-2.02	.044*	
Perceived Dangerousness	Pre-	(Constant)	16.53	0.57	--	15.41	17.64	29.27	.001***	0.04
		Know	-0.48	0.18	-0.19	-0.82	-0.13	-2.73	.007**	
	Post-	(Constant)	20.78	0.96	--	18.89	22.67	21.71	.001***	0.02
		Know	-0.61	0.30	-0.14	-1.19	-0.02	-2.05	.041*	
Negative Emotions	Pre-	(Constant)	15.93	0.53	--	14.87	16.98	29.21	.001***	0.02
		Know	-0.23	0.13	-0.13	-0.47	0.02	-1.79	.075	
	Post-	(Constant)	20.89	0.89	--	19.14	22.65	23.47	.001***	0.03
		Know	-0.51	0.21	-0.17	-0.92	-0.10	-2.44	.015*	

Note. *. XXXX is significant at the 0.05 level (2-tailed); **. XXXX is significant at the 0.01 level (2-tailed); ***. XXXX is significant at the 0.001 level (2-tailed).

Table 15

Hypothesis 3d-2: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Preferred Social Distance After Receiving Video Clip

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.22	0.03	-0.56	.001	0.30
Female	0.44	0.13	0.28	.001	0.07
Interaction	-0.13	0.06	-0.18	.035*	0.03
Total					0.40

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Table 16

Hypothesis 3p-1: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Preferred Social Distance Before Receiving Video Clip

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-2.19	0.36	-0.51	.001	0.32
Age	-0.20	0.05	-0.42	.001	0.07
Interaction	0.64	0.27	0.23	.021*	0.04
Total					0.43

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Table 17

Hypothesis 3p-2: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Preferred Social Distance After Receiving Video Clip

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-2.05	0.34	-0.49	.001	0.30
Age	-0.22	0.05	-0.45	.001	0.10
Interaction	0.63	0.27	0.23	.019*	0.03
Total					0.43

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Table 18

Exploratory Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and the Likelihood of Using Marijuana in the Future Before Receiving Module

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	0.08	0.03	0.17	.018	0.16
Ever Used	2.34	0.25	0.65	.001	0.40
Interaction	0.15	0.07	0.15	.030*	0.02
Total					0.58

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Pre-Likelihood to Ever Use

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Table 19

Exploratory Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and the Likelihood of Using Marijuana in the Future Before Receiving Module

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	2.96	0.74	0.33	.001	0.52
Ever Used	-1.91	0.34	-0.48	.001	0.15
Interaction	-5.21	1.53	-0.20	.001**	0.04
Total					0.71

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Pre-Likelihood to Ever Use

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Table 20

Exploratory Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and the Likelihood of Using Marijuana in the Future After Receiving Module

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	0.09	0.03	0.18	.007	0.18
Ever Used	-2.66	0.24	-0.69	.001	0.45
Interaction	-0.15	0.06	-0.14	.021*	0.02
Total					0.65

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Post-Likelihood to Ever Use

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Table 21

Exploratory Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and the Likelihood of Using Marijuana in the Future After Receiving Module

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	2.68	0.75	0.31	.001	0.49
Ever Used	-1.78	0.35	-0.47	.001	0.14
Interaction	-5.20	1.55	-0.21	.001**	0.04
Total					0.67

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Post-Likelihood to Ever Use

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Table 22

Exploratory Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and the Likelihood of Using Marijuana in the Future Before Receiving Video Clip

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	2.01	0.83	0.21	.018	0.23
Ever Used	1.21	0.36	0.33	.001	0.18
Interaction	6.39	1.81	0.31	.001**	0.07
Total					0.48

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Pre-Likelihood to Ever Use

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Table 23

Exploratory Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and the Likelihood of Using Marijuana in the Future After Receiving Video Clip

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	3.46	0.82	0.35	.001	0.32
Ever Used	1.00	0.35	0.27	.005	0.13
Interaction	6.31	1.82	0.29	.001**	0.07
Total					0.52

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Post-Likelihood to Ever Use

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Table 24

Hypothesis 1 and Results

	Hypothesis	Supported
1a	↑ in pre to post Knowledge for Psychoeducational Module Group with no change to Control Group	Supported
1b	↓ in pre to post Preferred Social Distance for Psychoeducational Module Group with no change to Control Group	Not Supported
1c	↓ in pre to post Perceived Dangerousness for Psychoeducational Module Group with no change to Control Group	Not Supported
1d	↓ in pre to post Negative Emotionality for Psychoeducational Module Group with no change to Control Group	Not Supported

Table 25
Hypothesis 2 and Results

	Hypothesis	Supported
2a-1	↑ Level of Contact predicts ↓ Pre-Preferred Social Distance, regardless of group	Supported
2a-2	↑ Level of Contact predicts ↓ Post-Preferred Social Distance, regardless of group	Supported
2b-1	↑ Level of Contact predicts ↓ Pre-Perceived Dangerousness, regardless of group	Supported
2b-2	↑ Level of Contact predicts ↓ Post-Perceived Dangerousness, regardless of group	Supported
2c-1	↑ Level of Contact predicts ↓ Pre-Negative Emotionality, regardless of group	Supported
2c-2	↑ Level of Contact predicts ↓ Post-Negative Emotionality, regardless of group	Supported
2d-1	↑ Level of Familiarity predicts ↓ Pre-Preferred Social Distance, regardless of group	Supported
2d-2	↑ Level of Familiarity predicts ↓ Post-Preferred Social Distance, regardless of group	Supported
2e-1	↑ Level of Familiarity predicts ↓ Pre-Perceived Dangerousness, regardless of group	Supported
2e-2	↑ Level of Familiarity predicts ↓ Post-Perceived Dangerousness, regardless of group	Supported
2f-1	↑ Level of Familiarity predicts ↓ Pre-Negative Emotionality, regardless of group	Supported
2f-2	↑ Level of Familiarity predicts ↓ Post-Negative Emotionality, regardless of group	Supported

Table 26

Hypothesis 2 Exploratory Analyses and Results

	Hypothesis	Supported
2g-1*	↑ Knowledge predicts ↓ Pre-Preferred Social Distance, regardless of group	Supported
2g-2*	↑ Knowledge predicts ↓ Pre-Preferred Social Distance, regardless of group	Supported
2h-1*	↑ Knowledge predicts ↓ Pre-Perceived Dangerousness, regardless of group	Supported
2h-2*	↑ Knowledge predicts ↓ Post-Perceived Dangerousness, regardless of group	Supported
2i-1*	↑ Knowledge predicts ↓ Pre-Negative Emotionality, regardless of group	Not Supported
2i-2*	↑ Knowledge predicts ↓ Post-Negative Emotionality, regardless of group	Supported

Note: * Exploratory; not part of original hypotheses

Table 27

Hypothesis 3a through 3d and Results

Grp		Hypothesis	Supported
3a-1	CG	↑ Pre-Preferred Social Distance when Level of Contact ↓ for females	Not Supported
3a-2	CG	↑ Post-Preferred Social Distance when Level of Contact ↓ for females	Not Supported
3a-3	PM	↑ Pre-Preferred Social Distance when Level of Contact ↓ for females	Not Supported
3a-4	PM	↑ Post-Preferred Social Distance when Level of Contact ↓ for females	Not Supported
3b-1	CG	↑ Pre-Perceived Dangerousness when Level of Contact ↓ for females	Not Supported
3b-2	CG	↑ Post-Perceived Dangerousness when Level of Contact ↓ for females	Not Supported
3b-3	PM	↑ Pre-Perceived Dangerousness when Level of Contact ↓ for females	Not Supported
3b-4	PM	↑ Post-Perceived Dangerousness when Level of Contact ↓ for females	Not Supported
3c-1	CG	↑ Pre-Negative Emotionality when Level of Contact ↓ for females	Not Supported
3c-2	CG	↑ Post- Negative Emotionality when Level of Contact ↓ for females	Not Supported
3c-3	PM	↑ Pre-Negative Emotionality when Level of Contact ↓ for females	Not Supported
3c-4	PM	↑ Post- Negative Emotionality when Level of Contact ↓ for females	Not Supported
3d-1	CG	↑ Pre-Preferred Social Distance when Level of Familiarity ↓ for females	Not Supported
3d-2	CG	↑ Post-Preferred Social Distance when Level of Familiarity ↓ for females	Supported
3d-3	PM	↑ Pre-Preferred Social Distance when Level of Familiarity ↓ for females	Not Supported
3d-4	PM	↑ Post-Preferred Social Distance when Level of Familiarity ↓ for females	Not Supported

Table 28

Hypothesis 3e through 3h and Results

Grp		Hypothesis	Supported
3e-1	CG	↑ Pre-Perceived Dangerousness when Level of Familiarity ↓ for females	Not Supported
3e-2	CG	↑ Post-Perceived Dangerousness when Level of Familiarity ↓ for females	Not Supported
3e-3	PM	↑ Pre-Perceived Dangerousness when Level of Familiarity ↓ for females	Not Supported
3e-4	PM	↑ Post-Perceived Dangerousness when Level of Familiarity ↓ for females	Not Supported
3f-1	CG	↑ Pre- Negative Emotionality when Level of Familiarity ↓ for females	Not Supported
3f-2	CG	↑ Post- Negative Emotionality when Level of Familiarity ↓ for females	Not Supported
3f-3	PM	↑ Pre- Negative Emotionality when Level of Familiarity ↓ for females	Not Supported
3f-4	PM	↑ Post- Negative Emotionality when Level of Familiarity ↓ for females	Not Supported
3g-1	CG	↑ Pre-Preferred Social Distance when Level of Contact ↓ for non-users	Not Supported
3g-2	CG	↑ Post-Preferred Social Distance when Level of Contact ↓ for non-users	Not Supported
3g-3	PM	↑ Pre-Preferred Social Distance when Level of Contact ↓ for non-users	Not Supported
3g-4	PM	↑ Post-Preferred Social Distance when Level of Contact ↓ for non-users	Not Supported
3h-1	CG	↑ Pre-Perceived Dangerousness when Level of Contact ↓ for non-users	Not Supported
3h-2	CG	↑ Post-Perceived Dangerousness when Level of Contact ↓ for non-users	Not Supported
3h-3	PM	↑ Pre-Perceived Dangerousness when Level of Contact ↓ for non-users	Not Supported
3h-4	PM	↑ Post-Perceived Dangerousness when Level of Contact ↓ for non-users	Not Supported

Table 29

Hypothesis 3i through 3l and Results

Grp		Hypothesis	Supported
3i-1	CG	↑ Pre-Negative Emotionality when Level of Contact ↓ for non-users	Not Supported
3i-2	CG	↑ Post- Negative Emotionality when Level of Contact ↓ for non-users	Not Supported
3i-3	PM	↑ Pre-Negative Emotionality when Level of Contact ↓ for non-users	Not Supported
3i-4	PM	↑ Post- Negative Emotionality when Level of Contact ↓ for non-users	Not Supported
3j-1	CG	↑ Pre-Preferred Social Distance when Level of Familiarity ↓ for non-users	Not Supported
3j-2	CG	↑ Post-Preferred Social Distance when Level of Familiarity ↓ for non-users	Not Supported
3j-3	PM	↑ Pre-Preferred Social Distance when Level of Familiarity ↓ for non-users	Not Supported
3j-4	PM	↑ Post-Preferred Social Distance when Level of Familiarity ↓ for non-users	Not Supported
3k-1	CG	↑ Pre-Perceived Dangerousness when Level of Familiarity ↓ for non-users	Not Supported
3k-2	CG	↑ Post-Perceived Dangerousness when Level of Familiarity ↓ for non-users	Not Supported
3k-3	PM	↑ Pre-Perceived Dangerousness when Level of Familiarity ↓ for non-users	Not Supported
3k-4	PM	↑ Post-Perceived Dangerousness when Level of Familiarity ↓ for non-users	Not Supported
3l-1	CG	↑ Pre- Negative Emotionality when Level of Familiarity ↓ for non-users	Not Supported
3l-2	CG	↑ Post- Negative Emotionality when Level of Familiarity ↓ for non-users	Not Supported
3l-3	PM	↑ Pre- Negative Emotionality when Level of Familiarity ↓ for non-users	Not Supported
3l-4	PM	↑ Post- Negative Emotionality when Level of Familiarity ↓ for non-users	Not Supported

Table 30

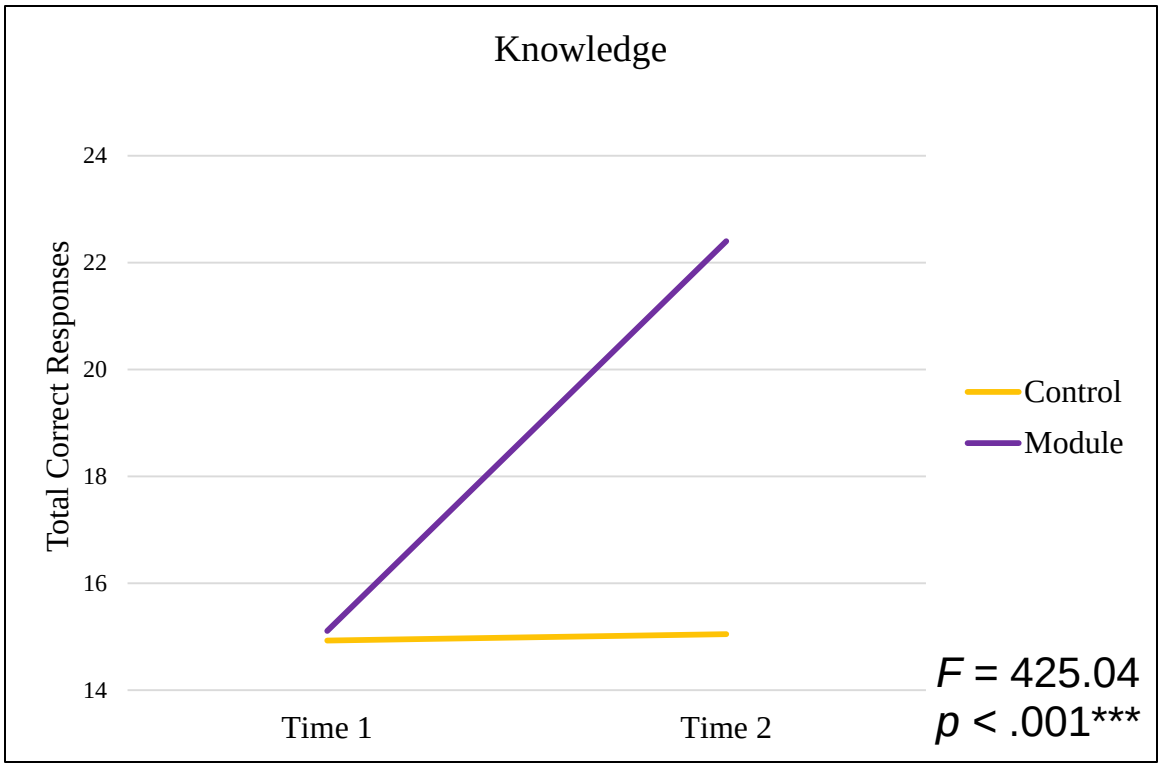
Hypothesis 3m through 3l and Results

Grp		Hypothesis	Supported
3m-1	CG	↑ Pre-Preferred Social Distance when Level of Contact ↓ for people over age 18	Not Supported
3m-2	CG	↑ Post-Preferred Social Distance when Level of Contact ↓ for people over age 18	Not Supported
3m-3	PM	↑ Pre-Preferred Social Distance when Level of Contact ↓ for people over age 18	Not Supported
3m-4	PM	↑ Post-Preferred Social Distance when Level of Contact ↓ for people over age 18	Not Supported
3n-1	CG	↑ Pre-Perceived Dangerousness when Level of Contact ↓ for people over age 18	Not Supported
3n-2	CG	↑ Post-Perceived Dangerousness when Level of Contact ↓ for people over age 18	Not Supported
3n-3	PM	↑ Pre-Perceived Dangerousness when Level of Contact ↓ for people over age 18	Not Supported
3n-4	PM	↑ Post-Perceived Dangerousness when Level of Contact ↓ for people over age 18	Not Supported
3o-1	CG	↑ Pre-Negative Emotionality when Level of Contact ↓ for people over age 18	Not Supported
3o-2	CG	↑ Post- Negative Emotionality when Level of Contact ↓ for people over age 18	Not Supported
3o-3	PM	↑ Pre-Negative Emotionality when Level of Contact ↓ for people over age 18	Not Supported
3o-4	PM	↑ Post- Negative Emotionality when Level of Contact ↓ for people over age 18	Not Supported
3p-1	CG	↑ Pre-Preferred Social Distance when Level of Familiarity ↓ for people over age 18	Supported
3p-2	CG	↑ Post-Preferred Social Distance when Level of Familiarity ↓ for people over age 18	Supported
3p-3	PM	↑ Pre-Preferred Social Distance when Level of Familiarity ↓ for people over age 18	Not Supported
3p-4	PM	↑ Post-Preferred Social Distance when Level of Familiarity ↓ for people over age 18	Not Supported

Table 31

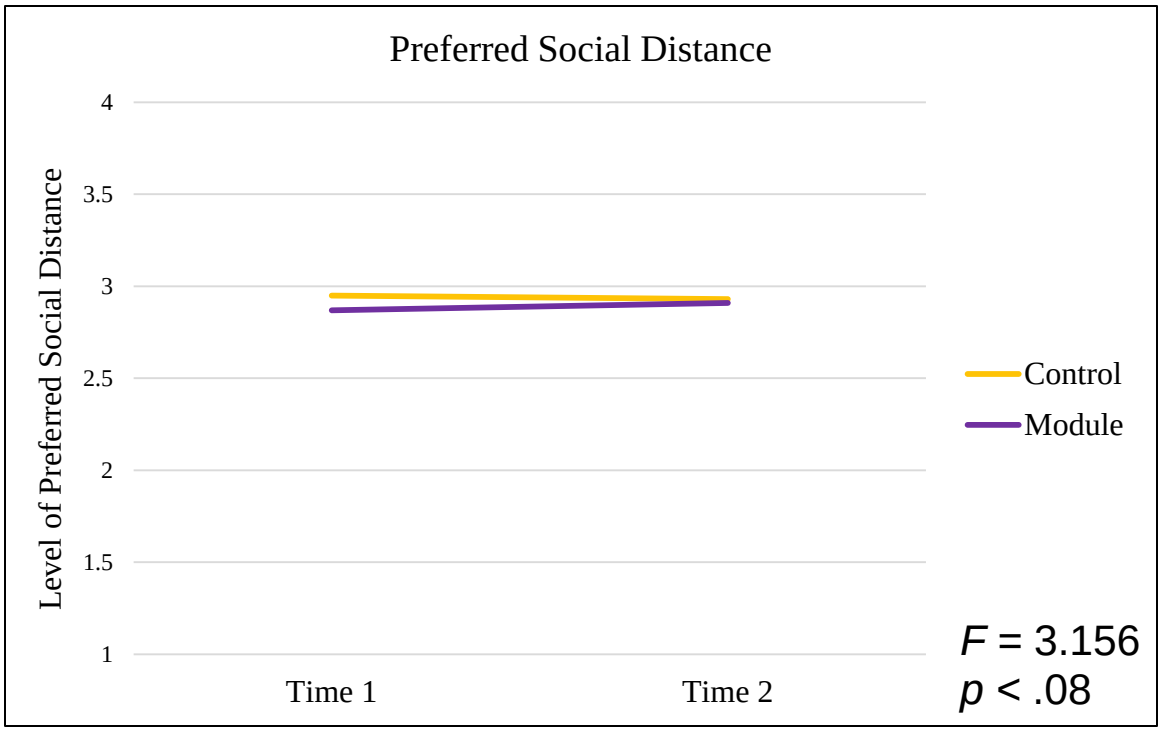
Hypothesis 3q through 3r and Results

Grp		Hypothesis	Supported
3q-1	CG	↑ Pre-Perceived Dangerousness when Level of Familiarity ↓ for people over age 18	Not Supported
3q-2	CG	↑ Post-Perceived Dangerousness when Level of Familiarity ↓ for people over age 18	Not Supported
3q-3	PM	↑ Pre-Perceived Dangerousness when Level of Familiarity ↓ for people over age 18	Not Supported
3q-4	PM	↑ Post-Perceived Dangerousness when Level of Familiarity ↓ for people over age 18	Not Supported
3r-1	CG	↑ Pre- Negative Emotionality when Level of Familiarity ↓ for people over age 18	Not Supported
3r-2	CG	↑ Post- Negative Emotionality when Level of Familiarity ↓ for people over age 18	Not Supported
3r-3	PM	↑ Pre- Negative Emotionality when Level of Familiarity ↓ for people over age 18	Not Supported
3r-4	PM	↑ Post- Negative Emotionality when Level of Familiarity ↓ for people over age 18	Not Supported



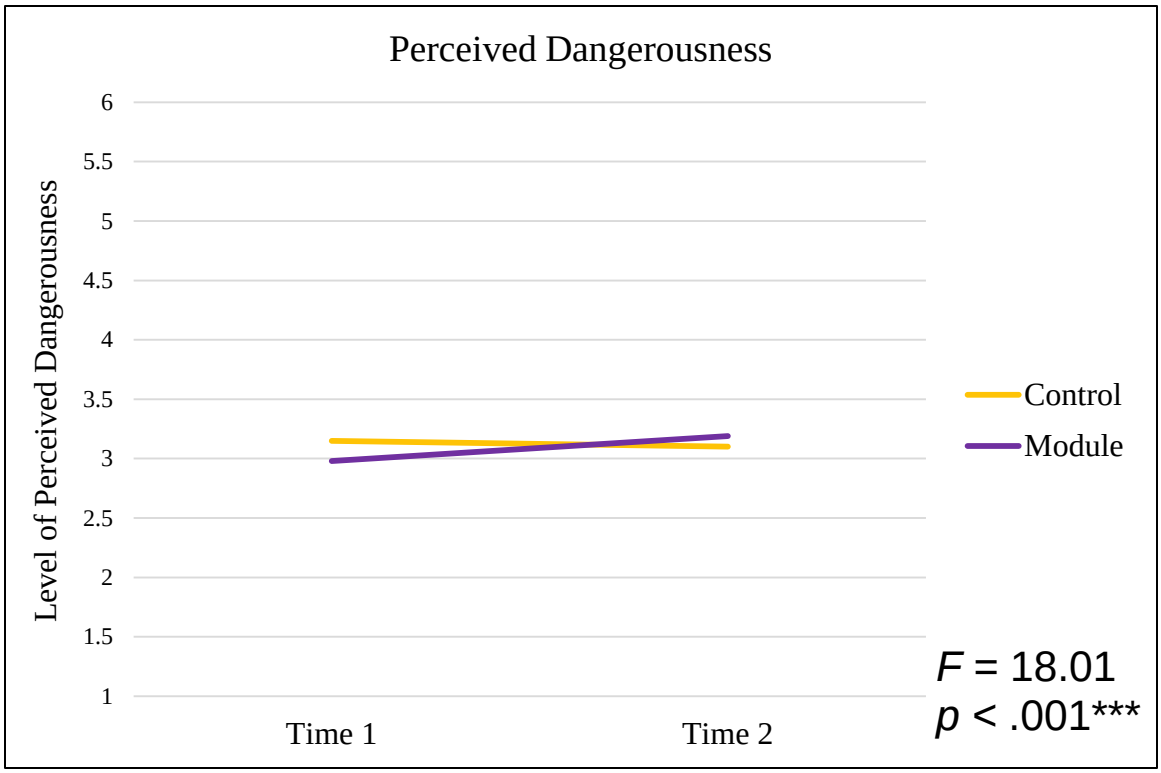
Note. Values given represent the between group interaction.

Figure 1. Hypothesis 1a two-way within-between groups interaction ANOVA analyses examining change in knowledge from pre- to post-test.



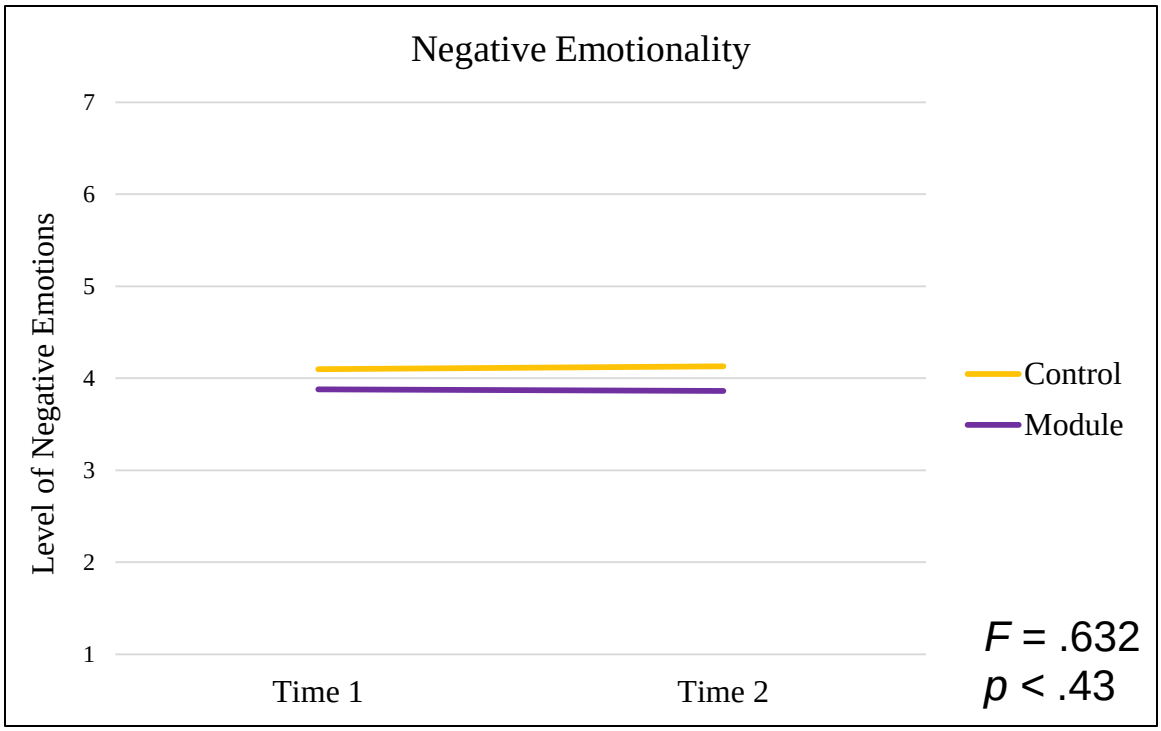
Note. Values given represent the between group interaction.

Figure 2. Hypothesis 1b two-way within-between groups interaction ANOVA analyses examining change in preferred social distance from pre- to post-test.



Note. Values given represent the between group interaction.

Figure 3. Hypothesis 1c two-way within-between groups interaction ANOVA analyses examining change in perceived dangerousness from pre- to post-test.



Note. Values given represent the between group interaction.

Figure 4. Hypothesis 1d two-way within-between groups interaction ANOVA analyses examining change in negative emotions regarding recreational marijuana users from pre- to post-test.

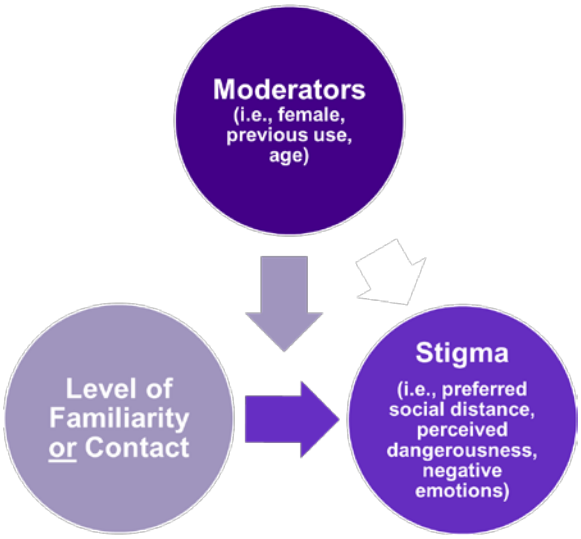


Figure 5. Moderation model for the pathway between the level of familiarity/contact and each stigma measure.

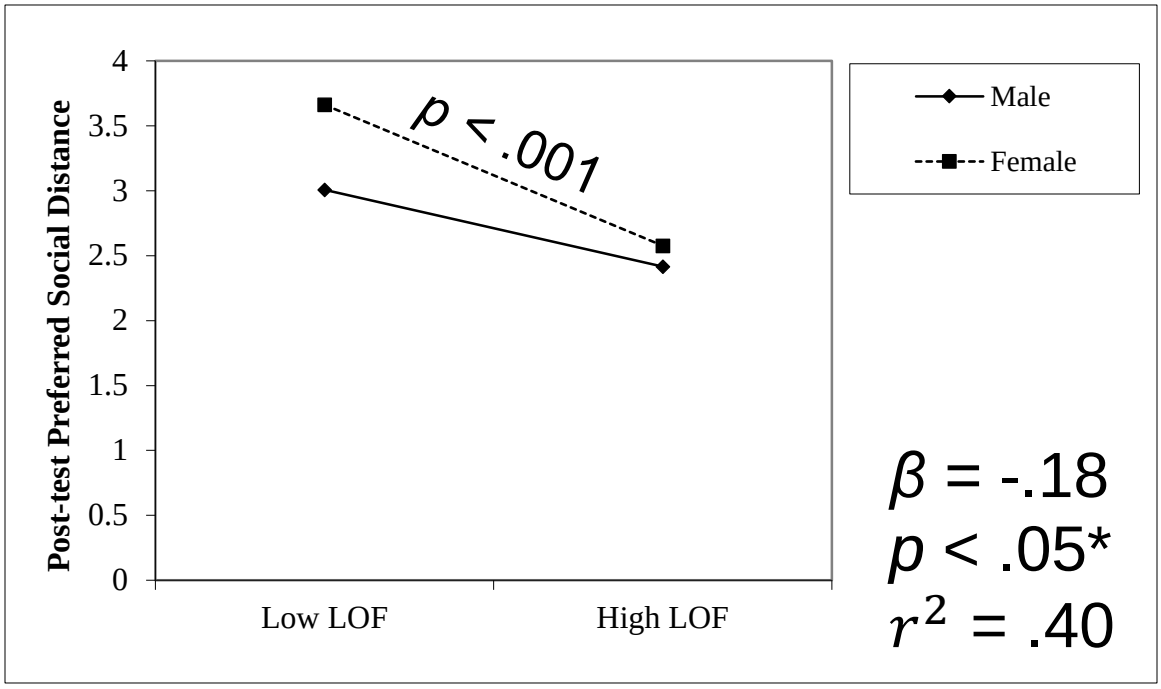


Figure 6. The control group simple slopes analysis of females and the level of familiarity to post-test preferred social distance.

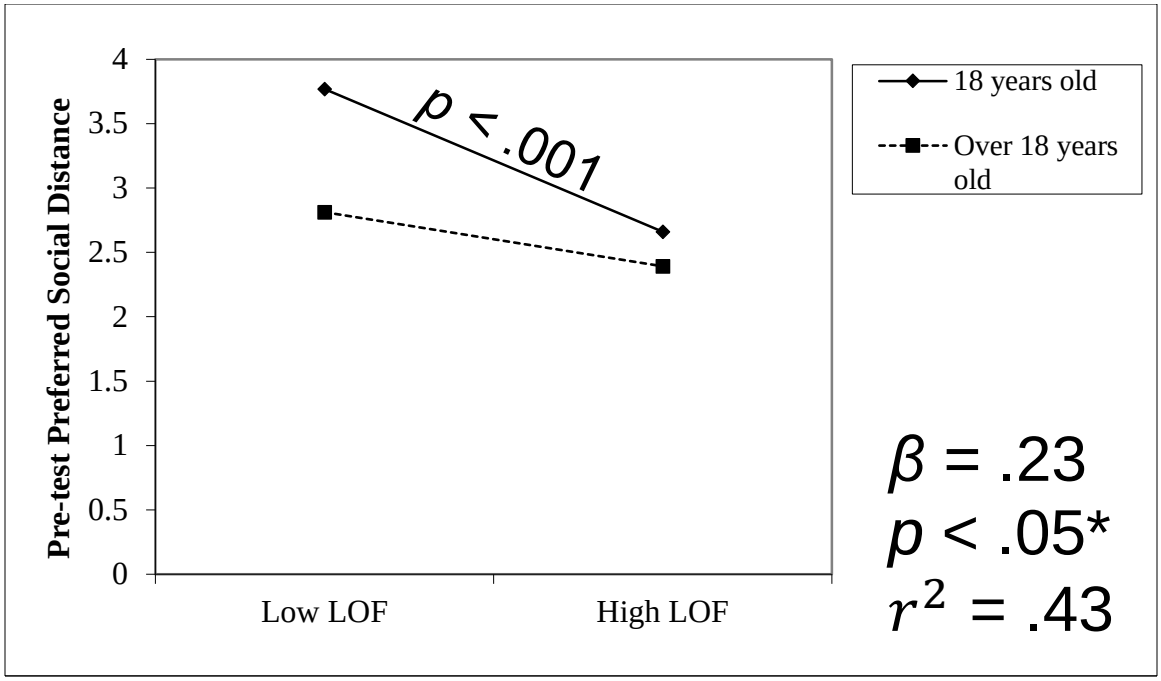


Figure 7. The control group simple slopes analysis of age and the level of familiarity to pre-test preferred social distance.

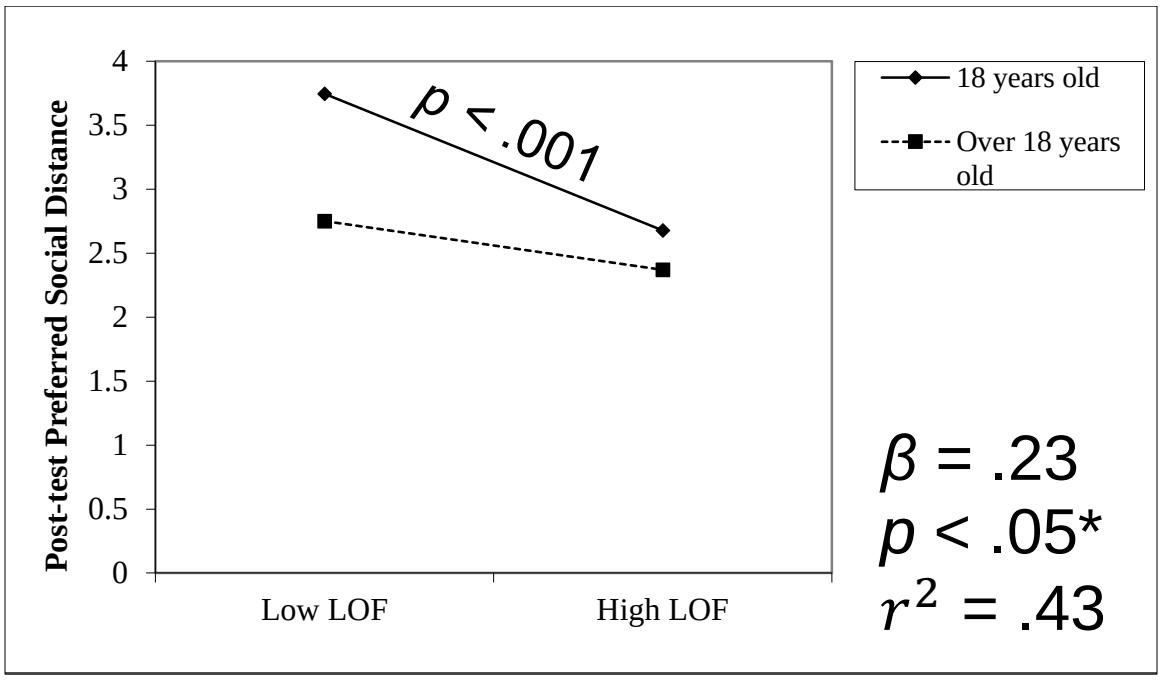


Figure 8. The control group simple slopes analysis of age and the level of familiarity to post-test preferred social distance.

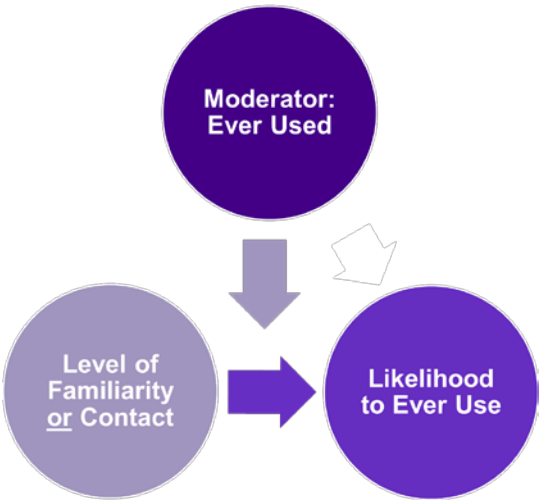


Figure 9. Exploratory moderation model examining the moderating effects of ever personally using marijuana on the pathway between the level of familiarity/contact and the likelihood of ever using in the future.

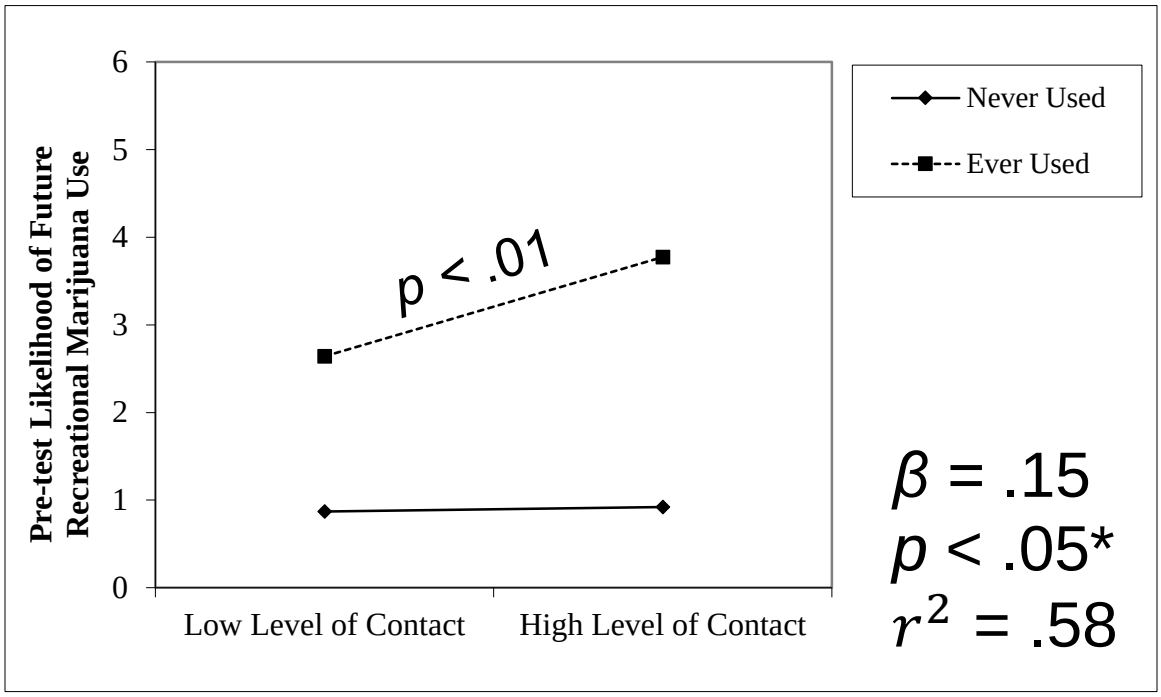


Figure 10. The psychoeducational module group simple slopes Exploratory Path Analysis examining the moderating effects of ever personally using marijuana on the level of contact and the likelihood of using marijuana in the future before receiving module.

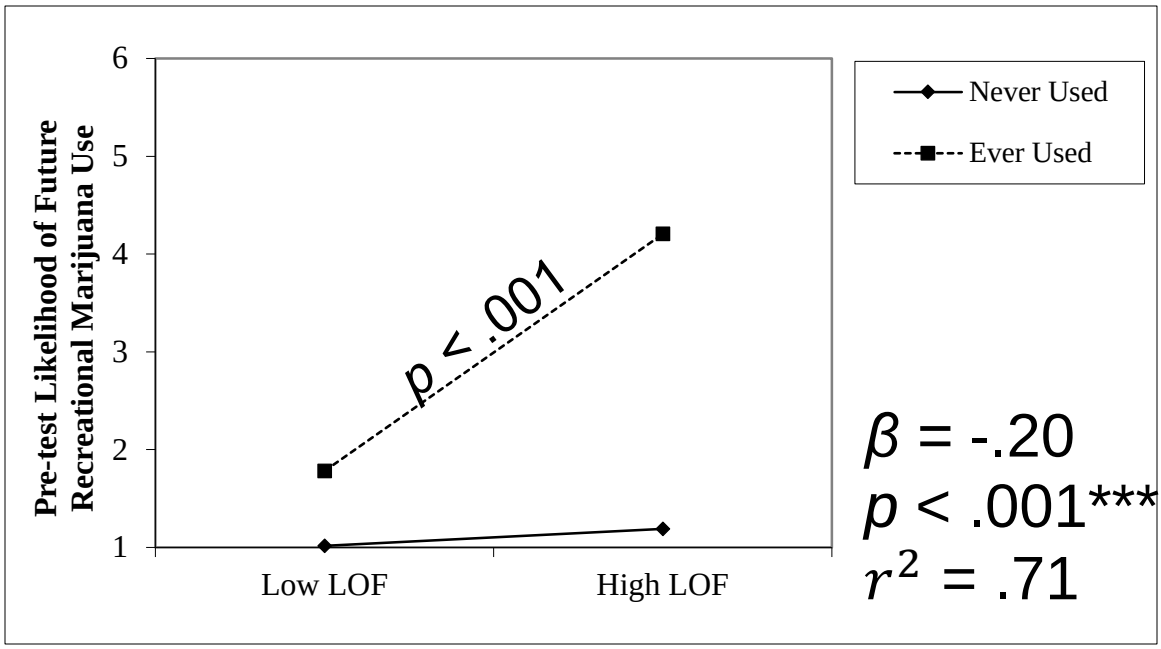


Figure 11. The psychoeducational module group simple slopes Exploratory Path Analysis examining the moderating effects of ever personally using marijuana on the level of familiarity and the likelihood of using marijuana in the future before receiving module.

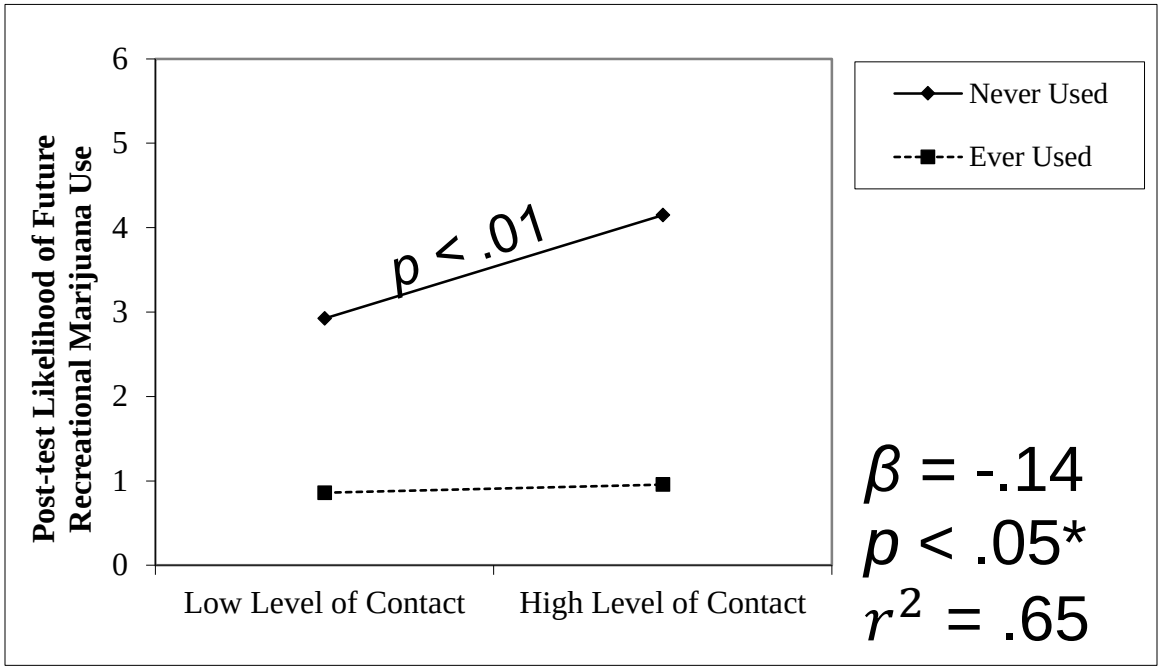


Figure 12. The psychoeducational module group simple slopes Exploratory Path Analysis examining the moderating effects of ever personally using marijuana on the level of contact and the likelihood of using marijuana in the future after receiving module.

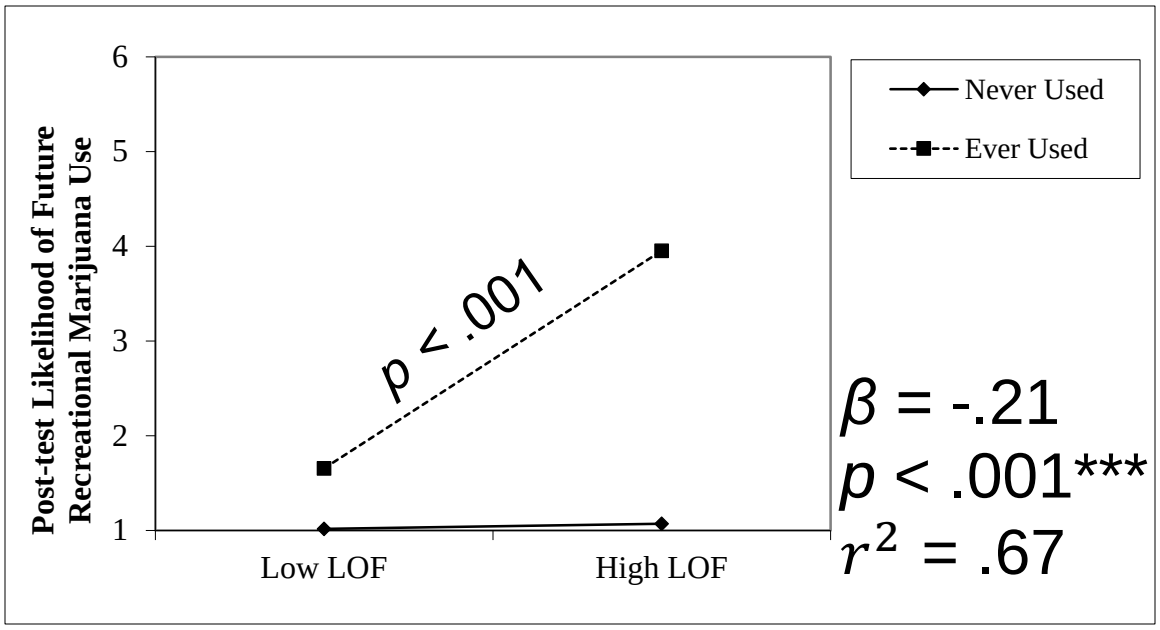


Figure 13. The psychoeducational module group simple slopes Exploratory Path Analysis examining the moderating effects of ever personally using marijuana on the level of familiarity and the likelihood of using marijuana in the future after receiving module.

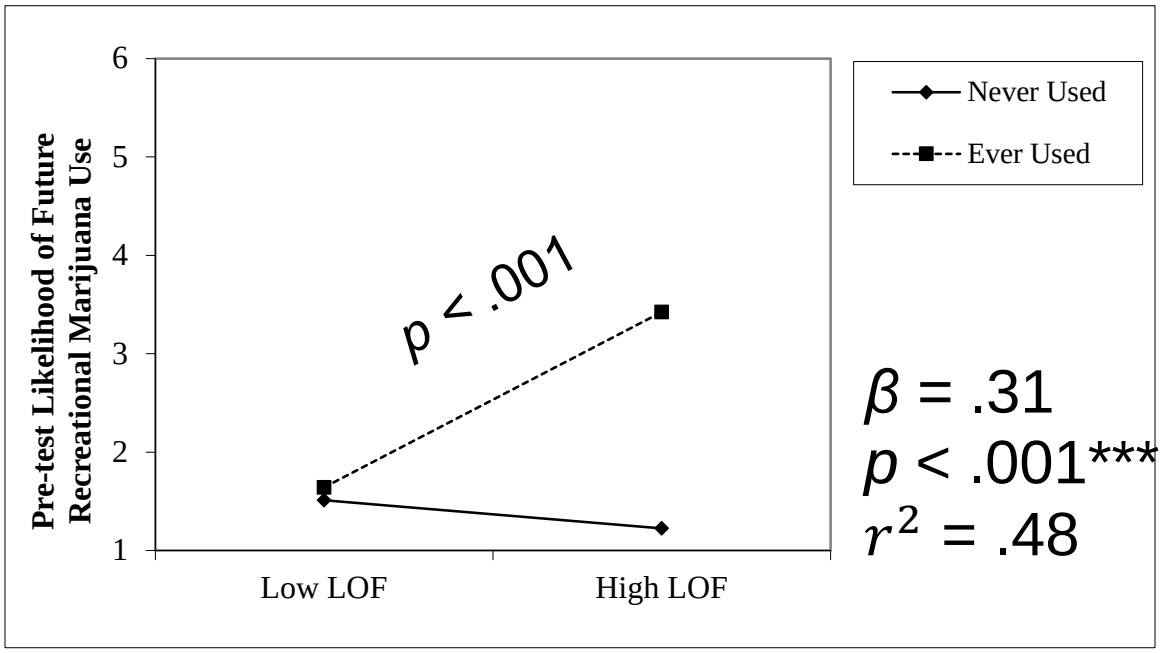


Figure 14. The control group simple slopes Exploratory Path Analysis examining the moderating effects of ever personally using marijuana on the level of familiarity and the likelihood of using marijuana in the future before receiving video clip.

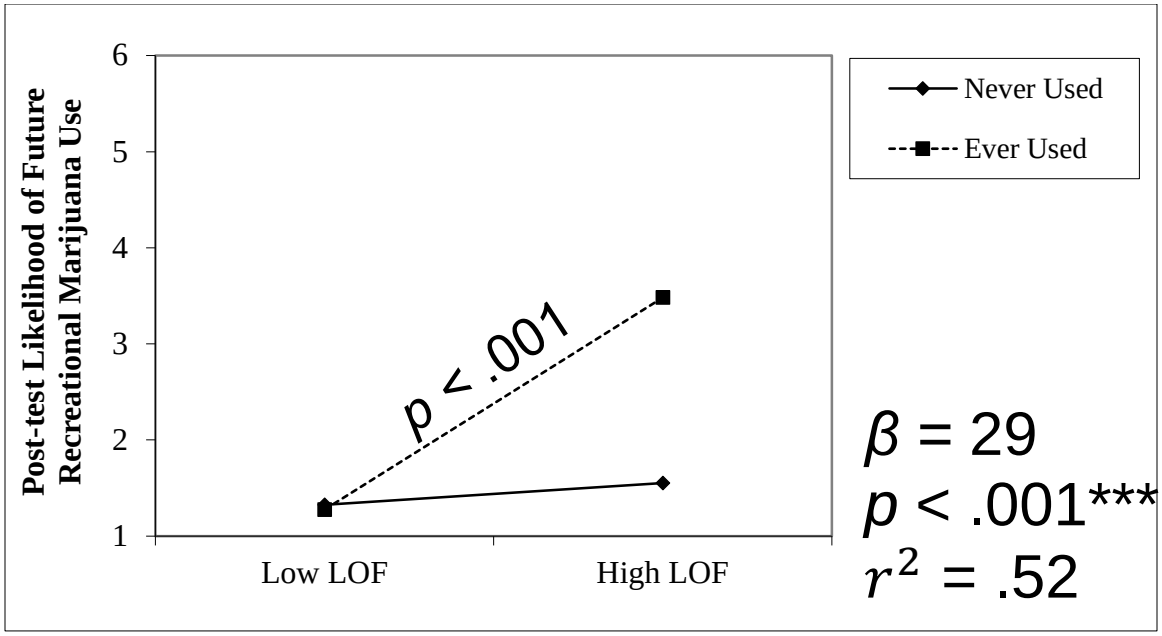


Figure 15. The control group simple slopes Exploratory Path Analysis examining the moderating effects of ever personally using marijuana on the level of familiarity and the likelihood of using marijuana in the future after receiving video clip.

APPENDIX A

INFORMED CONSENT

University of Northern Iowa
Human Participants review
Informed Consent

Project Title: Perceptions of Substance Use
Investigators: Stephanie J. Strong and Dilbur D. Arsiwalla.

Invitation to Participate: You are invited to participate in a research project conducted through the University of Northern Iowa. The University requires that you give your signed agreement to participate in this project. The following information is provided to help you make an informed decision about whether or not to participate.

Nature and Purpose: The purpose of this study is to examine your overall perceptions of marijuana and your perceptions toward those who use it recreationally.

Explanation of Procedures: During this 45-60 minute appointment, you will be asked to complete a questionnaire about your general perceptions towards marijuana, your current knowledge about marijuana, the level of familiarity you've had with it, and the level of contact with those who use it. Additionally, you will also be asked to view a video or a website for approximately 20-25 minutes. Furthermore, in the section about your current knowledge regarding marijuana, we ask that you please do not look up any answers to the questions online. This is in order to guarantee we get the most accurate representation of your current knowledge regarding marijuana.

Discomfort and Risks: Risks are minimal and similar to those typically encountered in your day to day life. You may feel some discomfort answering some of the more sensitive questions about your own use of marijuana. Please remember that you are free to skip any question you feel uncomfortable with. You are also free to withdraw from the study at any time during data collection.

Confidentiality: Information obtained during this study will be kept strictly confidential. Data from this research may be published in an academic journal or presented at a scholarly conference. However, given that we are asking about illegal behaviors it is

possible, but highly unlikely, that your information could be subpoenaed. Again, please remember that you are free to skip any question you feel uncomfortable with. You are also free to withdraw from the study at any time during data collection. Any identifying information will be removed, and answers to your questions will never be reported individually. All data collected will be used only for research purposes.

Right to Refuse or Withdraw: Your participation in this study is completely voluntary. You have the right to skip any question you wish, withdraw from participation at any time, or to choose not to participate at all. There will be no penalties or loss of benefits for withdrawal from the study.

Questions: The research assistants or primary investigator will answer any questions about the study or your participation. If you have further questions or seek additional information, you may contact the principal investigator Stephanie Strong at strongs@uni.edu. You may also contact Dr. Dilbur Arsiwalla at 319-273-7707 or dilbur.arsiwalla@uni.edu. Additionally, you may also contact the office of Research and Sponsored Programs, Director of Research, Anita Gordon at 319-273-6148, for answers to questions about the rights of research participants and the participant review process. You may also contact the UNI counseling center at (319) 273-2676 if you feel upset following the study.

I am fully aware of the nature and extent of my participation in this project as stated above and the possible risks arising from it. I hereby agree to participate in this project. I acknowledge that I have received a copy of this consent statement. I am 18 years of age or older.

_____

Print Name Date

_____

Sign Name Date

APPENDIX B

DEMOGRAPHICS

What is your sex?

1. Male
2. Female

What is your age? _____

Which race/ethnicity do you identify yourself with?

1. Caucasian (white, non-Hispanic origin)
2. African- American/Black
3. Asian/Pacific Islander
4. Hispanic/Latino
5. Middle Eastern
6. Other

What is your major?

1. Natural Science (Biology, chemistry, etc.)
2. Social Science (Psychology, sociology, etc.)
3. Education
4. Arts (Music, drama, etc.)
5. Languages and Literature (Spanish, French, etc.)
6. Business
7. Undecided
8. Other _____

What year are you in school?

1. Freshman
2. Sophomore
3. Junior
4. Senior
5. Other _____

Have you ever used marijuana?

1. Yes
2. No

Have you used marijuana in the last 30 days?

1. Yes
2. No

How often do you use marijuana?

1. Once a month
2. 2-3 times a month
3. Once a week
4. 2-3 times a week
5. 4-5 times a week
6. Everyday

Have you sought out substance use treatment in your life?

1. Yes If yes, please describe problem:_____
2. No

APPENDIX C

DESCRIPTION OF MARIJUANA USE

Marijuana Use

Marijuana (aka cannabis, pot, weed, etc.) is a dry, shredded green and brown mix of flowers, stems, seeds, and leaves derived from the hemp plant Cannabis sativa. Marijuana is usually smoked as a cigarette (joint) or in a pipe.

APPENDIX D

LEVEL OF FAMILIARITY

Please read each of the following statements carefully. After you have read all of the statements below, please select EVERY statement that represents your experience with **persons who use marijuana.**

_____ I have watched a movie or television show in which a character depicted a person who uses marijuana.

_____ My job involves providing services/treatment for persons who use marijuana.

_____ I have observed, in passing, a person I believe uses marijuana.

_____ I have observed persons who use marijuana on a frequent basis.

_____ I have used marijuana.

_____ I have worked with a person who used marijuana.

_____ I have never observed a person who used marijuana.

_____ A friend of the family uses marijuana.

_____ I have a relative who uses marijuana.

_____ I have watched a documentary on television about using marijuana.

_____ I live with a person who uses marijuana.

APPENDIX E

SUBSTANCE USE CONTACT SCALE- MARIJUANA

During the last year, please indicate how often you interacted with someone you knew (or suspected) uses in each of the settings listed below, either during the school year and/or the summer months. In those settings you have had contact, rate your impression of that/those person(s).

1	2	3	4
Never	Rarely	Occasionally	Often

During the last year, please indicate how often you interacted with individual(s) who use marijuana WHERE YOU LIVE? Where you live refers to those interactions where you live (e.g., roommates, family members).

1	2	3	4

During the last year, please indicate how often you interacted with individual(s) who use marijuana AT WORK? At work refers to those interactions at work (e.g., coworkers, supervisor, customers).

1	2	3	4

During the last year, please indicate how often you interacted with individual(s) who use marijuana AT SCHOOL? At school refers to those interactions at school (e.g., other students, instructors, staff).

1	2	3	4

During the last year, please indicate how often you interacted with individual(s) who use marijuana at SOCIAL EVENTS? Social events refers to those interactions where you spend time with friends and acquaintances.

1 2 3 4

During the last year, please indicate how often you interacted with individual(s) who use marijuana at FAMILY EVENTS? Family events refers to those interactions with family members and relatives (visiting, holidays), with the exception of those you live with.

1 2 3 4

During the last year, please indicate how often you interacted with individual(s) who use marijuana in THE GENERAL POPULATION? The general population refers to those interactions where you don't know the person well (e.g., neighbor, mailperson, grocer, stranger).

1 2 3 4

---

1 2 3 4 5

Very Unfavorable Neutral Favorable Very Favorable

If you have had contact, what was your overall impression of the individuals (s) WHERE YOU LIVE?

1 2 3 4 5

If you have had contact, what was your overall impression of the individual(s) AT WORK

1 2 3 4 5

If you have had contact, what was your overall impression of the individual (s) AT SCHOOL?

1 2 3 4 5

If you have had contact, what was your overall impression of the individual (s) at SOCIAL EVENTS?

1 2 3 4 5

If you have had contact, what was your overall impression of the individual(s) at FAMILY EVENTS?

1 2 3 4 5

If you have had contact, what was your overall impression of the individual (s) in THE GENERAL POPULATION?

1 2 3 4 5

APPENDIX F

PRE-/POST-TEST KNOWLEDGE REGARDING MARIJUANA

The following section will be asking questions related to your current knowledge about marijuana. In order to guarantee we get the most accurate representation of your knowledge regarding marijuana, we ask that you please do not look up any of answers to the following questions online in this section. If you do not know the answer, that is fine. Just take your best guess.

Total points possible: 25

1. What chemical in marijuana produces mind-altering effects? (1 point)
    a. Cannabinoids
    b. THC
    c. Cannabis Sativa
    d. HTC
2. What are four nicknames for marijuana? (up to 4 points)
    "weed,", "cannabis," "pot," "bud," "grass," "herb," "Mary Jane," "MJ," "reefer," "skunk," "boom," "gangster," "kif," "chronic," and "ganja"
3. What class of drugs does the Federal Government consider marijuana to be? (1 point)
    a. Schedule 3 (Moderate to low potential for psychological or physical dependence and lower potential for abuse)
    b. Schedule 2 (Some medical use, high potential for abuse, potentially severe psychological or physical dependence)
    c. Schedule 4 (Low potential for abuse and dependence)
    d. Schedule 1 (No accepted medical use, high potential for abuse, potentially severe psychological or physical dependence)
4. How many states have laws allowing the use of marijuana as a treatment for certain medical conditions? (1 point)
    a. 11-20 states
    b. 1-10 states
    c. 21-30 states
    d. No states
5. How is marijuana most commonly used? (1 point)
    a. Smoked using pipes, water pipes called "bongs", or hand-rolled cigarettes called "joints" or "nails."
    b. Mixed with food, sometimes called edibles
    c. Injected through a vein
    d. Used as a patch, similar to nicotine patches
6. Which one of these is **not** a way that marijuana can be used? (1 point)
    a. Cannabis patches, similar to nicotine patches
    b. Edibles
    c. Pill form
    d. Injected directly into the vein

7. True or False: The effects of smoking marijuana begin almost immediately and usually last 1 to 3 hours. (1 point) **TRUE**
8. Where does the THC attach to on the neuron? (1 point)
    a. THC neurotransmitter
    b. Cannabinoid receptor
    c. Neighboring neurons
    d. Lipid receptor
9. Marijuana triggers an increase in the activity of the endocannabinoid system, which causes the release of _____in the brain's reward centers, creating the pleasurable feelings or "high." (1 point)
    a. Serotonin
    b. Norepinephrine
    c. Dopamine
    d. Cannabinoid
10. Marijuana affects all of these except _____? (1 point)
    a. Coordination
    b. Judgment
    c. Digestion
    d. Learning and Memory
11. Which of these is not an area of the brain affected by using marijuana? (1 point)
    a. Hippocampus
    b. Cerebellum
    c. Basil ganglia
    d. Cerebral cortex
    e. None of the above
12. Can THC, the psychoactive ingredient in marijuana, pass through the placental barrier to a fetus? (1 point)
    a. No, the baby will not be affected by it
    b. No, but the baby can still be affected by it
    c. Yes, the baby can be affected by it
    d. Yes, but the baby will not be affected by it
13. What are some respiratory problems associated with using marijuana? (1 point)
    a. Lung cancer
    b. Daily cough
    c. Greater risk for lung infections
    d. All of the above
    e. Only b & c
14. True or False: Driving while under the influence of marijuana is completely safe but illegal. (1 point) **FALSE**
15. What skill or skills are affected by marijuana that are required for safe driving? (1 point)
    a. Alertness
    b. Concentration
    c. Coordination
    d. Reaction time
    e. All of the above

16. True or False: You cannot become addicted to marijuana? (1 point) **FALSE**
17. True or False: People who use marijuana can experience withdrawal symptoms when they try to stop using. (1 point) **TRUE**
18. What are the withdrawal symptoms experienced by someone who stops using marijuana? (1 point)
    a. **Irritability, sleeplessness, lack of appetite, weight loss, anxiety, and drug cravings**
    b. Irritability, increased appetite, daytime sleepiness, weight gain, anxiety, and drug cravings
    c. Extreme cheerfulness, waking frequently, bad dreams, weight loss, and drug cravings
    d. None of the above; people who use marijuana do not experience withdrawal symptoms when they try to stop using
19. True or False: You can die from using marijuana if you use too much, also known as overdosing. (1 point) **FALSE**
20. Has the Food and Drug Administration (FDA) approved any medications made from active chemicals found in the marijuana plant? (1 point)
    a. Yes, THC mixed with food, sometimes called edibles has been approved to increase appetite in some patients with AIDS.
    b. Yes, cannabis patches have been approved to treat nausea (feeling sick) in cancer patients.
    c. **Yes, pill versions of THC have been approved to treat nausea (feeling sick) in cancer patients and to increase appetite in some patients with AIDS.**
    d. No, the FDA has not approved any medications made from active chemicals found in the marijuana plant.
21. There is some early evidence that _____, a chemical component found in marijuana that does not have mind-altering effects, may be useful in treating seizures in children with severe epilepsy. (1 point)
    a. Cannabinoids (CBN)
    b. Cannabis Sativa (CBS)
    c. THC
    d. **Cannabidiol (CBD)**
22. What is one of the biggest issues with using marijuana as a medicine? (1 point)
    a. Older individuals, over 65, are seeking this treatment and marijuana can impact their driving ability more than younger individuals
    b. **Ingredients vary a lot from plant to plant, so there is no way to get a precise dose every time or even know what dose you are getting**
    c. The variety of plants available makes it difficult to determine which plant would be best to use for a particular disorder
    d. If given to adults, it can impact their brain development

APPENDIX G

LIKELIHOOD OF FUTURE USE QUESTIONS

1. How likely are you to use marijuana recreationally in the next week?
    a. Very unlikely
    b. Unlikely
    c. Somewhat unlikely
    d. Somewhat likely
    e. Likely
    f. Very likely
2. How likely are you to use marijuana recreationally in the next month?
    a. Very unlikely
    b. Unlikely
    c. Somewhat unlikely
    d. Somewhat likely
    e. Likely
    f. Very likely
3. How likely are you to use marijuana recreationally in the next year?
    a. Very unlikely
    b. Unlikely
    c. Somewhat unlikely
    d. Somewhat likely
    e. Likely
    f. Very likely
4. How likely are you to EVER use marijuana recreationally?
    a. Very unlikely
    b. Unlikely
    c. Somewhat unlikely
    d. Somewhat likely
    e. Likely
    f. Very likely

APPENDIX H

AFFECT SCALE-SUBSTANCE USE

Indicate how you would feel if you interacted with someone who smokes marijuana for recreational use?

Pessimistic	1	2	3	4	5	6	7	Optimistic
Tranquil	1	2	3	4	5	6	7	Anxious
Supportive	1	2	3	4	5	6	7	Resentful
Fearful	1	2	3	4	5	6	7	Confident
Empathic	1	2	3	4	5	6	7	Angry
Disgusted	1	2	3	4	5	6	7	Sympathetic
Apprehensive	1	2	3	4	5	6	7	Comfortable
Irritable	1	2	3	4	5	6	7	Patient
Relaxed	1	2	3	4	5	6	7	Tense
Calm	1	2	3	4	5	6	7	Nervous

APPENDIX I

SOCIAL DISTANCE SCALE-SUBSTANCE USE

Please rate the statements below on the following scale:

1 = Definitely willing
2 = Probably willing
3 = Probably unwilling
4 = Definitely unwilling

1. How would you feel about renting a room in your home to someone who uses marijuana recreationally?

2. How about as a worker on the same job as someone who uses marijuana recreationally?

3. How would you feel having someone who uses marijuana recreationally as a neighbor?

4. How about as the caretaker of your children for a couple of hours?

5. How about having your children marry someone who uses marijuana recreationally?

6. How would you feel about introducing someone who uses marijuana recreationally to a young person you are friendly with?

7. How would you feel about recommending someone who uses marijuana recreationally for a job working for a friend of yours?

APPENDIX J

DANGEROUSNESS SCALE (ADAPTED)

Please rate the statements below on the following scale:

1 = Strongly agree
2 = Agree
3 = Not sure but probably agree
4 = Not sure but probably disagree
5 = Disagree
6 = Strongly disagree

1. If someone who uses marijuana recreationally lived nearby, I would not allow my children to go to the movie theater alone.

2. If someone who uses marijuana recreationally applied for a teaching position at a grade school and was qualified for the job, I would recommend hiring him or her.

3. One important thing about someone who uses marijuana recreationally is that you cannot tell what they will do from one minute to the next.

4. If I knew someone who uses marijuana recreationally, I would be less likely to trust him or her.

5. If someone who uses marijuana recreationally lived nearby, I would not hesitate to allow young children under my care to play on the sidewalk.

6. Although someone who uses marijuana recreationally may seem all right, it is dangerous to forget for a moment that they use marijuana.

7. There should be a law forbidding someone who uses marijuana recreationally the right to obtain a hunting license.

APPENDIX K

INFORMATION IN PSYCHOEDUCATIONAL MODULE ABOUT MARIJUANA

The majority of the information in this module comes directly from the NIDA website http://teens.drugabuse.gov/drug-facts/marijuana. Permission has been sought to use these materials for research. Additionally, researcher created video clips will be used to enhance the information. The citation is listed in the reference section.

The link to the website for this module is:
https://sites.google.com/a/uni.edu/stephaniestrongthesis2/home

You must be signed in to your UNI account to access the site.

I. **What is marijuana?**
   a. **Description:** Marijuana is a mixture of the dried and shredded leaves, stems, seeds, and flowers of *Cannabis sativa* or *Cannabis indica* hemp plant. The mixture can be green, brown, or gray. Stronger forms of the drug include sinsemilla (sin-seh-me-yah), hashish ("hash" for short), and hash oil.
   b. **Nicknames:** weed, pot, bud, grass, herb, Mary Jane, MJ, reefer, skunk, boom, gangster, kif, chronic, and ganja
   c. **Why does Marijuana have mind-altering effects**? Of the approximately 400 chemicals in marijuana, delta-9-tetrahydrocannabinol, known as THC, is responsible for many of the drug's psychotropic (mind-altering) effects. It is this chemical that changes how the brain works, distorting how the mind perceives the world.
   d. **What are the major variety types of marijuana**? The two most commonly grown species of the Cannabis genus are *Cannabis indica* and *Cannabis sativa*. There is a third species of marijuana, known as *Cannabis ruderalis*, that is very short. This species is not commonly grown for industrial, recreational or medicinal use, however, due to these plants only having trace amounts of delta-9-tetrahydrocannabinol (THC) (Small & Cronquist, 1976).
   e. **Legality:** It is illegal to buy, sell, or carry marijuana under Federal law. The Federal Government considers marijuana a Schedule I substance—having no medicinal uses and high risk for abuse. However, across the United States, marijuana state laws for adult use are changing. As of 2014, 23 states and the District of Columbia have passed laws allowing the use of marijuana as a treatment for certain medical conditions.
      i. In addition, four states and the District of Columbia have legalized marijuana for adult recreational use. Because of concerns over the possible harm to the developing teen brain and the risk of driving under the influence, marijuana use by people under age 21 is prohibited in all states.

f. Pop Quiz

II. How is marijuana used?

a. Marijuana is commonly smoked using pipes, water pipes called “bongs,” or hand-rolled cigarettes called “joints” or “nails.” It is sometimes also combined with tobacco in partially hollowed-out cigars, known as “blunts.”
b. Recently vaporizers, that use heat without burning to produce a vapor, have increased in popularity.
c. Marijuana can also be brewed as tea or mixed with food, sometimes called edibles.
d. In addition, concentrated resins containing high doses of marijuana’s active ingredients, including honey-like “hash oil,” waxy “budder,” and hard amber-like “shatter,” are increasingly popular among both recreational and medical users.
e. Pill versions of THC have been approved to treat nausea (feeling sick) in cancer patients and to increase appetite in some patients with AIDS
f. Recently, cannabis patches, similar to nicotine patches, have also become a popular way to use marijuana. The 10 mg patch adheres to the skin anywhere. Once placed, the patch has lasting effects for 8-12 hours.
g. Pop Quiz

III. How does marijuana effect the brain?

a. The main chemical in marijuana that effects the brain is delta-9-tetrahydrocannabinol (THC). When marijuana is smoked, THC quickly passes from the lungs into the bloodstream, which carries it to organs throughout the body, including the brain. Its effects begin almost immediately and can last 1 to 3 hours. If marijuana is consumed in foods or beverages, however, the effects of THC appear later, usually in 30 minutes to 1 hour, and can last over 4 hours. As it enters the brain, THC attaches to brain cells, or neurons, with specific kinds of receptors called cannabinoid receptors. Normally, these receptors are activated by chemicals that occur naturally in the body. They are part of a communication network in the brain called the endocannabinoid system. This system is important for normal brain development and function. (Craig, Scherbarth, Krause, & Brichacek, 2012;
b. Most of the cannabinoid receptors are found in parts of the brain that influence pleasure, memory, thinking, concentration, sensory and time perception, and coordinated movement. Marijuana triggers an increase in the activity of the endocannabinoid system, which causes the release of dopamine in the brain's reward centers, creating the pleasurable feelings or “high.” Other effects include changes in perceptions and mood, lack of coordination, difficulty with thinking and problem solving, and disrupted learning and memory.
c. Certain parts of the brain have a lot of cannabinoid receptors. These areas are the hippocampus, the cerebellum, the basal ganglia, and the cerebral

cortex. The functions that these brain areas control are the ones most affected by marijuana:

i. **Learning and memory.** The hippocampus plays a critical role in certain types of learning. Disrupting its normal functioning can lead to problems studying, learning new things, and recalling recent events. A recent study followed people from age 13 to 38 and found that those who used marijuana a lot in their teens had up to an 8 point drop in IQ, even if they quit in adulthood (Meier et. al., 2012; Zalesky et. al., 2012).

ii. **Coordination.** THC affects the cerebellum, the area of our brain that controls balance and coordination, and the basal ganglia, another part of the brain that helps control movement. These effects can influence performance in such activities as sports, driving, and video games.

iii. **Judgment**. Since THC affects areas of the frontal cortex involved in decision making, using it can case you to do things you might not do when you are not under the influence of drugs—such as engaging in risky sexual behavior, which can lead to sexually transmitted diseases (STDs) like HIV, the virus that causes AIDS—or getting in a car with someone who's been drinking or is high on marijuana.

d. Pop Quiz

IV. What are the other effects of marijuana?

a. Effects on health

i. THC can produce impairment of short-term memory, interruptions in attention mechanisms, analgesia, and altered control of motor movements, postural control, and sensory awareness (Julien, 2013).

ii. **Increased heart rate and blood pressure.** When someone uses marijuana, heart rate—normally 70 to 80 beats per minute—may increase by 20 to 50 beats per minute or, in some cases, even double. Additionally, blood pressure increases as well (Julien, 2013). This effect can be greater if other drugs are taken with marijuana. Once heart rate reaches over 100 beats per minute, this is too fast and the person is considered to have tachycardia. The increased heart rate and blood pressure forces the heart to work extra hard to keep up.

iii. **Respiratory (lung and breathing) problems.** Smoke from marijuana irritates the lungs, causing breathing and lung problems among regular users similar to those experienced by people who smoke tobacco—like a daily cough and a greater risk for lung infections such as pneumonia. However, research is inconclusive on whether there is an association between marijuana use and lung cancer.

iv. **Increased risk for mental health problems**. Marijuana use has been linked with depression and anxiety, as well as suicidal thoughts among adolescents. In addition, research has suggested that in people with a genetic risk for developing schizophrenia, smoking marijuana during adolescence may increase the risk for developing psychosis and developing it at an earlier age. Researchers are still learning exactly what the relationship is between these mental health problems and marijuana use.

v. **Increased risk of problems for an unborn baby.** THC, the psychoactive ingredient in marijuana, can pass through the placental barrier to the fetus (Julien, 2013). This means the fetus is also affected by marijuana every time the mother uses. Pregnant women who use marijuana may risk changing the developing brain of the unborn baby. These changes could contribute to problems with attention, memory, and problem solving.

vi. **Impaired driving.** It is unsafe to drive while under the influence of marijuana. Marijuana affects a number of skills required for safe driving—alertness, concentration, coordination, and reaction time—so it is not safe to drive high or to ride with someone who's been smoking. Marijuana makes it hard to judge distances and react to signals and sounds on the road. Marijuana is the most common illegal drug involved in auto fatalities.

b. Pop Quiz

V. Can you get addicted to marijuana?

a. Yes, marijuana is addictive. A user may feel the urge to smoke marijuana again and again to re-create the "high." Repeated use could lead to addiction—which means the person has trouble controlling their drug use and often cannot stop even though they want to.

b. It is estimated that about 1 in 6 persons who start using this substance as a teen, and 25% to 50% percent of those who use it every day, become addicted to marijuana. What causes one person to become addicted to marijuana and not another depends on many factors—including their family history (genetics), the age they start using, whether they also use other drugs, their family and friend relationships, and whether they take part in positive activities like school or sports (environment).

c. People who use marijuana may also experience withdrawal symptoms when they stop using the drug. Withdrawal symptoms may include irritability, sleeplessness, and lack of appetite, which can lead to weight loss, anxiety, and drug cravings. These effects can last for several days to a few weeks after drug use is stopped. Relapse (returning to the drug after you've quit) is common during this period because people also crave the drug to relieve these symptoms.

d. Pop Quiz

VI. Can you die if you use marijuana?

a. It is very unlikely for a person to overdose and die from marijuana use. However, people can and do injure themselves and die because of marijuana's effects on judgment, perception, and coordination, for example when driving under the influence of the drug. Also, people can experience extreme anxiety (panic attacks) or psychotic reactions (where they lose touch with reality and may become paranoid).
b. Although the likelihood of dying from marijuana is low, approximately 461,028 emergency room visits in 2011 involved marijuana. This is about 39.4% of the total amount of emergency room visits involving illicit drugs in 2011 (SAMHSA, 2013).

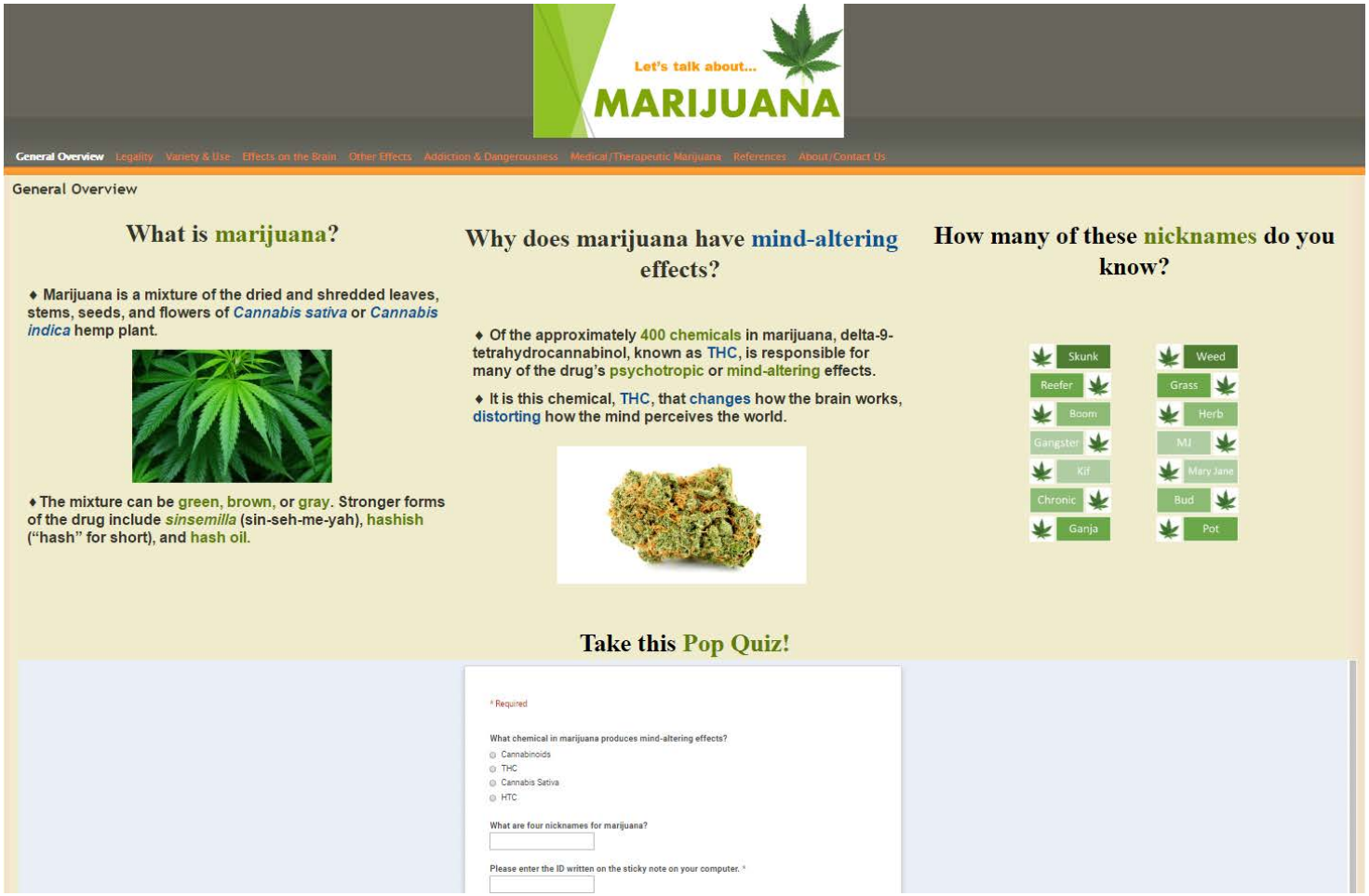
VII. What is medical or therapeutic marijuana?

a. The term medical marijuana refers to using the whole, unprocessed marijuana plant or its basic extracts to treat a disease or symptom.
b. The marijuana plant contains chemicals that may be useful for treating a range of illnesses or symptoms. A growing number of states (23 as of August 2014) have legalized the plant’s use for certain medical conditions. Although it is not legal or considered medicine by the Federal Government, a few medications made from active chemicals in the plant called cannabinoids have been approved by the U.S. Food and Drug Administration (FDA). One of these cannabinoids, THC, has some medicinal properties in addition to its mind-altering effects. Pill versions of THC have been approved to treat nausea (feeling sick) in cancer patients and to increase appetite in some patients with AIDS.
c. Another cannabinoid chemical called cannabidiol, which doesn’t have mind-altering effects, is also being studied for its possible uses as medicine. A new medication with a combination of THC and cannabidiol is available in several countries outside the United States as a mouth spray for treating symptoms of multiple sclerosis. There is some early evidence that cannabidiol may be useful in treating seizures in children with severe epilepsy, so a cannabidiol-based drug for that is also now being studied.
d. It is important to remember that because marijuana is often smoked, it can hurt lung health; these health risks as well as the way it impairs mental functioning may outweigh its value as a medical treatment, especially for people that are not very sick with cancer or other life-threatening diseases. Another problem with smoking or eating marijuana plant material is the ingredients vary a lot from plant to plant, so there is no way to get a precise dose every time or even know what dose you are getting. Hence, scientists are busy studying safe ways that THC, cannabidiol, and other chemicals can be extracted from the marijuana plant to create safe medicines.
e. Pop Quiz

APPENDIX L

SCREENSHOTS OF PSYCHOEDUCATIONAL MODULE WEBSITE

Page 1: General Overview Tab



Page 2: Legality Tab

Page 3: Variety and Use Tab

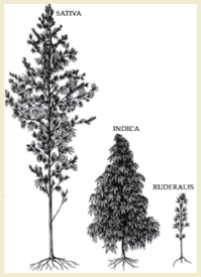
Let's talk about...
MARIJUANA

General Overview | Legality | **Variety & Use** | Effects on the Brain | Other Effects | Addiction & Dangerousness | Medical/Therapeutic Marijuana | References | About/Contact Us

Variety & Use

Are there different varieties of marijuana?

- Three total varieties exist. The two most commonly grown species of the Cannabis genus are *Cannabis indica* and *Cannabis sativa*. There is a third species of cannabis, known as *Cannabis ruderalis*, that is very short. However, this species is not commonly grown for industrial, recreational, or medicinal use due to these plants only having trace amounts of delta-9-tetrahydrocannabinol (THC) (Small & Cronquist, 1976)



So, how is marijuana used?

- Marijuana is most commonly smoked using pipes, water pipes called "bongs," or hand-rolled cigarettes called "joints" or "nails." It is sometimes also combined with tobacco in partially hollowed-out cigars, known as "blunts."
- Recently, vaporizers that use heat without burning to produce a vapor, have increased in popularity.
- Marijuana can also be brewed as tea or mixed with food, sometimes called edibles.
- In addition, concentrated resins containing high doses of marijuana's active ingredients, including honey-like "hash oil," waxy "budder," and hard amber-like "shatter," are increasingly popular among both recreational and medical users.
- Pill versions of THC have been approved to treat nausea (feeling sick) in cancer patients and to increase appetite in some patients with AIDS
- Recently, cannabis patches, similar to nicotine patches, have also become a popular way to use marijuana. The 10 mg patch adheres to the skin anywhere. Once placed, the patch has lasting effects for 8-12 hours.

Take this Pop Quiz!

* Required

How is marijuana most commonly used?

- Smoked using pipes, water pipes called "bongs", or hand-rolled cigarettes called "joints" or "nails."
- Mixed with food, sometimes called edibles
- Injected through a vein
- Used as a patch, similar to nicotine patches

Page 4: Effects on the Brain Tab Part 1

Let's talk about...

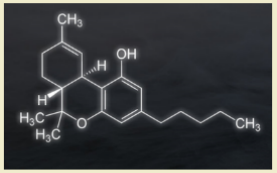
MARIJUANA

General Overview | Legality | Variety & Use | **Effects on the Brain** | Other Effects | Addiction & Dangerousness | Medical/Therapeutic Marijuana | References | About/Contact Us

Effects on the Brain

Next, let's look at marijuana's effects on the brain!

- As mentioned before, the main chemical in marijuana that affects the brain is delta-9-tetrahydrocannabinol or THC.



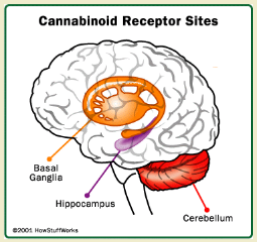
- When marijuana is smoked, THC quickly passes from the lungs into the bloodstream, which carries it to organs throughout the body, including the brain.
- When smoked, the effects begin almost immediately and can last 1 to 3 hours. If marijuana is consumed in foods or beverages, however, the effects of THC appear later, usually in 30 minutes to 1 hour, and can last over 4 hours.

Right click this video link and select "open in new tab" to learn more! You may stop watching at 2:00. Please come back to the website when finished.

http://www.youtube.com/watch?v=efbDQMkivJo&t=0m22s

- As it enters the brain, THC attaches to brain cells, or neurons, with specific kinds of receptors called cannabinoid receptors. Normally, these receptors are activated by chemicals that occur naturally in the body. They are part of a communication network in the brain called the endocannabinoid system. This system is important

- Certain parts of the brain have a lot of cannabinoid receptors. These areas are the hippocampus, the cerebellum, the basal ganglia, and the cerebral cortex.



The functions that these brain areas control are the ones most affected by marijuana:

- Learning and memory: The hippocampus plays a critical role in certain types of learning. Disrupting its normal functioning can lead to problems studying, learning new things, and recalling recent events.

- Coordination: THC affects the cerebellum, the area of our brain that controls balance and coordination, and the basal ganglia, another part of the brain that helps control movement. These effects can influence performance in such activities as sports, driving, and video games.

- Judgment: Since THC affects areas of the frontal cortex involved in decision making, using it can cause you to do things you might not do when you are not under the influence of drugs

Page 4: Effects on the Brain Tab Part 2

of receptors called cannabinoid receptors. Normally, these receptors are activated by chemicals that occur naturally in the body. They are part of a communication network in the brain called the endocannabinoid system. This system is important for normal brain development and function.

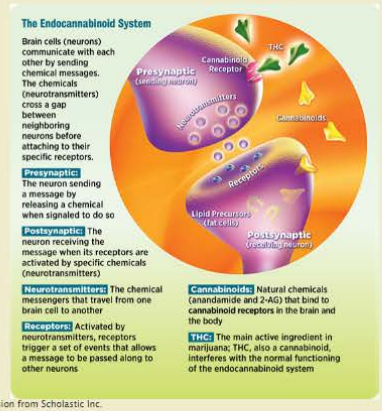


Image used with permission from Scholastic Inc.

- Judgment: Since THC affects areas of the frontal cortex involved in decision making, using it can cause you to do things you might not do when you are not under the influence of drugs.

Look at these **video clips** to learn more!

Take this Pop Quiz!

True or False: The effects of smoking marijuana begin almost immediately and usually last 1 to 3 hours.

- True
- False

Where does the THC attach to on the neuron?

- THC neurotransmitter
- Cannabinoid receptor
- Neighboring neurons
- Lipid receptor

Marijuana triggers an increase in the activity of the endocannabinoid system, which causes the release of _____in the brain's reward centers, creating the pleasurable feelings or "high."

- Serotonin
- Norepinephrine
- Dopamine
- Cannabinoid

Page 5: Other Effects Tab Part 1

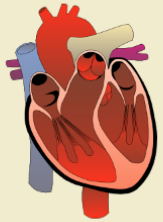
Let's talk about...
MARIJUANA

General Overview | Legality | Variety & Use | Effects on the Brain | **Other Effects** | Addiction & Dangerousness | Medical/Therapeutic Marijuana | References | About/Contact Us

Other Effects

Effects on Health

- **THC can produce impairment of short-term memory, interruptions in attention mechanisms, analgesia (the inability to feel pain), and altered control of motor movements, postural control, and sensory awareness** (Julien, 2013).
- **Increased heart rate and blood pressure.**
  - Heart rate (normally 70 to 80 beats per minute) may **increase by 20 to 50 beats per minute** or, in some cases, even double.
  - Blood pressure also **increases**. This effect can be **greater** if additional drugs are taken (Julien, 2013).
  - Once heart rate reaches **over 100 beats per minute**, this is too fast and the person is considered to have **tachycardia**. The increased heart rate and blood pressure forces the heart to work **extra hard** to keep up.



- **Respiratory (lung and breathing) problems.**
  - Smoke from marijuana **irritates** the **lungs**, causing **breathing** and **lung problems** among regular users similar to those experienced by people who smoke tobacco like:
    - *A **daily cough** or*
    - *A **greater risk** for **lung infections** such as pneumonia.*
  - However, research is **inconclusive** on whether there is an association between marijuana use and lung cancer.
- **Increased risk for mental health problems.**
  - Among adolescents marijuana is **linked** to:
- **Increased risk of problems for an unborn baby.**
  - THC, the psychoactive ingredient in marijuana, ***can pass through the placental barrier to the fetus*** (Julien, 2013).
  - This means the **fetus** is also affected by marijuana **every time** the mother uses.
  - Pregnant women who use marijuana **may risk** changing the developing **brain** of the unborn baby.
  - These changes could contribute to **problems** with:
    - **Attention**
    - **Memory**
    - **Problem solving**

- **Impaired driving.**
  - It is **unsafe** to drive or ride with someone who is under the influence of marijuana.
  - Skills needed for safe driving **affected** by marijuana:
    - **Alertness**
    - **Concentration**
    - **Coordination**
    - **Reaction time**
  - Marijuana makes it **hard** to **judge distances** and **react to signals** and **sounds** on the road.
  - **Marijuana** is the **most common** illegal drug involved in **auto fatalities**.

Page 5: Other Effects Tab Part 2

- **Depression**
- **Anxiety**
- **Suicidal thoughts**

- Research suggests people with **genetic risk** for developing **schizophrenia**, who smoke marijuana during adolescence may **increase** the risk for developing **psychosis** and/or **developing** it at an **earlier age**.
- Researchers are still **learning** about the nature of the relationship between marijuana and mental health problems.

Take this Pop Quiz!

Can THC, the psychoactive ingredient in marijuana, pass through the placental barrier to a fetus?
- No, the baby will not be affected by it
- No, but the baby can still be affected by it
- Yes, the baby can be affected by it
- Yes, but the baby will not be affected by it

What are some respiratory problems associated with using marijuana?
- Lung cancer
- Daily cough
- Greater risk for lung infections
- All of the above
- Only b & c

True or False: Driving while under the influence of marijuana is completely safe but illegal.
- True
- False

What skill or skills are affected by marijuana that are required for safe driving?
- Alertness
- Concentration
- Coordination
- Reaction Time
- All of the above

Please enter the ID written on the sticky note on your computer. *

Page 6: Addiction and Dangerousness Tab Part 1

Page 6: Addiction and Dangerousness Tab Part 2

- Taking part in positive activities (environment).

- People who use marijuana may also experience withdrawal symptoms when they stop using the drug. These effects can last for several days to a few weeks after drug use is stopped.

- Relapse (returning to the drug after you've quit) is common during this period because people also crave the drug to relieve these symptoms

Take this Pop Quiz!

True or False: You cannot become addicted to marijuana?
- True
- False

True or False: People who use marijuana can experience withdrawal symptoms when they try to stop using.
- True
- False

What are the withdrawal symptoms experienced by someone who stops using marijuana?
- Irritability, sleeplessness, lack of appetite, weight loss, anxiety, and drug cravings
- Irritability, increased appetite, daytime sleepiness, weight gain, anxiety, and drug cravings
- Extreme cheerfulness, waking frequently, bad dreams, weight loss, and drug cravings
- None of the above; people who use marijuana do not experience withdrawal symptoms when they try to stop using

True or False: You can die from using marijuana if you use too much, also known as overdosing.
- True
- False

Please enter the ID written on the sticky note on your computer. *

Submit

Never submit passwords through Google Forms.

Page 7: Medical/Therapeutic Marijuana Tab

Let's talk about...
MARIJUANA

General Overview | Legality | Variety & Use | Effects on the Brain | Other Effects | Addiction & Dangerousness | Medical/Therapeutic Marijuana | References | About/Contact Us

Medical/Therapeutic Marijuana

What is medical or therapeutic marijuana?

- The term medical marijuana refers to using the whole, unprocessed marijuana plant or its basic extracts to treat a disease or symptom.

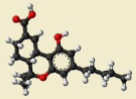
- The marijuana plant contains chemicals that may be useful for treating a range of illnesses or symptoms. Currently, 23 states have legalized the plant's use for certain medical conditions. Click on the Legality link above to learn more!

- Precise dosing is an issue to think about when talking about using marijuana as a medicine. Plant material and chemical makeup varies a lot from plant to plant, so there is no way to get a precise dose every time or even know what dose you are getting.

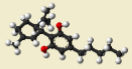
- Hence, scientists are busy studying safe ways that THC, cannabidiol, and other chemicals can be extracted from the marijuana plant to create safe medicines.

- Although it is not legal or considered medicine by the Federal Government, a few medications made from active chemicals in the plant called cannabinoids have been approved by the U.S. Food and Drug Administration (FDA):

  - THC: some medicinal properties. Pill versions of THC have been approved to treat nausea (feeling sick) in cancer patients and to increase appetite in some patients with AIDS



- Cannabidiol (CBD): doesn't have any mind-altering effects. It is currently being studied for other uses. A new medication combining THC and CBD is available in several countries outside the United States as a mouth spray for treating symptoms of multiple sclersosis. Some research finding reveal that CBD may be useful in treating seizures in children with severe epilepsy.



Take this Pop Quiz!

Has the Food and Drug Administration (FDA) approved any medications made from active chemicals found in the marijuana plant?

- Yes, THC mixed with food, sometimes called edibles has been approved to increase appetite in some patients with AIDS.
- Yes, cannabis patches have been approved to treat nausea (feeling sick) in cancer patients.
- Yes, pill versions of THC have been approved to treat nausea (feeling sick) in cancer patients and to increase appetite in some patients with AIDS.
- No, the FDA has not approved any medications made from active chemicals found in the marijuana plant.

There is some early evidence that _____, a chemical component found in marijuana that does not have mind-altering effects, may be useful in treating seizures in children with severe

APPENDIX M

ATTENTION AND MANIPULATION CHECK QUESTIONS

ACQ #1: Most modern theories of decision making recognize the fact that decisions do not take place in a vacuum. Individual preferences and knowledge, along with situational variables, can greatly impact the decision process. In order to facilitate our research on decision making, we are interested in knowing certain factors about you, the decision maker. Specifically, we are interested in whether you actually take the time to read the directions; if not, then some of our manipulations that rely on changes in the instructions will be ineffective. So, in order to demonstrate that you have read the instructions, please ignore the sports items listed below. Instead, simply click on the 'next' button to proceed to the next screen. Thank you very much.

1. Skiing
2. Soccer
3. Snowboarding
4. Running
5. Hockey
6. Football
7. Swimming
8. Tennis
9. Basketball
10. Cycling
11. Next

ACQ #2: While watching TV, have you ever had a fatal heart attack?

1. Five times
2. Three times
3. Two times
4. Never
5. One time

ACQ #3: The correct response to this question is to choose "other" and then type in "psychology" when you see a space to fill in information.
What was this survey about?

1. Cannabis use
2. Perceptions
3. Personality
4. Attitudes
5. Other (type-in)

MCQ#1: Do you believe you learned a lot, a little, or nothing about marijuana after participating in this study?

a. A lot

b. A little

c. Nothing

MCQ#2: How much did you know about marijuana before participating in this study?

1. A lot

2. A little

3. Nothing

MCQ#3: Do you believe you are more familiar with marijuana use after participating in this study?

1. Yes

2. No

3. Not sure

MCQ#4: Do you believe you have fewer negative thoughts or feelings about individuals who use marijuana recreationally after participating in this study?

1. Yes

2. No

3. Not sure

APPENDIX N

G*POWER A PRIORI POWER ANALYSIS FIGURES

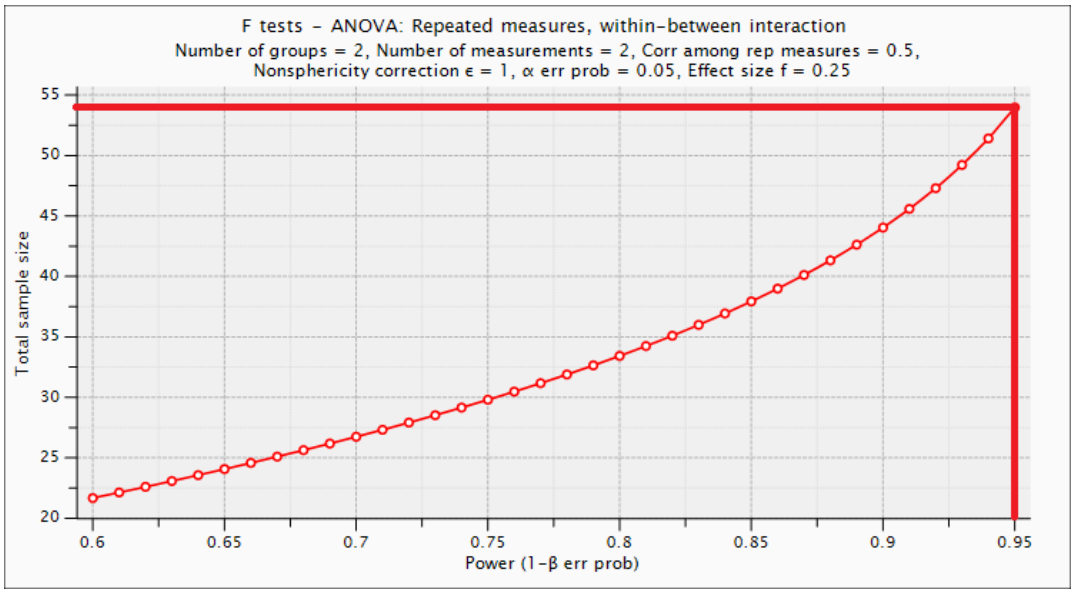


Figure 1: A priori power analysis for a two-way repeated measures, within-between interaction ANOVA when statistical power = .95, alpha = .05, and ES (f^2) = .15, showing a needed sample size of N = 54 per group.

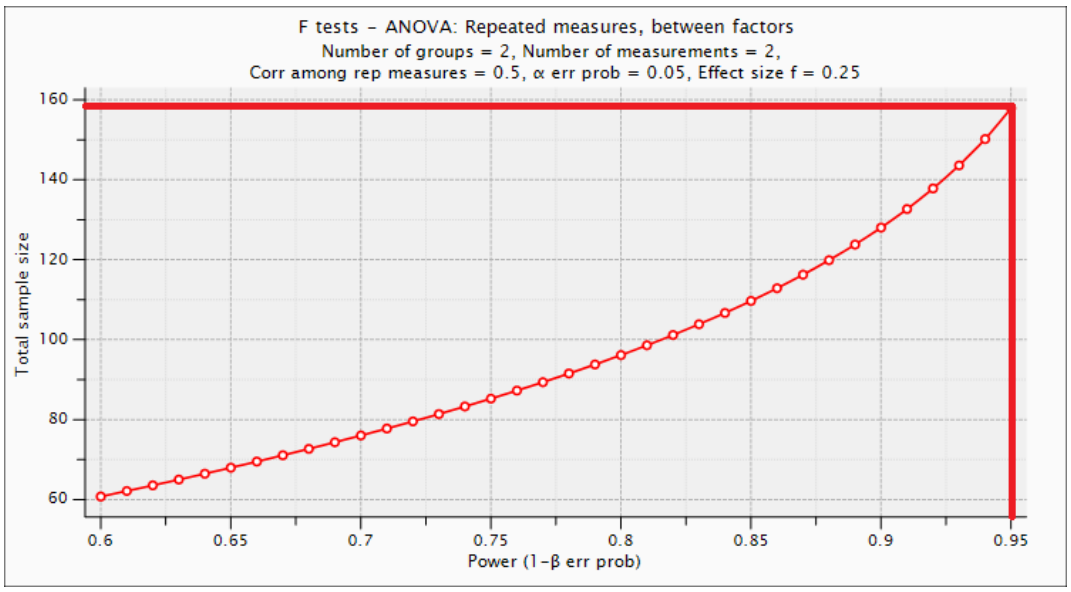


Figure 2: A priori power analysis for a two-way repeated measures, between factors ANOVA when statistical power = .95, alpha = .05, and ES (f^2) = .15, showing a needed sample size of N = 158 for both groups.

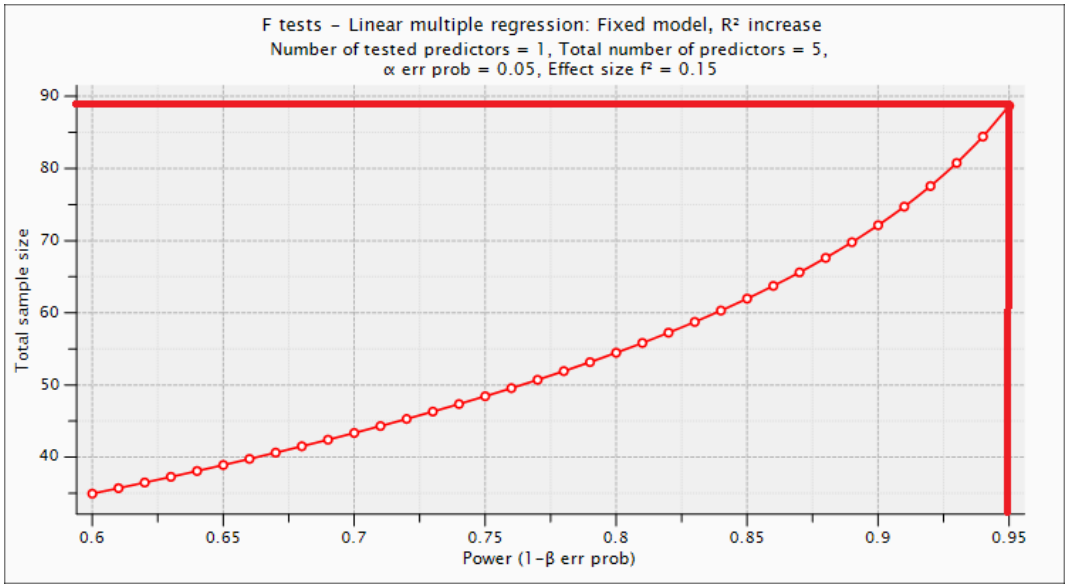


Figure 3: A priori power analysis for linear multiple regression analysis when statistical power = .95, alpha = .05, and ES (f^2) = .15, showing a needed sample size of N = 89 per group.

APPENDIX O

NON-SIGNIFICANT MODERATION TABLES FROM HYPOTHESIS 3

Appendix O Table 1

Hypothesis 3a-1: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Preferred Social Distance Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.07	0.02	-0.35	.001	0.09
Female	0.56	0.15	0.36	.001	0.12
Interaction	-0.04	0.04	-0.08	.378	0.01
Total					0.22

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 2

Hypothesis 3a-2: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Preferred Social Distance After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.07	0.02	-0.35	.001	0.09
Female	0.59	0.14	0.38	.001	0.14
Interaction	-0.05	0.04	-0.13	.169	0.02
Total					0.25

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 3

Hypothesis 3a-3: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Preferred Social Distance Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.11	0.02	-0.56	.001	0.32
Female	0.16	0.13	0.10	.228	0.01
Interaction	-0.02	0.03	-0.04	.654	0.00
Total					0.33

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 4

Hypothesis 3a-4: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Preferred Social Distance After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.12	0.02	-0.59	.001	0.36
Female	0.22	0.13	0.13	.106	0.02
Interaction	-0.02	0.04	-0.05	.540	0.00
Total					0.38

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 5

Hypothesis 3b-1: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Perceived Dangerousness Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	0.03	0.03	0.12	.235	0.01
Female	-0.59	0.21	-0.27	.007	0.07
Interaction	0.08	0.06	0.14	.174	0.02
Total					0.10

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 6

Hypothesis 3b-2: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Perceived Dangerousness After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	0.04	0.03	0.16	.114	0.02
Female	-0.53	0.21	-0.25	.016	0.06
Interaction	0.02	0.06	0.04	.706	0.00
Total					0.08

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 7

Hypothesis 3b-3: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Perceived Dangerousness Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.12	0.02	-0.44	.001	0.21
Female	0.45	0.19	0.21	.020	0.04
Interaction	-0.02	0.05	-0.03	.764	0.00
Total					0.25

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 8

Hypothesis 3b-4: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Perceived Dangerousness After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.12	0.03	-0.40	.001	0.18
Female	0.54	0.22	0.22	.015	0.05
Interaction	-0.02	0.06	-0.04	.694	0.00
Total					0.23

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 9

Hypothesis 3c-1: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.10	0.04	-0.26	.006	0.05
Female	1.18	0.27	0.40	.001	0.15
Interaction	-0.08	0.07	-0.09	.316	0.01
Total					0.21

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 10

Hypothesis 3c-2: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.11	0.04	-0.28	.004	0.05
Female	1.11	0.29	0.36	.001	0.13
Interaction	-0.04	0.08	-0.05	.601	0.00
Total					0.18

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 11

Hypothesis 3c-3: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.21	0.04	-0.53	.001	0.26
Female	0.28	0.27	0.09	.299	0.01
Interaction	-0.11	0.07	-0.14	.106	0.02
Total					0.29

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 12

Hypothesis 3c-4: Path Analysis Model Examining the Moderating Effects of Female on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.19	0.03	-0.49	.001	0.24
Female	0.29	0.27	0.09	.288	0.01
Interaction	-0.09	0.07	-0.11	.210	0.01
Total					0.26

Note: Interaction is defined as Level of Contact x Female.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 13

Hypothesis 3d-1: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Preferred Social Distance Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.22	0.03	-0.57	.001	0.32
Female	0.41	0.13	0.26	.002	0.06
Interaction	-0.10	0.06	-0.13	.112	0.02
Total					0.40

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 14

Hypothesis 3d-3: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Preferred Social Distance Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.18	0.03	-0.57	.001	0.33
Female	0.09	0.14	0.05	.519	0.01
Interaction	-0.03	0.06	-0.05	.549	0.00
Total					0.34

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 15

Hypothesis 3d-4: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Preferred Social Distance After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.19	0.03	-0.59	.001	0.37
Female	0.16	0.13	0.10	.229	0.01
Interaction	-0.03	0.06	-0.05	.556	0.00
Total					0.38

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 16

Hypothesis 3e-1: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Perceived Dangerousness Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	0.24	0.05	0.45	.001	0.20
Female	-0.47	0.19	-0.22	.019	0.04
Interaction	0.14	0.10	0.13	.163	0.02
Total					0.26

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 17

Hypothesis 3e-2: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Perceived Dangerousness After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	0.23	0.05	0.44	.001	0.19
Female	-0.38	0.20	-0.18	.058	0.03
Interaction	0.08	0.10	0.08	.393	0.01
Total					0.23

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 18

Hypothesis 3e-3: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Perceived Dangerousness Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.20	0.04	-0.47	.001	0.25
Female	0.34	0.19	0.16	.079	0.03
Interaction	0.03	0.08	0.03	.708	0.00
Total					0.28

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 19

Hypothesis 3e-4: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Perceived Dangerousness After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.21	0.04	-0.44	.001	0.22
Female	0.43	0.22	0.18	.052	0.03
Interaction	0.01	0.09	0.00	.960	0.00
Total					0.25

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 20

Hypothesis 3f-1: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.40	0.06	-0.54	.001	0.30
Female	0.90	0.24	0.31	.001	0.09
Interaction	-0.18	0.12	-0.13	.133	0.01
Total					0.40

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 21

Hypothesis 3f-2: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.41	0.07	-0.54	.001	0.29
Female	0.82	0.25	0.27	.002	0.07
Interaction	-0.18	0.13	-0.12	.158	0.01
Total					0.37

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 22

Hypothesis 3f-3: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.30	0.06	-0.47	.001	0.23
Female	0.17	0.29	0.05	.568	0.00
Interaction	-0.07	0.12	-0.05	.570	0.00
Total					0.23

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 23

Hypothesis 3f-4: Path Analysis Model Examining the Moderating Effects of Female on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.29	0.06	-0.46	.001	0.22
Female	0.18	0.28	0.06	.534	0.00
Interaction	-0.08	0.12	-0.06	.499	0.01
Total					0.23

Note: Interaction is defined as Level of Familiarity x Female.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 24

Hypothesis 3g-1: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Preferred Social Distance Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.04	0.02	-0.21	.014	0.09
Ever Used	-0.89	0.14	-0.55	.001	0.27
Interaction	0.03	0.04	0.07	.442	0.01
Total					0.37

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 25

Hypothesis 3g-2: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Preferred Social Distance After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.04	0.02	-0.22	.011	0.09
Ever Used	-0.89	0.14	-0.55	.001	0.28
Interaction	0.02	0.04	0.05	.552	0.00
Total					0.37

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 26

Hypothesis 3g-3: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Preferred Social Distance Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.09	0.02	-0.46	.001	0.32
Ever Used	-0.47	0.13	-0.30	.001	0.08
Interaction	0.00	0.03	0.01	.896	0.00
Total					0.40

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 27

Hypothesis 3g-4: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Preferred Social Distance After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.10	0.02	-0.50	.001	0.36
Ever Used	-0.45	0.13	-0.29	.001	0.07
Interaction	0.01	0.03	0.03	.713	0.00
Total					0.43

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 28

Hypothesis 3h-1: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Perceived Dangerousness Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.00	0.03	-0.00	.977	0.01
Ever Used	1.16	0.21	0.52	.001	0.22
Interaction	-0.11	0.06	-0.17	.065	0.03
Total					0.26

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 29

Hypothesis 3h-2: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Perceived Dangerousness After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	0.02	0.03	0.05	.564	0.02
Ever Used	1.05	0.21	0.47	.001	0.19
Interaction	-0.07	0.06	-0.11	.275	0.01
Total					0.22

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 30

Hypothesis 3h-3: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Perceived Dangerousness Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.10	0.02	-0.35	.001	0.21
Ever Used	-0.71	0.18	-0.34	.001	0.10
Interaction	0.07	0.05	0.11	.186	0.01
Total					0.32

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 31

Hypothesis 3h-4: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Perceived Dangerousness After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.10	0.03	-0.33	.001	0.18
Ever Used	-0.67	0.22	-0.29	.002	0.07
Interaction	0.07	0.06	0.10	.257	0.01
Total					0.26

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 32

Hypothesis 3i-1: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.05	0.03	-0.13	.151	0.05
Ever Used	-1.71	0.27	-0.56	.001	0.27
Interaction	0.10	0.08	0.12	.194	0.01
Total					0.33

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 33

Hypothesis 3i-2: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.06	0.04	-0.15	.097	0.05
Ever Used	-1.63	0.29	-0.51	.001	0.23
Interaction	0.09	0.08	0.10	.266	0.01
Total					0.29

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 34

Hypothesis 3i-3: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.17	0.04	-0.42	.001	0.27
Ever Used	-0.91	0.27	-0.30	.001	0.07
Interaction	0.09	0.07	0.10	.224	0.01
Total					0.35

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 35

Hypothesis 3i-4: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.15	0.03	-0.39	.001	0.24
Ever Used	-0.93	0.26	-0.31	.001	0.08
Interaction	0.10	0.07	0.12	.153	0.01
Total					0.33

Note: Interaction is defined as Level of Contact x Ever Used.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 36

Hypothesis 3j-1: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Preferred Social Distance Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.14	0.04	-0.37	.001	0.32
Ever Used	0.54	0.17	0.34	.002	0.08
Interaction	0.02	0.08	0.03	.772	0.00
Total					0.40

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 37

Hypothesis 3j-2: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Preferred Social Distance After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.13	0.04	-0.35	.001	0.30
Ever Used	0.60	0.16	0.38	.001	0.11
Interaction	0.01	0.08	0.02	.869	0.00
Total					0.41

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 38

Hypothesis 3j-3: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Preferred Social Distance Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-1.83	0.43	-0.52	.001	0.33
Ever Used	-0.14	0.20	-0.09	.485	0.01
Interaction	0.42	0.89	0.04	.639	0.00
Total					0.34

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 39

Hypothesis 3j-4: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Preferred Social Distance After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-2.10	0.43	-0.59	.001	0.37
Ever Used	-0.04	0.20	-0.03	.845	0.00
Interaction	-0.10	0.89	-0.01	.915	0.00
Total					0.37

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 40

Hypothesis 3k-1: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Perceived Dangerousness Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	0.13	0.06	0.25	.021	0.20
Ever Used	-0.80	0.25	-0.37	.002	0.09
Interaction	0.03	0.12	0.03	.789	0.00
Total					0.29

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 41

Hypothesis 3k-2: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Perceived Dangerousness After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	0.14	0.06	0.26	.015	0.19
Ever Used	-0.73	0.25	-0.34	.004	0.09
Interaction	-0.01	0.12	-0.01	.909	0.00
Total					0.28

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 42

Hypothesis 3k-3: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Perceived Dangerousness Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-1.69	0.60	-0.36	.006	0.25
Ever Used	-0.47	0.28	-0.23	.095	0.02
Interaction	1.64	1.25	0.12	.192	0.01
Total					0.28

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 43

Hypothesis 3k-4: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Perceived Dangerousness After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-2.08	0.69	-0.39	.003	0.22
Ever Used	-0.32	0.32	-0.14	.319	0.01
Interaction	1.62	1.44	0.11	.263	0.01
Total					0.24

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 44

Hypothesis 3l-1: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.25	0.07	-0.34	.001	0.30
Ever Used	1.05	0.31	0.35	.001	0.11
Interaction	0.12	0.15	0.08	.401	0.00
Total					0.41

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 45

Hypothesis 3l-2: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-0.27	0.07	-0.35	.001	0.29
Ever Used	0.97	0.32	0.31	.004	0.09
Interaction	0.14	0.16	0.09	.356	0.01
Total					0.39

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 46

Hypothesis 3l-3: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-2.36	0.91	-0.34	.011	0.23
Ever Used	-0.64	0.42	-0.21	.131	0.01
Interaction	1.64	1.89	0.08	.387	0.01
Total					0.25

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 47

Hypothesis 3l-4: Path Analysis Model Examining the Moderating Effects of Ever Personally Using Marijuana on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-2.28	0.89	-0.34	.012	0.22
Ever Used	-0.59	0.41	-0.20	.154	0.02
Interaction	0.89	1.84	0.05	.628	0.00
Total					0.24

Note: Interaction is defined as Level of Familiarity x Ever Used.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 48

Hypothesis 3m-1: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Preferred Social Distance Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.06	0.02	-0.31	.001	0.09
Age	-0.20	0.05	-0.42	.001	0.18
Interaction	0.00	0.02	0.01	.911	0.00
Total					0.27

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 49

Hypothesis 3m-2: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Preferred Social Distance After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.06	0.02	-0.31	.001	0.09
Age	-0.21	0.05	-0.44	.001	0.20
Interaction	0.00	0.02	0.00	.975	0.00
Total					0.29

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 50

Hypothesis 3m-3: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Preferred Social Distance Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.12	0.02	-0.57	.001	0.31
Age	0.08	0.07	0.09	.284	0.01
Interaction	0.00	0.02	0.02	.832	0.00
Total					0.32

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 51

Hypothesis 3m-4: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Preferred Social Distance After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.13	0.02	-0.61	.001	0.36
Age	0.04	0.07	0.05	.539	0.00
Interaction	-0.01	0.02	-0.06	.429	0.01
Total					0.37

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 52

Hypothesis 3n-1: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Perceived Dangerousness Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	0.03	0.03	0.10	.304	0.01
Age	0.26	0.07	0.39	.001	0.14
Interaction	0.01	0.03	0.03	.790	0.00
Total					0.15

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 53

Hypothesis 3n-2: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Perceived Dangerousness After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	0.04	0.03	0.14	.156	0.02
Age	0.23	0.07	0.36	.001	0.13
Interaction	-0.01	0.03	-0.03	.806	0.00
Total					0.15

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 54

Hypothesis 3n-3: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Perceived Dangerousness Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.12	0.02	-0.45	.001	0.21
Age	-0.04	0.10	-0.03	.733	0.00
Interaction	0.01	0.03	0.02	.805	0.00
Total					0.21

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 55

Hypothesis 3n-4: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Perceived Dangerousness After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.13	0.03	-0.42	.001	0.18
Age	-0.01	0.12	-0.01	.912	0.00
Interaction	-0.01	0.03	-0.03	.732	0.00
Total					0.18

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 56

Hypothesis 3o-1: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.09	0.03	-0.23	.011	0.05
Age	-0.45	0.09	-0.49	.001	0.22
Interaction	-0.01	0.03	-0.02	.824	0.00
Total					0.27

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 57

Hypothesis 3o-2: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.10	0.04	-0.25	.007	0.05
Age	-0.45	0.09	-0.47	.001	0.22
Interaction	-0.00	0.03	-0.01	.936	0.00
Total					0.27

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 58

Hypothesis 3o-3: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.21	0.04	-0.52	.001	0.27
Age	0.05	0.15	0.03	.753	0.00
Interaction	0.02	0.04	0.04	.641	0.00
Total					0.27

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 59

Hypothesis 3o-4: Path Analysis Model Examining the Moderating Effects of Age on the Level of Contact and Negative Emotions Regarding Recreational Marijuana Users After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Contact	-0.19	0.03	-0.49	.001	0.24
Age	0.07	0.15	0.05	.612	0.00
Interaction	0.00	0.04	0.00	.995	0.00
Total					0.24

Note: Interaction is defined as Level of Contact x Age.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 60

Hypothesis 3p-3: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Preferred Social Distance Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-2.05	0.29	-0.58	.001	0.33
Age	0.09	0.07	0.10	.230	0.02
Interaction	0.56	0.32	0.14	.083	0.02
Total					0.37

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Pre-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 61

Hypothesis 3p-4: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Preferred Social Distance After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-2.18	0.29	-0.61	.001	0.36
Age	0.05	0.07	0.06	.481	0.01
Interaction	0.28	0.32	0.07	.379	0.01
Total					0.38

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Post-Preferred Social Distance

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 62

Hypothesis 3q-1: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Perceived Dangerousness Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	2.22	0.54	0.38	.001	0.20
Age	0.21	0.07	0.32	.005	0.07
Interaction	-0.27	0.42	-0.07	.512	0.00
Total					0.27

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 63

Hypothesis 3q-2: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Perceived Dangerousness After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	2.19	0.53	0.38	.001	0.19
Age	0.22	0.07	0.34	.003	0.07
Interaction	-0.43	0.41	-0.12	.294	0.01
Total					0.27

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 64

Hypothesis 3q-3: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Perceived Dangerousness Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-2.35	0.42	-0.50	.001	0.25
Age	-0.01	0.10	-0.01	.952	0.00
Interaction	0.21	0.46	0.04	.659	0.00
Total					0.25

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Pre-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 65

Hypothesis 3q-4: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Perceived Dangerousness After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-2.51	0.47	-0.47	.001	0.22
Age	0.02	0.12	0.01	.887	0.00
Interaction	0.08	0.53	0.01	.888	0.00
Total					0.22

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Post-Perceived Dangerousness

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 66

Hypothesis 3r-1: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-3.77	0.65	-0.47	.001	0.30
Age	-0.39	0.09	-0.43	.001	0.12
Interaction	0.64	0.50	0.12	.204	0.01
Total					0.43

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 67

Hypothesis 3r-2: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users After Receiving Video Clip.

Control Sample (N = 97)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-3.88	0.68	-0.47	.001	0.29
Age	-0.41	0.09	-0.43	.001	0.12
Interaction	0.78	0.53	0.15	.141	0.01
Total					0.42

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 68

Hypothesis 3r-3: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users Before Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-3.34	0.62	-0.48	.001	0.23
Age	0.07	0.15	0.04	.641	0.00
Interaction	0.48	0.70	0.06	.496	0.00
Total					0.23

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Pre-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test

Appendix O Table 69

Hypothesis 3r-4: Path Analysis Model Examining the Moderating Effects of Age on the Level of Familiarity and Negative Emotions Regarding Recreational Marijuana Users After Receiving Module.

Psychoeducational Module Sample (N = 104)	Unstandardized Coefficients		Standardized Coefficients	Sig.	R^2
	B	Std. Error	Beta		
Level of Familiarity	-3.24	0.60	-0.48	.001	0.22
Age	0.10	0.15	0.06	.511	0.01
Interaction	0.39	0.68	0.05	.565	0.00
Total					0.23

Note: Interaction is defined as Level of Familiarity x Age.

Dependent Variable: Post-Negative Emotions

* p <0.05, two-tailed test ** p <0.001, two-tailed test