

2020-01-01

Comparing the Language of Computer-Mediated versus Face-To-Face Motivational-Type Interviews

Karla Deyanira Llanes
University of Texas at El Paso

Follow this and additional works at: https://scholarworks.utep.edu/open_etd



Part of the [Psychology Commons](#)

Recommended Citation

Llanes, Karla Deyanira, "Comparing the Language of Computer-Mediated versus Face-To-Face Motivational-Type Interviews" (2020). *Open Access Theses & Dissertations*. 2994.
https://scholarworks.utep.edu/open_etd/2994

This is brought to you for free and open access by ScholarWorks@UTEP. It has been accepted for inclusion in Open Access Theses & Dissertations by an authorized administrator of ScholarWorks@UTEP. For more information, please contact lweber@utep.edu.

COMPARING THE LANGUAGE OF COMPUTER-MEDIATED VERSUS FACE-TO-
FACE MOTIVATIONAL TYPE INTERVIEWS

KARLA DEYANIRA LLANES
Doctoral Program in Psychology

APPROVED:

Lawrence D. Cohn, Ph.D., Chair

Paul C. Amrhein, Ph.D.

Craig Field, Ph.D.

Oswaldo F. Morera, Ph.D.

James M. Wood, Ph.D.

Stephen L. Crites, Jr., Ph.D.
Dean of the Graduate School

Copyright ©

by

Karla Deyanira Llanes

2020

Dedication

I dedicate my dissertation to my mom, dad, and sister. Thank you for all your support and encouraging me to pursue a degree in Psychology.

COMPARING THE LANGUAGE OF COMPUTER-MEDIATED VERSUS FACE-TO-
FACE MOTIVATIONAL TYPE INTERVIEWS

by

KARLA DEYANIRA LLANES, M.A.

DISSERTATION

Presented to the Faculty of the Graduate School of

The University of Texas at El Paso

in Partial Fulfillment

of the Requirements

for the Degree of

DOCTOR OF PHILOSOPHY

Department of Psychology

THE UNIVERSITY OF TEXAS AT EL PASO

MAY 2020

Acknowledgments

I would like to thank my mentor, Dr. Lawrence D. Cohn. You inspired me to conduct research since I was an undergraduate student. You always made time for your students, whether it was a research related or a personal matter. You were very patient in teaching me how to become a better writer and rigorous researcher. I value your wisdom, enthusiasm, and guidance all these years. I could not have asked for a better mentor, friend, and colleague to get me through graduate school. I know I can count on you for future advice.

I would also like to thank my committee members: Dr. Lawrence D. Cohn, Dr. Paul C. Amrhein, Dr. Craig Field, Dr. Morera, and Dr. James M. Wood. To Dr. Amrhein, thank you for training us to use your manual, your insight, and for all your feedback since the start of the grant. To Dr. Field, your expertise in motivational interviewing and commitment language helped shape the direction of this project. I thank you for inviting me to attend motivational interviewing workshops. To Dr. Wood, I appreciate the opportunity to take your Foundations of Research course. It has taught me to think carefully about designing research studies. I also appreciate the opportunity to teach statistics many semesters. To Dr. Morera, your statistic courses have been instrumental to my current research and future research.

I would also like to thank several lab members: Eugene Lopez, Katherina Arteaga, Roberto Moran, Miguel Garcia, Hatty Lara, Emilio Acosta, Angie Ibarra, Krystal Cenicerros, Cinthia Munoz, Sean Silva, Kiran Misra, Adolfo Alvarez, Candice Coffman, Gabriel Frieze, Mosi Dane'el, and Kevin M. Gutierrez. Your contributions made this study possible.

Lastly, I would like to thank Dr. Jon Amastae and Dr. Edward Castañeda. To Dr. Amastae, for your dedication and Linguistics expertise. To Dr. Castañeda, for funding and allowing me to be part of this NIDA training grant.

Abstract

The current study seeks to determine if computer-mediated and face-to-face motivational-type interviews elicit the same level of affect words and insight words in young adults who are ambivalent about their marijuana use. One-hundred and fifty young adults from a large urban university were randomly assigned to complete a brief motivational-type interview using a standard face-to-face format or instead a novel computer-mediated format. In the computer-mediated format, the interviewer and participant communicated via computer from separate rooms. A two-month follow-up survey assessed each participant's past two-month marijuana use. Pennebaker's Linguistic Inquiry and Word Count (LIWC) program was used to determine if the face-to-face format elicits significantly more positive affect words, negative affect words, and insight words compared to the computer-mediated format. Computer-mediated motivational type interviews (CM-MTIs) elicited more negative affect and positive affect words than face-to-face motivational type interviews (FTF-MTIs), but insight related words were elicited more in the FTF-MTIs. Use of negative affect, positive affect, and insight words did not predict marijuana use at the two-month follow-up. The present findings indicate that the LIWC can be used to compare language usage in computer-mediated and face-to-face motivational type interviews. In addition, the findings also suggest that computer-mediated MTIs may be a feasible method for exploring a participant's ambivalence about their current marijuana use.

Table of Contents

| | |
|--|-----|
| Acknowledgements..... | v |
| Abstract..... | vi |
| Table of Contents..... | vii |
| List of Tables..... | ix |
| Introduction..... | 1 |
| Motivational Interviewing (MI) and Language Predictors of Drug Use..... | 3 |
| Motivational Interviewing..... | 3 |
| Efficacy of MI..... | 3 |
| Language Predictors of Behavioral Change..... | 4 |
| LIWC Text Analysis Software and Associated Studies..... | 11 |
| The Impetus for LIWC Development..... | 12 |
| LIWC Language Predictors of Behavioral Change..... | 13 |
| LIWC Language Predictors of Drug Use..... | 16 |
| LIWC Language Predictors of Behavior: Written, Typed, and Verbally Expressed..... | 17 |
| Computer-Mediated Communications..... | 20 |
| Emotion Expression in CMC..... | 23 |
| Computer-Mediated (CM) Interventions..... | 25 |
| Comparing FTF and CM Interventions..... | 26 |
| Comparing CM-MTI and FTF-MTI..... | 27 |
| Current Study..... | 28 |
| Method..... | 32 |
| Participants..... | 32 |
| Power Analysis..... | 33 |
| Design..... | 33 |
| Measures and Materials..... | 33 |
| Procedure..... | 39 |

| | |
|-----------------|-----|
| Results..... | 40 |
| Discussion..... | 44 |
| References..... | 49 |
| Appendix | 66 |
| Vita..... | 111 |

List of Tables

| | |
|---|----|
| Table 1.a: Participant Characteristics in Face-to-Face MTIs and Computer-Mediated MTIs: Categorical Variables..... | 57 |
| Table 1.b: Participant Characteristics in Face-to-Face MTIs and Computer-Mediated MTIs: Continuous Variables..... | 58 |
| Table 2: Correlations Between Marijuana Use and Percent of Words Per Category/ Dictionary..... | 60 |
| Table 3: Percent of Words per Language Category: Face-to-Face MTIs versus Computer- Mediated MTIs..... | 61 |
| Table 4: Moderation Analysis Predicting Frequency of Marijuana Use at Two-Month Follow-Up | 62 |
| Table 5: Predicting Frequency of Marijuana Use at Two-Month Follow-Up | 64 |

Introduction

Comparing the Language of Computer-Mediated versus Face-To-Face Motivational-Type Interviews

Motivational Interviewing (MI) is an extensively used technique to facilitate behavior change by increasing a person's own motivation and commitment toward changing the target behavior. Since the first MI article was published in 1982, more than 25,000 articles reference motivational interviewing (Miller & Rollnick, 2012). A literature search conducted on March 12, 2020 using Google Scholar database yielded 116,000 results when specifying the search term "motivational interviewing" and restricting the years 1980 to 2020. Two hundred controlled clinical trials support MI's efficacy (Miller & Rollnick, 2012). Motivational interviewing was developed in the context of substance abuse research, but MI is effective for addressing many other behavioral health problems (Burke, Arkowitz, & Menchola, 2003). For example, MI is effective at addressing diet and exercise problems (Burke, Arkowitz, & Menchola, 2003). The efficacy of MI is similar to other evidence-based interventions, but MI takes less time to administer, and its effects are long-lasting (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010). Motivational interviewing is characterized by a face-to-face collaborative conversation between the interviewer and the client. During such conversations (or 'interviews'), the interviewer poses a series of open-ended questions to the client regarding the target behavior, invites reflection and elaboration, and then guides the conversation in a manner that encourages the client to move toward the desired behavior change. MI interviews can be short (e.g., 15 minutes) or long (e.g., 12 hours dispersed in multiple MI sessions), and both types of formats appear to produce behavior change (Lundahl et al., 2010).

Virtually all studies of MI efficacy have relied on motivational interviews that were conducted using a face-to-face format, with the interviewer and client located in the same room during the ‘interview.’ Thus it is not known if motivational interviews can be successfully conducted in non-face-to-face format, such as via computer, with the interviewer located in one building, for example, and the client located in a different building. Such computer-mediated MI sessions, if effective, would expand the opportunities for clients to benefit from MI interventions when potential clients are unable to travel to a clinician’s office, which could be located miles from the client’s home or even located in another city. Several questions need to be addressed to determine if computer-mediated clinical interactions and face-to-face clinical interactions yield equivalent outcomes. First, however, investigators need to determine if face-to-face and computer-mediated interviews elicit the same ‘material’ from a client. For example, do both interview formats elicit approximately the same number of words, the same amount of self-disclosure, the same level of positive and negative affect, the same degree of commitment language, and the same points of discussion during an interview? The current study begins to address this gap in knowledge by investigating if computer-mediated and face-to-face motivational-type interviews elicit the same frequency of affect-related words and insight-related words. Motivational-type interviews were conducted with young adults who were ambivalent about their level of marijuana use, and Pennebaker’s Linguistic Inquiry and Word Count program was used to analyze the language content produced by each MI format (face-to-face and computer-mediated).

The following sections briefly discuss the efficacy of motivational interviews, language predictors of drug use using a motivational interviewing framework, the origins of the LIWC, language predictors of health outcomes using the LIWC, and the elicitation of commitment

language in computer-mediated and face-to-face motivational interviews. The following six-page section, taken verbatim from Llanes's (2019) masters thesis, summarizes several of the main tenets of MI and associated research investigating language predictors of drug use.

Motivational Interviewing (MI) and Language Predictors of Drug Use.

Motivational Interviewing. MI is a “collaborative, person-centered approach used to increase intrinsic motivation and reduce ambivalence about behavioral change” (Miller & Rollnick, 2012). MI differs from traditional confrontational approaches by adopting a directive, humanistic approach (Miller & Rollnick, 2012). Ambivalence regarding behavior change is viewed as non-pathological. For this reason, a person is asked to discuss their barriers and strengths toward making a behavior change. Clinicians do not confront or advise clients to make a change. Instead, a clinician guides an individual to commit to change by increasing the client's own motivation and strengthening commitment toward change. To facilitate change, MI uses the following four MI principles: 1) “express empathy” by reflective listening; 2) “develop discrepancy” between current behavior and future goals by asking evocative questions (i.e., open-ended questions); 3) “roll with resistance” by exploring a client's ambivalence about making a behavioral change; 4) “support self-efficacy” by viewing the person as capable of making the behavioral change (Miller & Rollnick, 2012). The clinician seeks to increase a client's own motivation to change by asking evocative questions and reflecting what was said by the client in a supportive and empathetic approach. By exploring a client's own reasons for the change, ambivalence reduces and leads to a strengthening of commitment to behavioral change.

Efficacy of MI. Numerous studies have established the efficacy of motivational interviewing. Prior meta-analyses suggest that motivational interviews are effective for promoting health behaviors (Burke et al., 2003; Lundahl et al. 2010). Lundahl et al. (2010)

conducted a meta-analysis of 119 studies investigating the efficacy of motivational interviewing. On average, motivational interviewing improved health outcomes by 0.22 standard deviation units compared to interventions not implementing motivational interviewing (Lundhal et al. 2010). Motivational interviewing was compared to weaker interventions (i.e., an intervention that used pamphlets, unspecified treatment as usual, or waitlist) and strong interventions known to be efficacious (e.g., cognitive behavioral therapy and 12 steps addiction programs). MI was significantly more effective than weaker interventions ($g=.28$), but not more effective than strong treatments ($g=.09$). MI took less time to administer (three sessions that adds up to approximately 180 minutes) than other active treatments. Motivational interviewing was significantly more effective than weak treatments in increasing motivation ($g=.23$) and increasing engagement in treatment ($g=.35$). Also, MI was significantly more effective than weaker treatments at a two-year follow-up ($g=.24$).

Language Predictors of Behavioral Change: Change Talk and Sustain Talk.

The client's language during motivational interviewing can reveal whether the client is ready to make a behavioral change or resist making a behavioral change. Change talk in motivational interviewing refers to language statements in the direction of behavioral change. Change talk is categorized into language statements expressing the client's desire (e.g., "I want to cut back on using marijuana"), ability (e.g., "I am *capable* of living without marijuana"), reasons (e.g., "I'm going to *lose* my kids"), need (e.g., "I *need* to reduce my use"), readiness (e.g., "I'm *ready* to reduce my use"), and commitment (e.g., "I *swear* I will never use marijuana") to change their behavior (Amrhein et al.,2003). Contrary to change talk, sustain talk in motivational interviewing refers to statements that support increasing or maintaining drug use. Sustain talk is similarly categorized into language statements expressing the clients desire,

ability, reasons, need, readiness, and commitment to maintaining their behavior. Each language statement is also assigned a strength (valence) value between “+ 5” and “-5”. Values between “-1” and “-5” reflect the strength of statements that support continued drug use. Values between “+1” and “+5” reflect the strength of statements that support reducing or abstaining from drug use. For example, a commitment statement such as “I will probably quit” is assigned a valence of “+2” and is distinct from the statement “There is no doubt about it I will quit,” which would be assigned a valence of “+5”. The second statement reflects a stronger commitment to change that is captured by assigning a higher strength value.

Change talk and sustain talk expressed by the client in motivational interviews is predictive of behavioral change (Amrhein et al., 2003). Amrhein et al. (2003) randomly assigned 84 inpatient and outpatient illicit substance users to receive a 45-90-minute MI session. Drug use was assessed at baseline, three, six, nine, and twelve months. Each statement during an MI session was categorized as desire, ability, reasons, need, readiness, commitment, or not codable (i.e., not an example of desire, ability, reasons, need, readiness, or commitment statements). Each language statement was assigned a valence between “-5” and “+5”. On average, commitment statements occurred more frequently ($M=2.86$) than reasons ($M=1.85$), ability ($M=1.48$), desire ($M=1.46$), need ($M=.68$) and readiness statements ($M=.16$). Amrhein et al. (2003) posited that commitment language strengthens from the beginning toward the end of the interview. Therefore, interviews were divided into ten equal time segments called time deciles to examine the strength of commitment language in the beginning, middle, and end of the MI session. The strength of commitment language predicted the frequency of drug use at follow-up, but only for the 7th time-decile and 10th time-decile. The strength of commitment language at the other time-deciles (1-6, 8, 9) did not significantly predict the number of days abstinent in the past 90 days

(p -values greater than .05 for the change in R^2). The strength of other language statements, known as preparatory change talk (i.e., desire, ability, reasons, needs, readiness), did not predict drug use abstinence. However, the strength of preparatory change talk was associated with the strength of commitment language, which suggests these categories may play an underlying role in increasing commitment strength.

A study of 24 cocaine-dependent patients receiving cognitive behavioral therapy revealed similar results: the strength of commitment language significantly predicted a reduction in cocaine use as indexed by negative urine tests (Aharonovich, Amrhein, Bisaga, Nunes, & Hasin, 2008). A recent study of 75 cocaine-dependent patients also found that the strength of commitment language predicted reduced cocaine use (Carpenter et al., 2016). Participants were trained to associate negative consequences words with cocaine-related words and complete a word relation task afterward. Performance on word relation task was used to group participants by high ability to relate cocaine-related words with negative consequences or low ability. The association between strength of commitment language (10th time-decile) and cocaine use was dependent on the performance of the word relation task. For those who learned to relate cocaine use words with negative consequences words, the strength of commitment language significantly predicted less cocaine use (unstandardized $\beta = -17.8$, $SE = 8.0$, $p = .03$). Commitment language did not predict cocaine use for individual's low in the ability to associate cocaine-related words with negative consequences. Also, the strength of other language categories did not predict a reduction in cocaine use. The study by Carpenter et al. (2016) suggests that training individuals to relate cocaine use with negative consequences reduces cocaine use.

Several additional studies report no association between commitment language and behavioral change. For example, Gaume, Gmel, and Daeppen (2008) coded 97 brief motivational

interviews of emergency room patients regarding their alcohol use. The investigators found that only the strength in ability statements (e.g., “I am *capable* of living without drugs”) significantly predicted changes in alcohol consumption at a 12-month follow-up (unstandardized $\beta=2.78$, $SE=1.41$, $p<.05$). Also, Baer et al. (2008) did not find an association between commitment language and reducing illicit drug use. A sample of 54 homeless adolescents (ages 13-19) received a brief MI and completed a measure that assessed their drug abstinence during a 30-day period at baseline, one-month, and three-month follow-up. The strength of reasons for abstaining from illicit drug use (change talk) predicted a higher number of days abstinent at one-month follow-up. Yet, sustain talk for desire language and ability language predicted a reduction in the number of days abstinent at one-month and three-month follow-up. Descriptive statistics revealed that reasons against illicit drug use ($M=1.01$, $SD=.78$) were more frequently expressed than desire/ability sustain talk ($M=.61$, $SD=.41$), and commitment sustain talk ($M=.27$, $SD=.27$).

A related study of 61 marijuana-dependent adults examined if the language used during MI predicted subsequent marijuana use (Walker, Stephens, Rowland, & Roffman, 2011). Participants were randomly assigned to complete nine sessions of Motivational Interviewing Enhancement Therapy (MET), Cognitive Behavioral Therapy (CBT), and Case Management (CM) in four weeks or 12 weeks. Participants in the MET condition received a brief motivational interview session with personalized feedback regarding a participant’s drug use relative to the general population. The number of days abstinent was measured at baseline, 4, 16, and 34 months. After controlling for baseline drug use and participant’s motivation to change, desire statements (e.g., “I want to stop using”) significantly predicted a decrease in marijuana use at 4, 16, and 34 months ($\beta=.24$, $\beta=.23$, $\beta=.37$, respectively). Reasons for changing marijuana use significantly predicted a decline in marijuana use at 4 and 16 months ($\beta=.24$, $\beta=.27$,

respectively). Only desire and reason statements predicted a reduction in marijuana use long-term.

There are several methods to measure sustain talk and change talk, which could explain the conflicting results among studies. For example, the studies by Amrhein et al. (2003), Aharonovich et al. (2008), and Carpenter et al. (2016) computed the average strength values for each of the following categories: desire, ability, reasons, need commitment, and readiness categories. However, other investigators counted the number of the language statements in the desire, ability, reasons, need, commitment, and readiness category. For example, Baer et al. (2008) found the frequency of commitment statements predict changes in health outcomes. Finally, other investigators ignore the individual categories (i.e., desire, ability, reasons, need, commitment, and readiness). Instead, these investigators count the number of language statements that reflect sustain talk and change talk separately. For example, Moyer et al. (2007) examined the impact of change talk and sustain talk separately. Forty-five sessions from Project MATCH were used to code sustain talk and change talk. The sessions consisted of Cognitive-Behavioral therapy ($n=15$), Twelve-Step facilitation ($n=15$) and Motivational interviewing with a feedback component ($n=15$). Both sustain talk and change talk predicted drinking outcomes, as measured by drinks per drinking day. Sustain talk significantly predicted an increase in drinking outcomes ($\beta=.46$) and change talk significantly predicted a reduction in drinking outcomes ($\beta=-.33$). Another study found similar results (Vader, Walters, Prabhu, Houck, & Field, 2010). College students ($N=143$) were randomly assigned to receive a motivational interview session or a motivational interview with a feedback session and report their drinking frequency at a three-month follow-up. Both change talk ($\beta=-0.01$, $SE= .004$) and sustain talk ($\beta=0.03$, $SE= .007$)

significantly predicted drinking outcomes for the motivational interviewing sessions with a feedback component.

Magill et al. (2014) conducted a meta-analysis based on 12 studies examining if sustain talk and change talk separately predicts behavior outcomes (i.e., alcohol, illicit drug use, and other behavioral outcomes). Sustain talk was negatively associated with less behavioral change ($r=-.24, p=.001$), but change talk was not associated with more behavioral change outcomes ($r=.06, p=.41$). Magill et al. (2014) also conducted another meta-analysis on six independent studies to examine if the strength of commitment language predicts behavioral health outcomes (i.e., that is treating sustain talk and change talk as a unidimensional variable, from -5 to +5). The findings from these six studies suggest that combining both sustain talk and change talk by averaging strength (valence) values was associated with positive behavioral outcomes ($r=.12, p=.006$).

The above findings reveal conflicting evidence regarding the type of language statements that predict positive behavioral change. For example, *commitment-related statements* predicted positive behavioral change in three studies, *desire-related statements* predicted positive behavioral change in one study, and *reason-related statements* predicted positive behavioral change in one additional study. These conflicting results may be in part due to the type of language investigators use in their analyses. Some investigators analyze the frequency of each type of language statements (e.g., desire) produced in MI, while other investigators analyze the valence assigned to each language statement. As noted above, the latter material was obtained from my masters' thesis (Llanes, 2019).

As described above, one way to analyze the language content of motivational interviewing is by having multiple human coders manually code all instances of sustain talk and

change talk. The benefit of classifying language into linguistic categories (e.g., sustain talk and change talk) using a manual like Amrhein's et al., (2003) is that it allows coders to interpret sarcasm or other key subtleties in language that might be missed or misinterpreted.

Nevertheless, manually coding transcripts requires training multiple coders and is a process that takes a long time to complete. Coders independently code transcripts and meet to resolve disagreement among coders. Researchers have developed many computerized software programs capable of analyzing large corpora of text in less time than manual coding. A widely used text analysis program is Pennebaker's Linguistic Inquiry and Word Count (LIWC), which counts the number of words in transcripts and other written documents and assigns each word to predetermined linguistic categories (referred to as dictionaries), such as the number of positive affect-related words (e.g., "happy," "cheerful," "joy"), negative affect-related words (e.g., "angry," "sad," "stressed"), and grammatical properties (e.g., pronouns, adjectives, verbs) (Pennebaker, Mayne, & Francis, 1997; Tausczik, & Pennebaker, 2010).

The LIWC provides investigators with an important opportunity to investigate linguistic patterns that may emerge in motivational interviews, and these patterns may be predictive of behavior change and health-related outcomes in the individuals who produced them. Notably, no studies have investigated if the LIWC can be used to identify patterns of language usage in motivational interviews that could predict subsequent behavior change in the interviewee. For example, the LIWC has not been used to investigate the level of positive affect words, negative affect words, and cognitive words elicited from motivational interviews. Also, few studies have compared the language content of orally expressed self-disclosure and written or typed self-disclosure. No study has compared the language content of computer-mediated motivational interviews and face-to-face motivational interviews, except for Llanes et al. (2019), who

compared the difference in sustain talk and change talk between computer-mediated and face-to-face motivational-type interviews. The use of manual coding and computerized text analysis program like the LIWC can complement each other in using distinctively different language content to predicting behavior change.

LIWC Text Analysis Software and Associated Studies

Pennebaker suggests that the words that individuals use to describe experiences serve as a "linguistic fingerprint," revealing important aspects of an individual's behaviors, thoughts, and psychological processes (Tausczik, & Pennebaker, 2010). Pennebaker's Linguistic Inquiry and Word Count (LIWC) text analysis program counts the number of words in transcripts and other written documents and assigns each word to predetermined linguistic categories (referred to as dictionaries), such as the number of positive affect-related words (e.g., "happy," "cheerful," "joy"), negative affect-related words (e.g., "angry," "sad," "stressed"), and grammatical properties (Pennebaker, Mayne, & Francis, 1997; Tausczik, & Pennebaker, 2010). The LIWC also includes word categories that reflect cognition (e.g., "think"), insight (e.g., "realized", "understand") and causation (e.g., "because," "reason," "why"). Presumably using the latter types of words (e.g., "realize," "see," "understand") signals some degree of self-reflection and understanding when a respondent discusses their personal experiences (Pennebaker, Mayne, & Francis, 1997; Tausczik, & Pennebaker, 2010). The LIWC includes more than 6,400 words that are assigned to 90 linguistic categories (Pennebaker, Boyd, Jordan & Blackburn, 2015). The LIWC provides a tally of the number of words in a transcript that can be assigned to each linguistic category ("dictionary"). For example, when the LIWC software program encounters the word "angry" in a transcript then the program 'counts' the word within multiple linguistic categories or 'dictionaries', including the category 'negative affect words', and the more general

category of ‘adjectives’. After all words in a transcript have been assigned to these 90 pre-determined categories (dictionaries), the LIWC computes the percent of words within the transcript that are assigned to each category. The LIWC is flexible and allows researchers to add words to existing language categories or create new language categories for words that may not be included in the LIWC (e.g., “coronavirus”). The LIWC is available for use with texts that are written in Spanish, German, Dutch, Italian, Norwegian, and Portuguese.

The words that Pennebaker assigned to each of the 90 linguistic categories were determined using a three-step process (Tausczik, & Pennebaker, 2010). First, an initial list of words obtained from dictionaries, thesauruses, and psychological measures (e.g., PANAS) were selected for potential inclusion in the LIWC language categories. Second, three judges independently assigned each word to a specific language category. The judges used the following inclusion and exclusion criteria for selection words: 1) a word was kept if two out of three judges agreed that it should be included in a language category; 2) a word was excluded from a language category if two out of three judges agreed that it should be excluded; and 3) additional words were added to a language category that were not included in the original word lists if two out of the three judges agreed that it should be included. The words that were assigned to the 90 language categories (dictionaries) were subsequently rated once more by three new judges. The level of agreement among judges’ ratings for each of the linguistic category reached 90% or higher (Tausczik, & Pennebaker, 2010).

The Impetus for LIWC Development.

The impetus for developing the LIWC grew out of early research investigating the beneficial effects of self-disclosure and expressive writing (i.e., writing about traumatic experiences). Pennebaker and Beall (1986) conducted one of the first studies investigating the

benefits of written self-disclosure. College students were randomly assigned to one of four conditions: 1) participants were asked to write about a neutral topic (e.g., description of their living room); 2) participants were asked to write about the facts surrounding a personal trauma; 3) participants were asked to write about the emotions that they experienced surrounding a trauma; and 4) participants were asked to write about both the facts and their emotions surrounding a trauma. All participants wrote for 15 minutes a day for four days. Participants who wrote about their emotional reactions to a traumatic experience reported significantly fewer health clinic visits at a six-month follow-up compared to participants who were assigned to the other two groups. Smyth (1998) conducted a meta-analysis of thirteen studies investigating the effect of written emotional expression on health-related outcomes. Compared to participants in control conditions (e.g., writing about a neutral topic), participants who completed the expressive writing tasks displayed significantly greater health benefits, $d=.47$. Specifically, writing about an emotional trauma increased positive health outcomes ($d=.42$), psychological well-being ($d=.66$), physiological functioning ($d=.68$), and general functioning ($d=.33$). Positive changes in health behaviors (e.g., smoking, alcohol use, and diet) were non-significant, $d=.03$. Fattaroli (2006) conducted a second meta-analysis of 146 studies and reported a significant, but smaller, average effect size, $r=.075$ (which is equivalent to a value of $d=.15$).

LIWC Language Predictors of Behavioral Change.

The initial version of the LIWC was used to determine if certain types of words that are generated by a participant during expressive writing tasks may predict beneficial outcomes across a range of personal problems. One study found insight-related words (e.g., “think,” “know,” “consider”) and positive affect words (e.g. “love,” “nice,” “sweet”) were associated with fewer health clinic visits in a sample of college students writing about their college experiences

(Pennebaker & Francis, 1996). In this study, 72 first-year college students were randomly assigned to the experimental condition (i.e., writing about their thoughts and feeling about coming to college) or the control condition (i.e., writing about an event or object without using emotions). It was hypothesized that moderate levels of negative affect, greater use of positive affect, and greater use of cognitive words (i.e., insight and causal words) would be beneficial to individual's health and well-being. Among participants in the experimental condition, it was found that insight-related words were associated with fewer health clinic visits ($\beta = -.33, p < .05$). Similarly, positive affect words were associated with fewer health clinic visits ($\beta = -.41, p < .05$). Although, negative emotion words or causal words did not significantly predict changes in the student health clinic visits, $ps > .05$. This study partially supports the theory that expressive writing is beneficial because individuals are engaging in emotional processing of the event and trying to understand the event, as show in the use of positive emotion words and insight words. A study by Ullrich and Lutgendorf (2002) formally test this theory by manipulating emotional and cognitive processing. Participants were randomly assigned to either write about current events from the news (control condition), or a personal stressful or traumatic topic focusing on only their feelings (emotional expression condition), or a personal stressful or traumatic topic focusing on their feelings and thoughts (emotional expression and cognitive processing condition). The third condition included additional instructions asking participants to discuss how they tried to make sense of the situation. Ullrich and Lutgendorf (2002) found that the use of cognitive words was associated with positive growth in individuals writing about traumas. Positive growth was defined as participant's perceived benefit of writing about their assigned topic. Moreover, the investigators found a significant partial positive correlation for the use of cognitive words and positive growth scores after controlling for baseline positive growth scores,

$r=.25$. However, negative emotion words and positive emotion words were not related to positive growth scores after controlling for baseline positive growth scores ($r=.06$, $r=-.08$, $ps>.05$, respectively). This finding is inconsistent with the hypothesis that expressive writing is beneficial because individuals engage in emotional processing, but the causal analysis does suggest that cognitive and emotional processing during self-disclosure, and expressive writing is beneficial. There was a statistically significant interaction between conditions and time (baseline and four weeks follow-up) on changes in positive growth, $F(2,120)=3.71$, $p<.05$. The group asked to focus on their thoughts and feeling when writing about a trauma had a significant increase in personal trauma growth scores at four weeks ($M=75.95$, $SD = 19.03$) compared to baseline ($M=70.68$, $SD = 20.87$), $F(1,120) = 4.55$, $p<.05$. There were no changes in positive growth scores from baseline to four weeks for the control condition and emotional expression condition. Cognitive processing and emotional processing during self-disclosure and expressive writing appears to promote positive posttraumatic growth (Ullrich & Lutgendorf, 2002). A related study revealed that participants who used more negative emotion terms (e.g., "angry") in their writing samples displayed poorer outcomes than participants who used more positive emotion terms (e.g., "joyful") (Pennebaker, Mayne, & Francis, 1997). A fourth study revealed that depressed college students who wrote about stressful experiences were more likely than non-depressed students to use the first-person pronoun "I" in their writing samples (Rude, Gortner, & Pennebaker, 2004). Rude, Gortner, and Pennebaker's (2004) study suggests the depressed students' use of first-person singular words are drawing attention to themselves. The word "I" in particular is thought to reflect self-reference, which may manifest in the language of depressed people. A fifth study found that greater use of positive emotion words, and moderate use of negative emotion words improved individuals' health (Pennebaker & Chung, 2011).

LIWC Language Predictors of Drug Use

The use of Pennebaker's Linguistic Inquiry and Word Count (LIWC) text analysis program is also a strategy for investigating the association between language use and vulnerability to drug use escalation. For example, one study used the LIWC to examine differences in the language used by smokers and non-smokers (Alexander-Emery, Cohen, & Prensky, 2005). Forty-eight college smokers and non-smokers were instructed to write about the health effects of smoking cigarettes. As predicted, a text analysis of their essays revealed that smokers were significantly less likely to use words denoting insight than nonsmokers ($M=1.33$, $M=2.14$, respectively). Smokers were also significantly more likely to use first-person pronouns than non-smokers ($M=10.14$, $M=4.20$, respectively) and words denoting inhibition ($M=0.96$, $M=0.41$, respectively). Non-smokers used more death words, social words, and other people reference words (e.g., "you"). There was not a significant difference in negative emotion words for college smokers and non-smokers. A second study used the LIWC to predict heavy drinking episodes in 100 college students receiving a brief intervention to reduce their drinking (Collins, Carey, & Smyth, 2005). College students were randomly assigned to one of two groups: 1) participants were emailed a pamphlet with personalized normative feedback regarding their drinking in comparison to their peers (gender specific feedback), or 2) participants were emailed an alcohol educational pamphlet. Both groups were asked to respond to the following questions: "What did you learn about your drinking from the enclosed information?" and "Was the information you received relevant to your current drinking? If so, in what ways?". Written responses for these two questions were coded using the LIWC. The personalized normative feedback group used a significantly higher percentage of first-person-singular words (e.g., "I," "me," "mine"), and school-related words (e.g., "college," "student"). The education pamphlet

group used a higher percentage of discrepancy words (e.g., “couldn’t,” “if”), second-person pronouns (e.g., “you,” “you’ll”), and body words (e.g., “fat,” “hangover,” “healthy”). Hierarchical regression was used to predict change scores in heavy drinking episodes (drinking more than 4-5 drinks in the past two weeks). The group comparison (personalized feedback versus education pamphlet) was entered in step 1, and the language categories (first-person singular, second-person pronoun, discrepancy words, school words, and body words) were entered in the second step, the change in r^2 for step 2 was $\Delta R^2 = .18$. The second step analysis revealed greater use of first-person singular pronouns was associated with lower heavy drinking episodes ($\beta = -.33$, $SE = 0.13$, $p < .05$). Lower use of second-person pronouns was associated with lower heavy drinking episodes ($\beta = .37$, $SE = 0.56$, $p < .05$).

LIWC Language Predictors of Behavior: Written, Typed, and Verbally Expressed Communications.

The LIWC has been used in several contexts to analyze language samples from diverse sources (e.g., written emotional experiences, natural speech conversation transcripts, newspaper articles, books, and social media text). For instance, Kahn, Tobin, Massey, and Anderson (2007) conducted a study to validate the positive affect word linguistic category and negative affect word linguistic category in both written and orally expressed language. Participants were randomly assigned to write about a sad, amusing, or neutral autobiographical memory. Essays written by participants in the sad group contained significantly more words depicting negative emotions ($M = 4.22$, $SD = 2.28$) than both the amusing condition ($M = .92$, $SD = 1.34$) and neutral condition ($M = .27$, $SD = .66$), $F(2, 76) = 105.75$, $p < .001$, $\eta^2 = .74$. Essays written by participants in the amusing condition had significantly more word count depicting positive affect ($M = 1.14$, $SD = 1.50$) than both the sad ($M = .49$, $SD = .82$) and neutral condition ($M = .08$, $SD = .28$), $F(2, 76)$

=31.30, $p < .001$, $n^2 = .45$. Additional support that the LIWC captures momentarily experienced positive and negative emotion was provided by Kahn et al. (2007), but this time using verbally (orally) expressed language. Participants watch a scene from a sad movie about a funeral and a scene from a comedy movie. They were then asked to talk into a microphone about the emotions they experienced watching the movie. Participants in the comedy condition produced a greater number of positive emotion words ($M = 7.31$, $SD = 3.38$) than the funeral condition ($M = 2.50$, $SD = 1.87$, $F(3,58) = 32.98$, $p < .001$, $n^2 = .63$). Participants in the funeral condition produced a greater number of negative emotion words ($M = 5.10$, $SD = 3.27$) than the comedy condition ($M = 1.67$, $SD = 2.16$, $F(3,58) = 27.75$, $p < .001$, $n^2 = .59$). Participants in the funeral condition also produced a greater number of sad and depressive words ($M = 2.41$, $SD = 1.74$) than the comedy condition ($M = .10$, $SD = .25$), $F(3,58) = 27.75$, $p < .001$, $n^2 = .66$. Both studies show that the LIWC captures emotional expression in both written and orally expressed language (Kahn et al., 2007).

A related study investigated the language used in online social support groups for breast cancer (Shaw, Hawkins, McTavish, Pingree, & Gustafson, 2006). Online social support groups are usually anonymous social communities that allow people to cope with their traumatic experiences. Participants with cancer were recruited and asked to write about their cancer experiences in an online social support group. The LIWC was used to analyze the social support group text of each of the participants. Shaw et al. (2006) found that insight words reduced emotional concerns for women with breast cancer.

Dirkse, Hadjistavropoulos, Hesser, and Barak (2015) examined the language used by clients during internet delivered cognitive behavioral therapy (CBT) for generalized anxiety. Each week for twelve weeks participants completed an online module of CBT online and answered questions about their anxiety, depression, and panic using an 11-point scale ranging

from 0 (no symptoms) to 10 (extremely severe symptoms). During each module, patients communicated with a therapist online via email. The investigators found that negative words and anxiety words decreased over the twelve weeks. Causation words decreased over the twelve weeks. The use of insight words decreased over time, but the effect of time was not statistically significant. There was an increase in past tense word use over-time. The higher the percentage of negative words, anxiety words, and sadness words were associated with an increase in anxiety symptoms. The higher percentage of negative words, anger words, and sadness words were associated with an increase in depression symptoms. The higher the percentage of negative words and anger words were associated with an increase in panic symptoms. Contrary to other studies, the use of causation words, insight words, positive words, and first-person singular were not associated with changes in anxiety, depression, or panic. These computer-mediated studies support the notion that emotion can be expressed in computer-mediated communications, and the language content can predict health outcomes (e.g., anxiety, depression, panic, and distress).

The question remained whether orally expressed communication would differ from written or typed communications in the use of positive affective words, negative affect words, and cognitive words. Several studies have examined the language content of evidence-based interventions by using manual human coding of language (e.g., Motivational Interviewing). Yet, no study had compared the language content of orally expressed self-disclosure and written or typed self-disclosure, except for Llanes et al. (2019) who compared the difference in commitment language between computer-mediated and face-to-face motivational type interviews. The following 2.5-page section, taken verbatim from Llanes's 2019 masters' thesis, summarizes several key findings regarding computer mediated communications that helped guide the current study.

Computer-Mediated communications.

The onset of computer technologies led investigators to examine the advantages and disadvantages of computer-mediated (CM) and face-to-face (FTF) communications. A few studies have tested whether computer-mediated communications elicit greater self-disclosure than face-to-face communications (Joinson, 2001; a meta-analysis by Ruppel et al., 2017). In the context of clinical interviews, computer-mediated interventions are more effective in changing health behaviors compared to receiving no treatment (Carey et al., 2009), but no study compared the language of computer-mediated communication and face-to-face efficacy. Despite the increased use of computer-mediated communication, only one study has compared the language content of face-to-face motivational interviews and computer-mediated motivational interviews (Llanes et al., 2019).

Examining the differences in computer-mediated and face-to-face motivational interviews is important as the U.S. continues to advance technologically. The high prevalence of internet use and the availability of innovative media devices may change how individuals seek information, communicate, and receive treatment (Bordia, 1997; PEW Research Center, 2014). One notable change implemented in the communication medium landscape is the adoption of computer-mediated communications and computer-mediated interventions. The following 2.5 page section, taken verbatim from Llanes's 2019 masters thesis, summarizes several key findings regarding computer mediated communicaitons.

Computer-mediated communications (CMC) and face-to-face communications (FTF) are two distinct communication mediums. Computer-mediated communication (CMC) refers to the use of email, chat rooms, instant messenger, computer bulletin boards, or computer servers linking multiple computers to communicate (Baltes, Dickson, Sherman, Bauer, & LaGanke,

2002). CMC is referred to as text-based mediums because their messages are typed and are presented visually on a screen (Herring, Barab, Kling, & Gray, 2004). Computer-mediated communications are diverse. For example, some CMC use more synchronized communication mediums that require less of a delay in receiving messages (e.g., instant messenger) than asynchronous mediums (e.g., email). According to Herring et al. (2004), each type of CMC (i.e., email, chat, online discussion boards) has a social context for its use. For example, email has a more formal setting and is influenced by the delay of receiving messages. The delay in time for this CMC allows its users to edit messages before sending.

Contrary to CMC, FTF communication provides information visually and auditorily. Computer-mediated communications are often viewed as more impersonal because nonverbal cues are absent (Kiesler, Zubrow, Moses, & Geller, 1985). In FTF communication, non-verbal cues (e.g., facial expressions, voice tone, nodding) clarify if the message is understood and also reveals the social characteristics of communicators (Herring et al., 2004). These social characteristics (e.g., status, age, or gender) are concealed in CMC (Herring et al., 2004). Although CMC lack nonverbal cues compared to FTF, there is mixed evidence that CMC are more impersonal than FTF. For example, some findings suggest CMC are as interpersonal as face-to-face communications but require more time for users to become familiar with the communication medium and conversation style of the person they are communicating with (Walther, 1996; Bordia, 1997). The inconsistency in the literature is often attributed to not distinguishing between asynchronous and synchronized types of CMC and not providing users with enough time to adapt to CMC.

CMC are either asynchronous or synchronized. Asynchronous types of CMC have a delayed response (e.g., email). Synchronized CMC (e.g., online chat rooms and messengers)

closely resemble FTF communication in the ability to provide immediate responses that facilitate interpersonal interactions. For example, using more interactive forms of computer-mediated communications like instant messengers was associated with enhanced existing friendships (Valkenburg & Peter, 2007; Valkenburg & Peter, 2009). In Valkenburg and Peter's (2009) study, 794 Dutch adolescents (i.e., 10-16 years old) completed surveys assessing online communication use and experienced closeness to existing friendship. They found that 30% of adolescents thought that online communication was more effective in disclosing intimate information. The use of online communication increased the closeness of existing friendships for adolescents who reported using the internet to connect with friends via instant messenger, $r=.23$ (Valkenburg & Peter, 2009). CMC is also effective in becoming acquainted with strangers, which can facilitate the building of new relationships (Tidwell & Walther, 2002).

CMC users adapt to initially unavailable social information (e.g., age, gender, emotion expression) by actively seeking information, or by using contextual cues in the text to make social inferences (Herring et al., 2004; Tidwell & Walther, 2002; Walther, 1996). For example, Tidwell and Walther (2002) found that more direct strategies are adopted for obtaining more information about a stranger when communicating via computer. Individuals getting to know strangers via computer asked significantly more questions (18%) compared to individuals communicating face-to-face (13%). Also, individuals significantly disclosed more personal information in the CMC condition (69%) than the FTF condition (59%).

Few studies suggest the anonymity associated with CMC also results in more self-disclosure compared to FTF format (Joinson, 2001). Other studies suggest no difference in self-disclosure in FTF and CMC, and a meta-analysis describes under what conditions FTF elicits more self-disclosures (Ruppel et al., 2017). In Joinson's (2001) study, for example, transcripts

from dyads discussing a dilemma of whom to let live in the event of nuclear war were analyzed. Dyads of the same gender were randomly assigned to discuss the dilemma either face-to-face or via computer using a chat program. Joinson (2001) concluded that the mean self-disclosure within each dyad per session was significantly greater in the synchronized computer-mediated communication ($M = 3.10, SD = 2.41$) compared to face-to-face communication transcripts ($M = .70, SD = 0.82$). In the second study by Joinson (2001), dyads randomly assigned to the synchronized computer-mediated communication group self-disclosed significantly more ($M = 3.05, SD = 2.49$) than the video link communication group ($M = .63, SD = 0.92$). A meta-analysis based on 31 studies revealed mixed findings when comparing the level of self-disclosure in computer-mediated communication (CMC) and face-to-face communication (FTF) (Ruppel, 2017). When both self-report studies (getting people to report the number of times they self-disclosed in CMC and FTF communications) and experimental designs (randomly assigning people to communicate face-to-face or via computer and counting the number of times they self-disclose) are included in the analysis, face-to-face communication elicits more self-disclosure than computer-mediated communication. The correlation was relatively small but significant, $r = .21$. However, a subsequent analysis included only the experimental designs, and exclude self-report studies; there was no relationship between self-disclosure and the type of communication format, $r = .06, p > .05$. These studies demonstrate that anonymity can influence the extent of information disclosure by an individual. As noted above, the latter material was obtained from my masters' thesis (Llanes, 2019).

Emotion Expression in CMC. CMC users adapt to unavailable non-verbal cues to determine the message intent, such as the emotional state of the sender or social characteristics of the sender. Past studies have identified five message contextual cues that are used to convey

emotion in computer-mediated communication: 1) vocal spelling (e.g., “riiiiiight”), 2) lexical surrogates (e.g., “uh-huh”), 3) manipulation of grammatical markers (e.g., to indicate a pause, “...”), 4) emoticons (e.g., 😞), and 5) minus features (e.g., not using capitalization of punctuation) (Harris & Paradice, 2007). In a study by Harris and Paradice (2007), participants read two emails consisting of one positive news email (i.e., the sender of the email getting a job they applied for) that varied in the number and type of message cues present and one negative news email (i.e., the sender of the email going through a break-up with their significant other) that varied in the number and type of message cues present. Then, participants were asked to infer the emotional state of the sender using a 15-point Likert scale (-7= strongly negative, 0= neutral, +7= strongly positive). It was found that the more message cues that are available when reading a positive news emails from a sender, the higher the perceived positive emotional state of the sender ($r=.28, p<.05$). The more message cues that are available when reading a negative news email from a sender also resulted in higher perceived negative emotional state of the sender ($r=.20, p<.05$). The more available message cues used, the stronger the person reading the emails perceives the emotional state of the sender.

A study by Kato, Kato, and Akahori (2007) examined if the number of emotional cues communicated via email elicits positive emotions (e.g., interest, joy, surprise, and willingness), negative emotions (e.g. sadness, anxiety, guilt, shyness, and inward hostility), and hostile emotions (e.g. anger, disgust, and contempt). Twenty-two participants were randomly paired to discuss a topic, “juvenile crime”. The investigators assessed the emotional states experienced by participants when emails were sent (e.g., I felt interested when I composed and sent the email to my partner”) and when emails were received (e.g., “ I felt interested when I read the email from my partner”). Also measured were the expected partner’s emotional states when receiving an

email (e.g., “I expected my partner would feel interested when reading this email”) and the perceived emotional state of the partner sending emails (e.g., I perceived my partner had interest when he/she composed this email”). Response options ranged from 1= “not at all true” to five= “very true”. When the sender’s email contained few emotional cues present, the receiver experience more negative emotions and more hostile emotions than when the sender communicated with high emotional cues ($M_{Snegative}=1.66$ vs.1.13; $M_{Shostile\ emotion}=1.45$ vs.1.09). However, there was not a significant difference in positive emotions experience by receivers when the sender’s email contained few versus high emotional cues ($M_{Spositive}=2.95$ vs. 2.70). The results suggest receivers experience frustration in interpreting the emotional intent of the sender when the sender does not convey their emotional intent clearly (i.e., using plenty of cues to facilitate message intent).

Computer-Mediated (CM) Interventions. The following one page section, taken verbatim from Llanes’s 2019 masters thesis, summarizes several key findings regarding computer mediated interventions. A meta-analysis of 35 studies compared drinking behaviors of college students assigned to either a computer-delivered intervention or control condition (Carey et al., 2009). The control groups consisted of waitlists, or no treatment. The computer-delivered interventions were delivered via the internet, intranet, or CD-ROM DVD. Compared to a control condition, computer-delivered interventions with a five-week or less follow-up significantly reduced the quantity of drinks ($d=.16$), the quantity of drinks during drinking days ($d=.15$), the frequency of heavy drinking ($d=.21$), and frequency of drinking days ($d=.19$). At a long-term follow-up, greater than six weeks, the reduction was maintained in quantity ($d=.20$) and frequency of drinking days ($d=.28$).

Meta-analyses comparing other computer-delivered interventions also show similar results. Rodriguez et al. (2015) conducted a meta-analysis of six studies examining the efficacy of personalized feedback interventions in college students. College students received computer-based personalized feedback regarding their drinking behavior in a lab setting (i.e., in-person) or remotely. Remote computer-mediated interventions are described as cost-effective, flexible, anonymous, and wider-reaching interventions (Rodriguez et al., 2015). In contrast, more control of environmental distractors characterizes in-person computer-mediated interventions because a set time and location are specified. Rodriguez et al. (2015) found that in-person computer-mediated interventions were more effective at reducing the total number of alcohol drinks per week (unstandardized $\beta = -2.185$, $SE = .88$, $p = .007$) and reducing alcohol-related problems (unstandardized $\beta = -1.749$, $SE = .77$, $p = .023$) compared to remote computer-mediated interventions. There was no difference between both modalities in reducing perceived drinking norms ($p = .133$). Although remote computer-mediated interventions can be effective, these results showed that several characteristics make in-person interventions more effective.

Comparing FTF and CM Interventions

Despite the increased use of computer-mediated interventions, no study has sought to deliver motivational interviews via computer, in which a therapist conducts a motivational interview via computer in 'real-time'. Thus, the efficacy and language used in face-to-face motivational interviews have not been compared to the efficacy and language used in computer-delivered motivational interviews.

However, several studies have used computer programs to assess participants' health-related activities and to deliver individualized feedback (Butler & Correia, 2009; Carey et al., 2012; Hester, Squires, & Delaney 2005). For example, a study by Hester, Squires, and Delaney

(2005) developed a web-based brief motivational intervention called the Drinker's Check-up (DCU). The Drinker's Check-up is a web application that includes assessment of drinking risks, individualized feedback, a decisional balance exercise, menu of options to reduce drinking, change plan worksheet, and follow-up assessment. After completing the online assessment of drinking risks, the computer program provides participants with individualized feedback in a non-confrontational and empathetic approach. To test the efficacy of DCU, the participants were randomly assigned to receive DCU or a four-week delayed DCU. The DCU reduced drinking compared to a delayed condition after four weeks, $d=.21$. Such innovative computerized interventions incorporate important elements of motivational interviewing but do not entail a comparison of computer-mediated and face-to-face motivational interviews, in which both interview formats rely on live interviewers who respond to participants in real-time. Thus, it is not known if motivational interviewing administered via computer elicits different language content than face-to-face motivational interviews. The current dissertation research begins to address the latter issue.

Comparing CM-MTI and FTF-MTI

Llanes et al. (2019) were the first investigators to compare the extent of sustain talk and change talk in computer-mediated and face-to-face motivational-type interviews. Llanes et al. (2019) recruited non-marijuana users, occasional marijuana users, and frequent marijuana users to discuss their ambivalence regarding their marijuana use status. One-hundred and fifty young adults from a large urban university were randomly assigned to receive either a computer-mediated motivational-type interview (CM-MTI) or a face-to-face motivational-type interview (FTF-MTI). A two-month follow-up survey assessed their past two-month marijuana use. Transcripts were scored for sustain talk and behavior change talk using Amrhein's (2003) coding

system. Word count and the number of language units were significantly higher for FTF-MTI than CM-MTI. FTF-MTI took significantly less time to administer than CM-MTI. FTF-MTI and CM-MTI did not differ significantly in the proportion of sustain talk and change talk within the CM-MTI and FTF-MTI, nor did the interviews differ in the mean strength of sustain talk and change talk. Although this is the first study to compare FTF-MTI and CM-MTI, it did not investigate other types of language usage across computer-mediated and face-to-face motivational interviews. For example, the language used in interviews can be classified as affect-related language (i.e., positive or negative) and drug-related language (Tausczik, & Pennebaker, 2010). The drug-related content and affect-related content may differ in computer-mediated and face-to-face motivational interviews, may reveal whether a person uses the drug or not, and may be more or less predictive of future behavior in FTF-MIs than a CM-MIs. The current study addresses these questions directly.

Current Study

The current study compared the language content of computer-mediated motivational-type interviews and face-to-face motivational-type interviews among young adults who were ambivalent about their level of marijuana use. As noted earlier, the motivational-type interviews that were conducted in the current study employed the traditional MI conversational style of expressing empathy, respecting a participant's autonomy, and exploring the participant's perceived benefits and costs of using marijuana recreationally. Notably, standard motivational interviewing is direction-oriented and the therapist intentionally guides a client towards making a targeted behavioral change, such as decreasing their drug use (Rollnick & Miller, 2002). The motivational-type interviews that were conducted in the current study, however, *did not* subtly guide participants away from recreational marijuana use; nor did the MI-type interviews subtly

guide participants towards increased recreational marijuana use. Instead, the interviewer adopted a neutral role, helping participants explore their ambivalence about increasing or decreasing their recreational marijuana use without favoring either behavioral outcome. Thus, the direction-oriented component of MI was intentionally omitted from motivational-type interviews conducted in the current study. Stated differently, our motivational-type interview did not emphasize the discrepancy between a participant's potential increased recreational use of marijuana and their goals. Deciding to omit the direction-oriented component of motivational interviewing was guided by a single consideration: the national trend towards legalizing recreational marijuana use. The trend toward legalization may have prompted some 'non-marijuana users' to consider using the drug if recreational marijuana use was legalized in their state. Similarly, the trend towards legalization may have prompted some 'occasional marijuana users' to consider increasing their marijuana use if recreational use was legalized in their state. For this reason, we omitted the directional component of MI and let participants freely explore their own ambivalence regarding their level of marijuana use.

Non-marijuana users, occasional marijuana users, and frequent marijuana users were recruited to discuss their ambivalence regarding their marijuana use. Participants were randomly assigned to receive either a computer-mediated motivational-type interview (CM-MTI) or a face-to-face motivational-type interview (FTF-MTI). A two-month follow-up survey assessed their marijuana use during the two-month period following the interview. The current study used a standard motivational interviewing prompt to encourage participants to explore both the benefits and consequences of smoking marijuana; perceived self-efficacy of quitting, reducing, or maintaining use or non-use, and individuals' behavioral intentions in non-user, occasional users, and frequent users who are ambivalent about changing their marijuana use status. The study is

the first to compare a face-to-face motivational-type interview with computer-mediated motivational-type interviews using the LIWC, as a tool for analyzing language differences elicited by the two interview formats.

The first hypothesis and second hypothesis were exploratory, but were guided by the Ruppel (2017) meta-analysis on self-disclosure. Hypotheses three to five were guided by findings from the LIWC literature that suggest emotionally processing and cognitive processing (i.e., trying to understand personal experience) of personal experiences increases positive health outcomes. Specifically, moderate levels of negative affect, high levels of positive affect, and high levels of insight are associated with a significant increase in positive health outcomes.

Hypothesis 1: The use of positive affect words (e.g. “love,” “nice,” “happy”), negative affect words (e.g. “hurt,” “ugly,” “sad”), insight-related words (e.g., “realized,” “understand”) will be higher in the FTF-MTI compared to the CM-MTI.

Hypothesis 2: The use of optimism-related words (e.g. “hope,” “optimistic,” “determined”), causal words (e.g. “why,” “because”), leisure (e.g., “relax”) social words (e.g., “family,” “friends,” “co-workers”), biological words (e.g., “sex,” “health,” “ingestion”), and pronouns will be higher in the FTF-MTI compared to the CM-MTI.

Hypothesis 3: The greater the number of insight-related words, the lower marijuana use at the two-month follow-up.

Hypothesis 4: The lower the number of negative affect-related words, the lower marijuana use at the two-month follow-up.

Hypothesis 5: The greater the number of positive affect-related words, the lower marijuana use at the two-month follow-up.

Method

Participants

Llanes (2019) previously described the participants who were recruited into the present study and the measures and materials administered. The following description is largely extracted verbatim from Llanes (2019). One hundred and fifty young adults (52.7% males) were recruited from a large urban university. Recruitment flyers were distributed across several venues on campus, including the campus library, the campus Student Health Center, and the campus bus stop. The ages ranged from 18-29 years old ($M=21.3$, $SD=2.73$). Reflecting the demographics of the University of Texas at El Paso, 83.3% of students were Hispanic, 5.3% non-Hispanic White, 5.3% African-American, 0.7% other, and 5.3% mixed (i.e., two or more ethnicities selected). Sixteen percent of participants were freshman, 26% sophomores, 26% juniors, 30% seniors, and 2% not sure.

Three types of participants were eligible to participate: *non-marijuana users*, *occasional marijuana users*, and *frequent marijuana users*. The *non-marijuana user* ($n=47$) was defined as a person who had no history of marijuana use. The *occasional marijuana user* ($n=47$) was defined as a person who used marijuana less than 24 times in the past year and one to five times in the last two months. The *frequent marijuana user* ($n=50$) was defined as a person who used marijuana more than seven times during the past two months, and greater than 24 times in the past year. Six marijuana users reported not using marijuana in the year preceding the study. The latter participants were classified as *lapsed marijuana users*. Eligible participants also had to express ambivalence about their level of marijuana use, as determined by responses to the ambivalence questionnaire (see page 34). Participants were compensated \$20 for the first assessment and \$30 for a two-month follow-up assessment.

Power Analyses

A post hoc power analysis was conducted using G-Power 3.1 to determine the probability of detecting a population effect size of a change in r^2 , $\Delta R^2 = .18$ (obtained from the Collins, Carey, & Smyth, 2005 study) using multiple linear regression. Alpha was set to 0.05, the total sample size was set to $N=150$, and the number of predictors in the model was set to six (baseline marijuana use, a dummy coded variable comparing CM-MTI and FTF-MTI, and the percent of positive affect words, negative affect words, insight words, pronouns). Given the specified level of making a type 1 error at $\alpha = 0.05$, there is a 98.80% chance of detecting a change in r^2 of .18 if the effect exists in the population.

Design

A between subjects (FTF-MTI versus CM-MTI) repeated measures design was used. Participants were randomly assigned to receive either the face-to-face motivational-type interview ($n=75$) or a computer-mediated motivational-type interview ($n=75$). However, 78 face-to-face motivational-type interviews were conducted, and 72 computer-mediated motivational-type were conducted. Three interviews that were originally assigned to the computer-mediated condition were conducted in the face-to-face format due to computer software issues (i.e., the interviewer's prompt would not appear on the participant's screen). Each participant's marijuana use was assessed at a two-month follow-up.

Measures and Materials

Self-generated ID Number Questionnaire (see Appendix B). Participants completed a short 7-item survey assessing their favorite color, favorite type of car, and related personal information. Each response was assigned a numeric value, which was used to generate a confidential 7-digit ID number. The survey was completed during the eligibility, baseline, and two-month follow-up

assessment. The 7-digit ID number was used to match surveys completed by each participant at baseline and two-month follow-up. Sample item: *What was your favorite subject in high school?*

Eligibility Assessment (see Appendix C).

Demographic Questionnaire. A two-item measure assessed age and gender. Young adults between the ages 18-29 were eligible to participate in the study.

Drug use Questionnaire (Adapted from Monitoring the Future, 2014). An 8-item measure assessed lifetime drug use (i.e., alcohol, cigarettes, and marijuana use), past year marijuana use, and past two-months marijuana. Response options for lifetime use were 1= “Yes” and 0= “No.” Response options for the past year and past two months ranged from “0 times” to “more than 50 times.” Sample item: *During the past two months, approximately how many times (if any) have you smoked or consumed marijuana?*

Ambivalence Questionnaire. A 9-item measure assessed each participant’s ambivalence toward changing marijuana use during the past year. Sample item: *During the **past year** I’ve had **mixed emotions** about my level of marijuana use or non-use.”* The ambivalence items were developed by the Cohn lab and consists of 7 Likert-type items with response scales ranging from 0 = “not at all” to 10= “a lot.” Young adults were eligible to participate in the study if ratings in 2 out of the 9 items were at least five or higher.

Baseline Assessment (see Appendix D-J).

Demographics questionnaire. A 6-item measure assessed age, gender, ethnicity, and language proficiency (see Appendix D). The questionnaire was completed anonymously and did not including any identifying information.

Drug use questionnaire (Adapted from Monitoring the Future, 2014). A 10-item measure

assessed lifetime drug use (i.e., alcohol, cigarettes, and marijuana use), past year marijuana use, and past two-months marijuana. Response options for lifetime marijuana use were 1= “Yes” and 0= “No.” Response options for the past year and past two months ranged from “0 times” to “more than 50 times” (see Appendix E). *Sample item:* During the past two months, approximately how many times (if any) have you smoked or consumed marijuana?

Brief Motivational-Type Interviews (see Appendix I).

Training Interviewers in Motivational Interviewing. Three doctoral students (two females and one male) trained in motivational interviewing conducted the interviews. Doctoral students attended a two-day MI workshop on May 9, 2013, and May 10, 2013. The workshop was delivered by Dr. Bob Phillips. Dr. Phillips is a member of the Association for Addiction Professionals and the Motivational Interviewing Network of Trainers (MINT). Interviewers also watched the Professional Training DVD Series developed by Miller and Rollnick and directed by Theresa Moyer (Center on Alcoholism, Substance Abuse, and Addictions, 1998). The DVDs provided six hours of motivational interviewing training on developing motivational interviewing skills. Interviewers also watched four additional sets of DVDs by an expert practicing motivational interviewing (Cole, 2014). After watching the videos and attending MI workshops, senior trainee (Llanes) observed the junior trainees during six role-playing sessions and provided the trainees with feedback on their MI skills. The MI trainee role-played as “*the interviewer*,” and a research assistant role played “*the marijuana user or non-user*”.

Face-To-Face Motivational-Type Interviews (FTF-MTIs): There were 78 recorded motivational-type interviews conducted in a private lab space. The interviewers were guided by a 4-page single spaced script developed for the study. The script was

based on the guiding principles of motivational interviews developed by Miller and Rollnick (1991). The same humanistic conversation style of expressing empathy by engaging in reflective listening, respecting the autonomy of the person, and exploring the benefits and costs of using marijuana use was adapted. The script consisted of an equal number of open-ended questions addressing the benefits and costs of using marijuana. However, the motivational-type interviews were not intended as a clinical intervention and thus did not seek to reduce marijuana use among college students in the study who identified as non-users, occasional users, or ‘regular’ users of marijuana. Instead, the interviewer adopted a neutral role, helping participants explore their ambivalence about increasing or decreasing their recreational marijuana use without favoring either behavioral outcome. That is, the interviewer did not reinforce change talk more than sustain talk.

The face-to-face interviews were audio recorded, transcribed, and proofread. Trained research assistants transcribed words verbatim. In addition, utterances (e.g., um, uh) and nonverbal sounds (e.g., laughter, crying) were also indicated in the transcript. In addition, long pauses between statements were also indicated in the transcript. The transcript of the interview was only identified by the self-generated ID number. Identifying information that participants provided accidentally during the course of the interview was deleted (e.g., the name of their high school). In addition, the transcripts were read by research assistants to identify errors not identified by Microsoft Word’s Spellcheck (e.g., adding “d” to word “coul” to correctly spell the word “could”). Lastly, material was removed from the transcript when it revealed the type of interview that was conducted (e.g., filler words like um, ah, uh; beginning/end prompts; and bracket material

conveying emotion, change of tone, crosstalk). These modified files were used to compare the emotional content and language content of computer-mediated and face-to-face motivational interviewing.

Computer-Mediated Motivational-Type Interviews (CM-MTIs): There were 72 computer-mediated interviews. The computer-mediated interviews were conducted using the identical script used for the face-to-face motivational-type interviews (see Appendix D). However, participants in the computer-mediated interviews only interacted with the interviewer via computer. Participants were greeted by a research assistant who asked the participant to complete the paper surveys. After all surveys were completed, the research assistant told the participant that another interviewer would communicate with them via computer located in another room. The participants and interviewer did not see each other to ensure anonymity of both the student and the interviewer. The research assistant showed the participant how to use the LAN Instant Messenger (version 1.2.35), which is a free instant messaging software that was used to conduct the 72 computer-mediated interviews. The participant was reassured in the informed consent and again during the interview that the computer interviews could not be linked to any participant.

Interviews that were completed via computer automatically produced a transcript of the interview. Here, too, the transcript of the interview was only identified by the self-generated ID number. A doctoral student (Llanes) changed the font and text to be equivalent to the FTF-MTI transcripts. Three undergraduate and post-baccalaureate research assistants and one doctoral student (Llanes) proofread the files for accuracy by using Microsoft Word's Spellcheck and Track changes to document the changes made. In addition, proofreaders read each computer transcript to identify errors not identified by

Microsoft Word's Spellcheck. Transcripts were read again to remove material that revealed the transcripts were computer-mediated MIs (e.g., time stamps, beginning and end prompts). These files were used for Llanes (2019) thesis, therefore emojis were removed. The emojis were reinserted in the computer-mediated motivational type interviews. These modified files were used to compare the use of emotion words and other language content of computer-mediated and face-to face motivational type interviews.

LIWC categories.

The LIWC calculates the percentage of words that are assigned to 90 different language categories. The current study focused on the percent of positive affect, negative affect, insight, causal, optimism, pronouns, leisure, biological, and social words. A description is provided for the main linguistic categories of interest.

Positive affect words: The positive affect linguistic category includes words that reflect the expression of positive feelings and positivity. There are 328 words in the positive affect linguistic category. Sample word items: "love," "nice," "happy," "joy"

Negative affect words: The negative affect linguistic category includes words that reflect the expression of negative feelings and negativity. There are 541 words in the negative affect linguistic category. Sample word items: "hurt," "ugly," "sad"

Insight words: The insight linguistic category includes words that reflect the cognitive processes of self-reflection and understanding of personal experiences. There are 116 words in the insight linguistic category. Sample word items: "realize," "see," "understand"

Two-Month Follow-Up Assessment.

Marijuana Use Questionnaire (Adapted from Monitoring the Future, 2014). A 10-item

questionnaire assessed lifetime and past two months' marijuana use. Response options for lifetime marijuana use were 1= "Yes" and 0= "No." The response options for the past two months ranged from 0= "0 times" to 50= "more than 50 times" (see Appendix K). Sample item: *"During the past two months, approximately how many times (if any) have you smoked or consumed marijuana?"*

Procedure

Eligibility Assessment. Participants initially completed the self-generated ID number questionnaire, followed by completion of the drug use questionnaire, and the ambivalence questionnaire. The latter two questionnaires were used to determine if the respondent was eligible to participate in the study.

Baseline Assessment. If eligible, participants again completed the self-generated ID number questionnaire, as well as the demographic questionnaire, and then the drug use questionnaire. Participants also completed several questions regarding their history of driving after using small amounts of marijuana and alcohol during the same two hours window. These questions were part of a larger study conducted by Amastae, Cohn, and Llanes, and will not be reported here (see Appendix J). After completing the drug use questionnaire, participants were randomly assigned to receive either a face-to-face motivational-type interviews or a computer-mediated motivational-type interviews.

Two-Month Follow-Up Assessment. At two-month follow-up, participants completed the self-generated ID number questionnaire and marijuana use questionnaire.

Results

The Relationship Between Marijuana Use and the Percent of Words Per

Category/Dictionary

Pearson's correlation coefficients were computed to assess the relationship between frequency of marijuana use at the two-month follow-up and the percent of words used for each of the language categories/dictionaries (see Table 2). Frequency of marijuana use at the two-month follow-up was not significantly associated with positive affect, negative affect, insight, and first-person pronoun I ($r=.10$; $r=.03$, $r=.12$, $r=.01$, $p>.05$ respectively). Causal words, leisure words, social words, and she/he words ($r=-.11$) were not significantly associated with frequency of marijuana use at the two-month follow-up. Frequency of marijuana use at the two-month follow-up was positively associated with the percent of we words ($r=.23$), you words ($r=.19$), biological processes words ($r=.45$), and optimism words ($r=.25$), $p<.05$. Frequency of marijuana use at the two-month follow-up was negatively associated with they words ($r=-.26$), $p<.05$.

Comparing CM-MTIs and FTF-MTIs

The computer-mediated motivational type interviews (CM-MTIs) and face-to-face motivational-type interviews (FTF-MTIs) were compared on the percent of words in the positive affect, negative affect, insight, first-person pronoun I categories/dictionaries (see Table 3). On average, CM-MTIs had a higher percent of positive emotion words ($M=3.79$, $SD=1.44$) than FTF-MTIs ($M=3.16$, $SD=0.83$), $t(144)=-3.26$, $p<.01$, $d=-.54$. CM-MTIs also had a higher percent of negative emotion words ($M=1.90$, $SD=0.92$) than FTF-MTIs ($M=1.58$, $SD=0.65$), $t(144)=-2.44$, $p=.016$, $d=-.40$. FTF-MTIs had a higher percent of insight words ($M=4.42$, $SD=1.65$) than CM-MTIs ($M=3.34$, $SD=1.20$), $t(144)=4.46$, $p<0.01$, $d=.74$. FTF-MTIs and

CM-MTIs did not differ statistically in the percent of first-person pronoun “I” words ($M_{FTF} = 9.34$, $SD = 2.24$; $M_{CM} = 8.95$, $SD = 2.12$), $t(143) = 1.06$, $p = .289$, $d = .18$.

The computer-mediated and the face-to-face interview formats were compared in other exploratory linguistic categories/dictionaries (i.e., we, you, she/he, they, cause, biological processes, leisure, social and optimism). On average, CM-MTIs had a higher percent of causal words, and leisure words than FTF-MTIs (see Table 2). On average, FTF-MTIs had a higher percent of we, you, she/he, and social words than CM-MTIs (see Table 2).

Predicting Frequency of Marijuana Use at Two Month Follow-Up from the Linguistic Dictionaries/Categories

Contrary to what was hypothesized, correlational analyses revealed frequency of marijuana use at the two-month follow-up was not significantly associated with positive affect, negative affect, insight, and first-person pronoun “I”. Moderation analysis was used to test if the relationship between frequency of marijuana use at the two-month follow-up and percent of positive words, negative words, insight, and first-person pronoun “I” depends on the type of motivational interviews (i.e., FTF-MTIs and CM-MTIs). The predictors were entered in four steps using the following order: Step 1) baseline frequency of marijuana use, $R^2 = .76$, $p < .001$; Step 2) condition comparison variable (CM-MTI versus FTF-MTI), $\Delta R^2 = 0.00004$, $p = .896$; and Step 3) the percent of words for each of the language categories (i.e., positive affect, negative affect, insight, first person pronoun I), $\Delta R^2 = .007$, $p = .533$; Step 4) the interactions between positive affect and condition comparison variable, negative affect and condition comparison variable, first person pronoun “I” and condition comparison, and insight and condition comparison variable, $\Delta R^2 = .011$, $p = .304$.

After controlling for other predictors in the model (step 4), baseline marijuana use predicted frequency of marijuana use at the two-month follow-up. The higher the marijuana use at baseline, the higher marijuana use at follow-up, $\beta = .86, p < .001$. The type of motivational interviewing did not differ in the frequency of marijuana use at the two-month follow-up, $\beta = -.01, p = .884$. The percent of positive words, negative words, insight, and first-person pronoun did not predict frequency of marijuana use at the two-month follow-up, $ps > .05$ (See Table 5). All interactions were not statistically significant, $ps > .05$ (See Table 5).

Predicting Frequency of Marijuana Use at Two Month Follow-Up From Other Exploratory Linguistic Dictionaries/Categories

A second linear hierarchical regression analysis was used to investigate if the other language categories (i.e., pronouns, causal words, social words, biological words, leisure words and optimism words) predict marijuana use at the two-month follow-up. The predictors were entered into three steps using the following order: Step 1) baseline marijuana use, $R^2 = .76, p < .001$; Step 2) condition comparison variable (CM-MTI versus FTF-MTI), $\Delta R^2 = .00004, p = .896$; and Step 3) the percent of words for each of the language categories (i.e., pronouns, causal words, optimism words, leisure words, biological words, and social words), $\Delta R^2 = .05, p = .004$.

After controlling for other predictors in the model (step 3), baseline marijuana use predicted frequency of marijuana use at the two-month follow-up. The higher the marijuana use at baseline, the higher marijuana use at follow-up, $\beta = .79, p < .001$. There was no difference in the frequency of marijuana use at the two-month follow-up between face-to-face motivational type interviews and computer-mediated motivational type interviews, $\beta = .01, p = .849$. The greater use of we words, you words, biological processes, and optimism words predicted greater frequency

of marijuana use at the two-month follow-up ($\beta = .11$, $\beta = .16$, $\beta = .12$, $\beta = .13$, $p < .05$ respectively). The percent of they words, causal words, social words, and leisure words did not predict frequency of marijuana use at the two month follow-up, $p > .05$ (See Table 5).

Discussion

Communicating via computer is becoming more widespread, especially in clinical interventions. Despite the increased use of computer-mediated interventions, computer-delivered motivational interviews, in which a therapist provides MI via computer, has not been compared to face-to-face motivational interviews. Therefore, it is unknown if computer-mediated MIs elicit the same level of affect as face-to-face MIs. It is also unknown if computer-mediated MIs elicit the same level of behavioral change as face-to-face MIs. Text analysis software, like the Pennebaker's Linguistic Inquiry and Word Count (LIWC) program, allows researchers to count the number of words in each transcript that can be assigned to broad categories of words, such as 'affect' related words, nouns, pronouns, and adjectives. The current study used the LIWC to compare the language content of computer-mediated motivational-type interviews with face-to-face motivational-type interviews. This study also investigated if frequency of marijuana use at a two-month follow-up can be predicted from language used in computer-mediated versus face-to-face motivational type interviews.

The findings in the current study suggest individuals can convey emotion when communicating via computer. That is, face-to-face MTIs elicited less positive affect and negative affect words than computer-mediated MTIs. Face-to-face MTIs had similar first-person pronoun words than do CM-MTIs. Face-to-face MTIs also elicited more insight related words, we, you, she/he, and social words. FTF-MTIs elicited fewer causal words, and leisure words than CM-MTIs. There are several competing theories regarding the level of affect elicited in computer-mediated communication versus face-to-face communication. Earlier research suggested that CMC lacks social cues present in FTF, therefore, FTF is the richer medium in conveying emotional and social information (Kiesler, Zubrow, Moses, & Geller, 1985; Ruppel,

2017). Other researchers posit that individuals need time to adapt to initially unavailable cues or use other strategies to convey emotional and social information via computer (Walters, 1996; Joinson, 2001). The second theory is consistent with the current findings. Individuals may use more linguistic strategies to convey emotion (e.g., directly type how they are feeling or use emojis). It is important to note that the proxy for conveying positive affect and negative affect is based only on the number of positive affect and negative affect words elicited from the interviews. The LIWC counts the number of words per linguistic category, but it does not capture the context or sarcasm used by the participants. The current study did not code for changes in tone or laughter in the face-to-face motivational interviews, which may underrepresent the level of affect conveyed in the face-to-face MTIs.

Language plays an important role in predicting health outcomes. In the expressive writing studies, individuals benefited from writing about their deepest thoughts when more positive emotion words, fewer negative emotion words, and more insight words were used (Pennebaker & Francis, 1996; Pennebaker, Mayne, & Francis, 1997; Tausczik, & Pennebaker, 2010). According to these studies, coping with personal experience requires emotional processing and trying to make sense of the experience. The use of positive emotion words, negative emotion words, insight, and first-person pronoun did not predict future marijuana use. The results are inconsistent with the few studies that have used the LIWC linguistic categories to predict drug use and general health outcomes. Other studies found that the increase use of first-person pronoun I and second person you had the worst health outcome. Particularly, the first-person pronoun I can serve as a linguistic marker for depression (Rude, Gortner, & Pennebaker, 2004), which results in worse health outcomes. Individuals have worse outcomes when using the first-person pronoun “I” because it reflects a self-reference attention, that is drawing attention inward.

Motivational interviewing encourages the use of commitment language, which means the context of the word I might differ in motivational interviewing studies. Individuals can make commitment statements towards marijuana use and commitment statements against marijuana use. Both of these types of commitment statements makes it unclear if more “I” words would be associated with more marijuana use or less marijuana use. This study found no association between marijuana use and first-person pronoun I. The higher use of “you” words was associated with more marijuana use, which is consistent with one study (Collins, Carey, & Smyth, 2005). The use of biological processes and optimism did predict marijuana use at the two-month follow-up. This analysis was exploratory, but more experienced marijuana users could describe their experiences using more biological processes (e.g., eat, ingest, health) and using more optimistic words toward using marijuana.

Strengths, Limitations, and Future Directions

The current study had several strengths. First, this is one of only two studies that have compared the language content of computer-mediated motivational type interviews (CM-MTI) and face-to-face motivational type interviews (FTF-MTI), both of these studies made use of the same sample (Llanes, 2019). Second, participants were randomly assigned to face-to-face and computer-mediated MTIs, increasing the internal validity of the research design. Third, an identical script was used to guide face-to-face motivational type interviews and computer-mediated motivational type interviews. Fourth, audio recordings of face-to-face MTIs were transcribed, proofread, and corrected when needed, thereby increasing the internal validity of the research design. Fifth, the current study assessed marijuana use at baseline and a two-month follow-up, permitting the researchers to investigate language predictors of marijuana use.

The current study had several limitations. First, the use of a college sample could limit the generalizability of findings. Second, the motivational type interviews used in the current study did not seek to discourage marijuana use; that is these motivational type interviews were not designed to be an intervention. This subtle change in MI dynamics could have influenced the language produced by participants. Third, the interviewers in the current study received training and feedback regarding their MI skills, but the interviewers were not clinicians and had no prior experience conducting MI. It is possible that more skilled motivational interviewers could have elicited different language usage during computer-mediated and face-to-face motivational interviews. Fourth, emojis (e.g., happy face, sad face) in computer-mediated motivational type interviews were coded as expressions of a positive affect ‘word’ or a negative affect ‘word,’ but facial or vocal expressions of happiness and sadness (e.g., smile,, laughter) in face-to-face motivational type interviews were not coded. This omission might underrepresent the use of positive emotion words and negative emotion words in face-to-face motivational type interviews. Lastly, the study sought to predict marijuana use at Time 2 based on global word usage at Time 1. For example, we assessed if the use of positive affect words within the entire protocol predicted marijuana use at two-month follow-up. However, an alternative approach would entail calculating the percent of words used in response to relevant questions regarding marijuana use (e.g., “What do you like about using marijuana”). That is, the current study did not look at language usage within contexts or in response to particular questions.

The current study suggests several avenues for future research. First, and most importantly, the current findings need to be replicated. Second, future studies might benefit from including more diverse population. For example, the current study did not include participants that were heavy marijuana users. Yet, such participants may respond differently than non-heavy

drug users when completing interviews in a computer mediated versus face-to-face format. Will language usage differ in such formats, and will it better predict drug use in heavy drug users? Third, future studies might benefit from using experienced motivational interviewers who intentionally seek to guide behavior away from health-threatening behaviors. Fourth, future studies would benefit from a longitudinal design with longer follow-up assessments periods. Lastly, as noted above, the current study sought to predict marijuana use at Time 2 based on global word usage at Time 1; for example, we assessed if the use of positive affect words within the entire protocol predicted marijuana use at the two month follow-up. However, future research could calculate the percent of words used in response to relevant questions regarding marijuana use (e.g., “What do you like about using marijuana”). That is, the current study did not look at language usage within a particular context or in response to particular questions. Future should address the latter issues, which may help to identify language predictors of subsequent marijuana use or other health related behaviors.

References

- Agostinelli, G., Brown, J. M., & Miller, W. R. (1995). Effects of normative feedback on consumption among heavy drinking college students. *Journal of Drug Education, 25*(1), 31-40.
- Aharonovich, E., Amrhein, P. C., Bisaga, A., Nunes, E. V., & Hasin, D. S. (2008). Cognition, commitment language, and behavioral change among cocaine-dependent patients. *Psychology of Addictive Behaviors, 22*(4), 557.
- Alexander-Emery, S., Cohen, L. M., & Prenskey, E. H. (2005). Linguistic analysis of college aged smokers and never smokers. *Journal of Psychopathology and Behavioral Assessment, 27*(1), 11-16.
- Amrhein, P. C., Miller, W. R., Yahne, C. E., Palmer, M., & Fulcher, L. (2003). Client commitment language during motivational interviewing predicts drug use outcomes. *Journal of Consulting and Clinical Psychology, 71*(5), 862.
- Baltes, B. B., Dickson, M. W., Sherman, M. P., Bauer, C. C., & LaGanke, J. S. (2002). Computer-mediated communication and group decision making: A meta-analysis. *Organizational Behavior and Human Decision Processes, 87*(1), 156-179.
- Baer, J. S., Beadnell, B., Garrett, S. B., Hartzler, B., Wells, E. A., & Peterson, P. L. (2008). Adolescent change language within a brief motivational intervention and substance use outcomes. *Psychology of Addictive Behaviors, 22*(4), 570.
- Bordia, P. (1997). Face-to-face versus computer-mediated communication: A synthesis of the experimental literature. *The Journal of Business Communication (1973), 34*(1), 99-118.
- Burke, B. L., Arkowitz, H., & Menchola, M. (2003). *The Efficacy of Motivational Interviewing: A Meta-Analysis of Controlled Clinical Trials.*

- Butler, L. H., & Correia, C. J. (2009). Brief alcohol intervention with college student drinkers: Face-to-face versus computerized feedback. *Psychology of Addictive Behaviors, 23*(1), 163–167. <https://doi-org.lib.utep.edu/10.1037/a0014892>
- Carey, K. B., Scott-Sheldon, L. A., Elliott, J. C., Bolles, J. R., & Carey, M. P. (2009). Computer-delivered interventions to reduce college student drinking: A meta-analysis. *Addiction, 104*(11), 1807-1819.
- Carey, K. B., Scott-Sheldon, L. A., Elliott, J. C., Garey, L., & Carey, M. P. (2012). Face-to-face versus computer-delivered alcohol interventions for college drinkers: A meta-analytic review, 1998 to 2010. *Clinical Psychology Review, 32*(8), 690–703.
<https://doi.org/10.1016/j.cpr.2012.08.001>
- Carpenter, K. M., Amrhein, P. C., Bold, K. W., Mishlen, K., Levin, F. R., Raby, W. N., . . . Nunes, E. V. (2016). Derived relations moderate the association between changes in the strength of commitment language and cocaine treatment response. *Experimental and Clinical Psychopharmacology, 24*(2), 77.
- Collins, S. E., Carey, K. B., & Smyth, J. (2005). Relationships of linguistic and motivation variables with drinking outcomes following two mailed brief interventions. *Journal of Studies on Alcohol, 66*(4), 526-535.
- Dirkse, D., Hadjistavropoulos, H. D., Hesser, H., & Barak, A. (2015). Linguistic analysis of communication in therapist-assisted internet-delivered cognitive behavior therapy for generalized anxiety disorder. *Cognitive Behaviour Therapy, 44*(1), 21-32.
- Gaume, J., Gmel, G., Faouzi, M., & Daeppen, J. (2008). Counsellor behaviours and patient language during brief motivational interventions: A sequential analysis of speech. *Addiction, 103*(11), 1793-1800.

- Harris, R. B., & Paradice, D. (2007). An investigation of the computer-mediated communication of emotions. *Journal of Applied Sciences Research*, 3(12), 2081-2090.
- Hayes, A. F. (2015). An index and test of linear moderated mediation. *Multivariate Behavioral Research*, 50(1), 1-22.
- Herring, S. C., Barab, S., Kling, R., & Gray, J. (2004). An approach to researching online behavior. *Designing for Virtual Communities in the Service of Learning*, 338
- Hester, R. K., Squires, D. D., & Delaney, H. D. (2005). The Drinker's check-up: 12-month outcomes of a controlled clinical trial of a stand-alone software program for problem drinkers. *Journal of Substance Abuse Treatment*, 28(2), 159-169.
- Johnston, L. D., O'Malley, P. M., Bachman, J. G., Schulenberg, J. E., & Miech, R. A. (2016). Monitoring the future national survey results on drug use, 1975-2015: Volume II, college students and adults ages 19-55. Retrieved from https://deepblue.lib.umich.edu/bitstream/handle/2027.42/137906/mtfvol2_2015.pdf?sequence=1&isAllowed=y
- Joinson, A. N. (2001). Self-disclosure in computer-mediated communication: The role of self-awareness and visual anonymity. *European Journal of Social Psychology*, 31(2), 177-192.
- Kahn, J. H., Tobin, R. M., Massey, A. E., & Anderson, J. A. (2007). Measuring emotional expression with the Linguistic Inquiry and Word Count. *The American journal of psychology*, 263-286.
- Kahn, J. H., Tobin, R. M., Massey, A. E., & Anderson, J. A. (2007). Measuring emotional expression with the Linguistic Inquiry and Word Count. *The American Journal of Psychology*, 263-286.
- Kiesler, S., Zubrow, D., Moses, A. M., & Geller, V. (1985). Affect in computer-mediated

- communication: An experiment in synchronous terminal-to-terminal discussion. *Human-Computer Interaction*, 1(1), 77-104.
- Kato, Y., Kato, S., & Akahori, K. (2007). Effects of emotional cues transmitted in e-mail communication on the emotions experienced by senders and receivers. *Computers in Human Behavior*, 23(4), 1894-1905.
- Llanes, K. D. (2019). *The language content of computer-mediated versus face-to-face motivational type interviews* (Order No. 22617086). Available from Dissertations & Theses @ University of Texas - El Paso; ProQuest Dissertations & Theses Global. (2315224137). Retrieved from <http://lib.utep.edu/?url=/docview/2315224137?accountid=7121>
- Lundahl, B. W., Kunz, C., Brownell, C., Tollefson, D., & Burke, B. L. (2010). A meta-analysis of motivational interviewing: Twenty-five years of empirical studies. *Research on Social Work Practice*, 20(2), 137-160.
- Magill, M., Gaume, J., Apodaca, T. R., Walthers, J., Mastroleo, N. R., Borsari, B., & Longabaugh, R. (2014). The technical hypothesis of motivational interviewing: A meta-analysis of MI's key causal model. *Journal of Consulting and Clinical Psychology*, 82(6), 973-983. doi:10.1037/a0036833
- Markus, M. L. (1987). Toward a "critical mass" theory of interactive media: Universal access, interdependence and diffusion. *Communication Research*, 14(5), 491-511.
- Miller, W., & Rollnick, S. (2002). *Motivational interviewing: Preparing people for change*. New York: Guilford.

- Moyers, T. B., Martin, T., Christopher, P. J., Houck, J. M., Tonigan, J. S., & Amrhein, P. C. (2007). Client language as a mediator of motivational interviewing efficacy: Where is the evidence? *Alcoholism: Clinical and Experimental Research*, 31, 40-47.
- National Institute of Drug Abuse (2017). *As some states implement new marijuana laws, science should guide public health policy*. Retrieved from <https://www.drugabuse.gov/about-nida/noras-blog/2016/12/some-states-implement-new-marijuana-laws-science-should-guide-public-health-policy>
- National Conference of State Legislatures (2019). *Marijuana Overview*. Retrieved from <http://www.ncsl.org/research/civil-and-criminal-justice/marijuana-overview.aspx>
- Pennebaker, J. W., & Beall, S. K. (1986). Confronting a traumatic event: toward an understanding of inhibition and disease. *Journal of Abnormal Psychology*, 95(3), 274.
- Pennebaker, J. W., Boyd, R. L., Jordan, K., & Blackburn, K. (2015). *The development and psychometric properties of LIWC2015*. Retrieved from <https://repositories.lib.utexas.edu/handle/2152/31333>
- Pennebaker, J. W., & Chung, C. K. (2011). Expressive writing: Connections to physical and mental health. *Oxford Handbook of Health Psychology*, 417-437.
- Pennebaker, J. W., & Francis, M. E. (1996). Cognitive, emotional, and language processes in disclosure. *Cognition & Emotion*, 10(6), 601-626.
- Pennebaker, J. W., Mayne, T. J., & Francis, M. E. (1997). Linguistic predictors of adaptive bereavement. *Journal of Personality and Social Psychology*, 72(4), 863.
- Pew Research Center (2014). *Part 1: How the internet has woven itself into American life*. Retrieved from <http://www.pewinternet.org/2014/02/27/part-1-how-the-internet-has-woven-itself-into-american-life/>

- Rodriguez, L. M., Neighbors, C., Rinker, D. V., Lewis, M. A., Lazorwitz, B., Gonzales, R. G., & Larimer, M. E. (2015). Remote versus in-lab computer-delivered personalized normative feedback interventions for college student drinking. *Journal of Consulting and Clinical Psychology, 83*(3), 455.
- Rude, S., Gortner, E. M., & Pennebaker, J. (2004). Language use of depressed and depression-vulnerable college students. *Cognition & Emotion, 18*(8), 1121-1133.
- Ruppel, E. K., Gross, C., Stoll, A., Peck, B. S., Allen, M., & Kim, S. Y. (2017). Reflecting on connecting: Meta-analysis of differences between computer-mediated and face-to-face self-disclosure. *Journal of Computer-Mediated Communication, 22*(1), 18-34.
- Shaw, B. R., Hawkins, R., McTavish, F., Pingree, S., & Gustafson, D. H. (2006). Effects of insightful disclosure within computer mediated support groups on women with breast cancer. *Health Communication, 19*(2), 133-142.
- Smyth, J. M. (1998). Written emotional expression: effect sizes, outcome types, and moderating variables. *Journal of Consulting and Clinical Psychology, 66*(1), 174.
- Substance Abuse and Mental Health Services Administration (2015). *Results from the 2015 National survey on drug use and health*. Retrieved from <https://www.samhsa.gov/data/sites/default/files/NSDUH-DetTabs-2015/NSDUH-DetTabs-2015/NSDUH-DetTabs-2015.pdf>
- Substance Abuse and Mental Health Services Administration (2017). *Results from the 2016 National survey on drug use and health*. Retrieved from <https://www.samhsa.gov/data/sites/default/files/NSDUH-FFR1-2016/NSDUH-FFR1-2016.pdf>
- Schulenberg, J. E., Johnston, L. D., O'Malley, P. M., Bachman, J. G., Miech, R. A., & Patrick,

- M. E. (2018). *Monitoring the Future national survey results on drug use, 1975-2017: Volume II, college students and adults ages 19-55*. Ann Arbor: Institute for Social Research, The University of Michigan, 454. Retrieved from
- Shingleton, R. M., & Palfai, T. P. (2016). Technology-delivered adaptations of motivational interviewing for health-related behaviors: A systematic review of the current research. *Patient Education and Counseling, 99*(1), 17-35.
- Tate, D. F., & Zabinski, M. F. (2004). Computer and Internet applications for psychological treatment: Update for clinicians. *Journal of Clinical Psychology, 60*(2), 209-220.
- Tausczik, Y. R., & Pennebaker, J. W. (2010). The psychological meaning of words: LIWC and computerized text analysis methods. *Journal of Language and Social Psychology, 29*(1), 24-54.
- Tidwell, L. C., & Walther, J. B. (2002). Computer-mediated communication effects on disclosure, impressions, and interpersonal evaluations: Getting to know one another a bit at a time. *Human Communication Research, 28*(3), 317-348.
- Ullrich, P. M., & Lutgendorf, S. K. (2002). Journaling about stressful events: Effects of cognitive processing and emotional expression. *Annals of Behavioral Medicine, 24*(3), 244-250.
- Vader, A. M., Walters, S. T., Prabhu, G. C., Houck, J. M., & Field, C. A. (2010). The language of motivational interviewing and feedback: Counselor language, client language, and client drinking outcomes. *Psychology of Addictive Behaviors, 24*(2), 190.
- Valkenburg, P. M., & Peter, J. (2007). Online communication and adolescent well-being: Testing the stimulation versus the displacement hypothesis. *Journal of Computer-Mediated Communication, 12*(4), 1169-1182.
- Valkenburg, P. M., & Peter, J. (2009). Social consequences of the internet for adolescents: A

- decade of research. *Current Directions in Psychological Science*, 18(1), 1-5.
- Volkow, N. D., Baler, R. D., Compton, W. M., & Weiss, S. R. (2014). Adverse health effects of marijuana use. *New England Journal of Medicine*, 370(23), 2219-2227.
- Walker, D., Stephens, R., Rowland, J., & Roffman, R. (2011). The influence of client behavior during motivational interviewing on marijuana treatment outcome. *Addictive Behaviors*, 36(6), 669-673.
- Walther, J. B. (1996). Computer-mediated communication: Impersonal, interpersonal, and hyperpersonal interaction. *Communication Research*, 23(1), 3-43.
- Walther, J. B., Van Der Heide, B., Hamel, L. M., & Shulman, H. C. (2009). Self-generated versus other-generated statements and impressions in computer-mediated communication: A test of warranting theory using facebook. *Communication Research*, 36(2), 229-253.

Table 1a.

Participant Characteristics in Face-to-Face MTIs and Computer-Mediated MTIs: Categorical Variables

| Categorical Variable | | <u>FTF-MTI</u> %(n) | <u>CM-MTI</u> %(n) | $X^2(1)$ | <i>p</i> -value |
|----------------------------|--------|------------------------|-----------------------|----------|-----------------|
| Gender | Male | 28.6% (42) | 23.8% (35) | 0.30 | 0.582 |
| | Female | 23.8% (35) | 23.8% (35) | | |
| Lifetime cigarettes smoked | No | 17.4% (26) | 24.8% (37) | 5.37 | 0.020* |
| | Yes | 34.9% (52) | 22.8% (34) | | |
| Lifetime alcohol use | No | 3.4% (5) | 6.0% (9) | 1.71 | 0.190 |
| | Yes | 49.0% (73) | 41.6% (62) | | |
| Lifetime marijuana use | No | 14.1% (21) | 16.8% (25) | 1.20 | 0.274 |
| | Yes | 38.3% (57) | 30.9% (46) | | |

Note. Statistically significant results are bold-faced using a Bonferroni correction

* $p < .05$.

Table 1b.

Participant Characteristics in Face-to-Face MTIs and Computer-Mediated MTIs: Continuous Variables

| Continuous Variables | Range | <u>FTF-MTI</u> M (SD) | <u>CM-MTI</u> M (SD) | t (147) | p-value |
|--|-------|--------------------------|-------------------------|---------|---------|
| Age | 18-29 | 21.79(2.72) | 20.83 (2.69) | 2.17 | 0.032* |
| During the past year, how many times (if any) have you smoked or consumed marijuana? | 0-50 | 20.17 (22.39) | 13.37(18.91) | 1.99 | 0.048* |
| During the past two months, how many times (if any) have you smoked or consumed marijuana? | 0-50 | 10.49 (15.60) | 8.73(16.61) | 0.67 | 0.507 |
| During the past two months, how many times (if any) have you used marijuana-related substances (for example, Spice)? | 0-50 | 1.41(5.66) | 1.52 (8.08) | -0.10 | 0.922 |
| How much have you thought about changing your marijuana use during the past year? | 0-10 | 5.61 (3.02) | 4.99 (2.48) | 1.36 | 0.178 |
| How much have you thought about increasing your marijuana use during the past year? | 0-10 | 3.80 (3.15) | 4.04 (2.74) | -0.48 | 0.631 |
| How much have you thought about reducing your marijuana use during the past year? | 0-10 | 4.10 (3.52) | 3.57(3.37) | 0.78 | 0.440 |
| How much have you thought about using | 0-10 | 4.11 (3.40) | 3.50 (2.83) | 0.98 | 0.329 |

| | | | | | |
|--|------|-------------|-------------|--------|--------|
| stronger or more potent marijuana during the past year? | | | | | |
| How much have you thought about using weaker or less potent marijuana during the past year? | 0-10 | 1.71(2.83) | 1.33(2.27) | 0.75 | 0.457 |
| How much have you thought about taking a trip to a state where the purchase of recreational marijuana is legal (such as Colorado)? | 0-10 | 6.75(3.30) | 5.06(3.67) | 2.96 | 0.004* |
| How certain are you about maintaining your current level of marijuana use or non-use? | 0-10 | 5.87 (2.92) | 5.12 (2.79) | 1.59 | 0.114 |
| During the past year, I have thought a lot about changing my marijuana use: | 0-10 | 5.36(3.12) | 5.53(2.61) | -0.344 | 0.732 |
| During the past year, I've had mixed emotions about my level of marijuana use: | 0-10 | 4.43 (3.22) | 5.09 (3.24) | -1.25 | 0.213 |

Note. Statistically significant results are bold-faced using a Bonferroni correction

* p<.05.

Table 2.

Correlations Between Marijuana Use and Percent of Words Per Category/Dictionary

| | Baseline MJ Use | Follow-up MJ Use | 0=FTF 1=CM | affect | PE | NE | insight | i | we | you | shehe | they | cause | bio | leisure | social | optimism |
|------------------|-----------------|------------------|---------------|--------|--------|-------|---------|--------|-------|--------|-------|-------|--------|------|---------|--------|----------|
| Baseline MJ Use | 1 | | | | | | | | | | | | | | | | |
| Follow-up MJ Use | .88** | 1 | | | | | | | | | | | | | | | |
| 0=FTF 1=CM | -.07 | -.07 | 1 | | | | | | | | | | | | | | |
| affect | .01 | .10 | .32** | 1 | | | | | | | | | | | | | |
| PE | .04 | .10 | .26** | .83** | 1 | | | | | | | | | | | | |
| NE | -.04 | .03 | .20* | .57** | .04 | 1 | | | | | | | | | | | |
| insight | .10 | .12 | -.35** | -.17* | -.06 | -.21* | 1 | | | | | | | | | | |
| i | .05 | .01 | -.09 | -.13 | -.13 | -.03 | .28** | 1 | | | | | | | | | |
| we | .11 | .23* | -.25** | -.05 | .04 | -.15 | .26** | .08 | 1 | | | | | | | | |
| you | .16 | .19* | -.51** | -.18* | -.07 | -.19* | .45** | -.11 | .24** | 1 | | | | | | | |
| shehe | -.04 | -.11 | -.26** | -.28** | -.27** | -.12 | -.13 | .07 | -.01 | .02 | 1 | | | | | | |
| they | -.28** | -.26** | -.16 | .05 | .09 | -.05 | -.03 | -.22** | -.16 | .01 | -.03 | 1 | | | | | |
| cause | .01 | -.05 | .25** | .09 | .13 | -.06 | .03 | -.03 | -.19* | -.27** | -.11 | -.004 | 1 | | | | |
| bio | .41** | .45** | .12 | .08 | .01 | .13 | -.15 | -.08 | -.08 | .02 | .02 | -.16 | .01 | 1 | | | |
| leisure | -.06 | -.07 | .40** | .14 | .24** | -.13 | -.13 | -.07 | -.11 | -.22** | -.07 | .006 | .30** | .14 | 1 | | |
| social | -.02 | .002 | -.38** | -.13 | -.02 | -.21* | .25** | -.16 | .29** | .64** | .32** | .38** | -.26** | -.09 | -.03 | 1 | |
| optimism | .10 | .24* | .17 | .32** | .30** | .13 | -.004 | .14 | .01 | .01 | -.07 | -.14 | .08 | .04 | .04 | -.04 | 1 |

Note. PE and NE are abbreviations for positive affect and negative affect. Baseline MJ is an abbreviation for past two-months frequency of marijuana use at baseline. Follow-up MJ is an abbreviation for past two-months frequency of marijuana use at two-month follow-up. **. Correlation is significant at the 0.01 level (2-tailed).

Table 3.

Percent of Words per Language Category: Face-to-Face MTIs versus Computer-Mediated MTIs

| Dependent Variable | <i>Range</i> | <i>FTF-MTI</i> | <i>CM-MTI</i> | <i>t</i> (144) | <i>p-value</i> | <i>d</i> |
|-------------------------|-------------------|------------------------|------------------------|----------------|------------------|--------------|
| | | <i>M</i> (<i>SD</i>) | <i>M</i> (<i>SD</i>) | | | |
| Affect | 2.28-11.43 | 4.83(1.04) | 5.78 (1.70) | -4.10 | <.01* | -0.68 |
| Positive Emotion | 1.37-9.35 | 3.16(0.83) | 3.79 (1.44) | -3.26 | <.01* | -0.54 |
| Negative Emotion | 0-4.24 | 1.58(0.65) | 1.90(0.92) | -2.44 | .016* | -0.40 |
| Insight | 0-10.54 | 4.42(1.65) | 3.34 (1.20) | 4.46 | <.01* | 0.74 |
| Pronoun I | 0-13 | 9.34(2.24) | 8.95(2.12) | 1.06 | .289 | 0.18 |
| We | 0-2.65 | .40 (0.48) | .19 (0.32) | 3.14 | .002* | 0.51 |
| You | 0-5.93 | 2.18 (1.45) | .77 (0.81) | 7.12 | <.01* | 1.17 |
| She/he | 0-2.71 | .47 (0.60) | .20 (0.38) | 3.18 | .002* | 0.53 |
| They | 0-4.21 | 1.19(.81) | .93 (.82) | 1.89 | .061 | 0.32 |
| Cause | 0.75-8.31 | 3.30 (1.18) | 3.99 (1.54) | -3.08 | .002* | -0.50 |
| Biological | 0-9.05 | 1.97 (1.04) | 2.29 (1.71) | -1.40 | .165 | -0.23 |
| Leisure | .23-5.43 | 1.16 (0.66) | 1.91 (1.06) | -5.19 | <.01* | -0.86 |
| Social | 1.59-12.83 | 7.36 (2.19) | 5.72 (1.80) | 4.88 | <0.01* | 0.81 |
| Optimism | 0-1.91 | .38 (.27) | .50 (.45) | -2.06 | .042* | -0.33 |

Note. Statistically significant results at $p < .05$ are bold-faced.

Table 4.

Moderation Analysis Predicting Frequency of Marijuana Use at Two-Month Follow-Up

| | <i>Unstandardized b</i> | <i>Standardized β</i> | <i>SE</i> | <i>t</i> | <i>P</i> | <i>95% LLCI</i> | <i>95% ULCI</i> |
|---|-----------------------------|---------------------------|-------------|--------------|------------------|---------------------|---------------------|
| <u>Step 1:</u> | | | | | | | |
| Constant | 9.80 | -- | 0.83 | 11.88 | <0.001 | 8.17 | 11.44 |
| Baseline MJ | 0.89 | 0.87 | 0.05 | 18.44 | <0.001 | 0.80 | 0.99 |
| <u>Step 2:</u> | | | | | | | |
| Constant | 9.71 | -- | 1.13 | 8.61 | <0.001 | 7.47 | 11.94 |
| Baseline MJ | 0.89 | 0.87 | 0.05 | 18.28 | <0.001 | 0.80 | 0.99 |
| Condition (0=FTF-MTI vs 1=CM-MTI) | 0.22 | 0.01 | 1.67 | 0.13 | 0.896 | -3.09 | 3.52 |
| <u>Step 3:</u> | | | | | | | |
| Constant | 9.85 | -- | 1.19 | 8.27 | <0.001 | 7.49 | 12.21 |
| Baseline MJ | 0.89 | 0.87 | 0.05 | 17.88 | <0.001 | 0.79 | 0.99 |
| Condition (0=FTF-MTI vs 1=CM-MTI) | -0.06 | 0.00 | 1.88 | -0.03 | 0.975 | -3.78 | 3.67 |
| I | -0.41 | -0.05 | 0.39 | -1.04 | 0.302 | -1.19 | 0.37 |
| PE | 0.77 | 0.05 | 0.77 | 0.99 | 0.323 | -0.76 | 2.30 |
| NE | 1.02 | 0.05 | 1.05 | 0.97 | 0.332 | -1.06 | 3.10 |
| Insight | 0.43 | 0.04 | 0.59 | 0.73 | 0.466 | -0.74 | 1.60 |
| <u>Step 4:</u> | | | | | | | |
| Constant | 8.99 | --- | 1.26 | 7.14 | <0.001 | 6.49 | 11.49 |
| Baseline MJ | 0.88 | 0.86 | 0.05 | 17.52 | <0.001 | 0.78 | 0.98 |

| | | | | | | | |
|---|-------|--------|------|-------|-------|-------|------|
| Condition (0=FTF-MTI vs 1=CM-MTI) | -0.28 | -0.01 | 1.91 | -0.15 | 0.884 | -4.06 | 3.50 |
| I | -0.52 | -0.07 | 0.52 | -1.00 | 0.319 | -1.54 | 0.51 |
| PE | -0.85 | -0.06 | 1.35 | -0.63 | 0.53 | -3.52 | 1.82 |
| NE | 0.003 | 0.0001 | 1.79 | 0.002 | 0.999 | -3.55 | 3.56 |
| Insight | 1.03 | 0.10 | 0.76 | 1.36 | 0.177 | -0.47 | 2.54 |
| I *Condition | -0.01 | -0.001 | 0.81 | -0.01 | 0.989 | -1.62 | 1.60 |
| PE*Condition | 2.17 | 0.11 | 1.64 | 1.32 | 0.189 | -1.09 | 5.42 |
| NE*Condition | 1.70 | 0.06 | 2.24 | 0.76 | 0.449 | -2.74 | 6.14 |
| Insight*Condition | -1.76 | -0.09 | 1.24 | -1.42 | 0.159 | -4.22 | 0.70 |

Note. All variables were mean centered before conducting the analysis. PE and NE are abbreviations for the positive affect and negative affect. Baseline MJ is an abbreviation for past two-months frequency of marijuana use at baseline. Statistically significant results at $p < .05$ are bold-faced.

Table 5.

Predicting Frequency of Marijuana Use at Two-Month Follow-Up

| | <i>Unstandardized b</i> | <i>Standardized β</i> | <i>SE</i> | <i>t</i> | <i>p</i> | <i>95% LLCI</i> | <i>95% ULCI</i> |
|---|-----------------------------|---------------------------|-------------|--------------|------------------|---------------------|---------------------|
| <u>Step 1:</u> | | | | | | | |
| Constant | .92 | -- | .99 | .93 | .35 | -1.05 | 2.89 |
| Baseline MJ | .89 | .87 | .05 | 18.44 | <.001 | .80 | .99 |
| <u>Step 2:</u> | | | | | | | |
| Constant | .82 | -- | 1.29 | .64 | .53 | -1.73 | 3.37 |
| Baseline MJ | .89 | .87 | .05 | 18.28 | <.001 | .80 | .99 |
| Condition (0=FTF-MTI vs 1=CM- MTI) | .22 | .01 | 1.67 | .13 | .90 | -3.09 | 3.52 |
| <u>Step 3:</u> | | | | | | | |
| Constant | -4.15 | -- | 4.10 | -1.01 | 0.314 | -12.29 | 3.99 |
| Baseline MJ | 0.81 | 0.79 | 0.05 | 14.95 | <0.001 | 0.70 | 0.91 |
| Condition (0=FTF-MTI vs 1=CM- MTI) | 0.39 | 0.01 | 2.04 | 0.19 | 0.849 | -3.66 | 4.44 |
| we | 5.36 | 0.11 | 2.49 | 2.15 | 0.034 | 0.42 | 10.31 |
| you | 1.96 | 0.16 | 0.92 | 2.13 | 0.035 | 0.14 | 3.78 |
| they | 1.73 | 0.09 | 1.18 | 1.47 | 0.145 | -0.61 | 4.06 |
| causal | -0.003 | -0.0002 | 0.62 | -0.01 | 0.996 | -1.23 | 1.23 |
| social | -1.10 | -0.14 | 0.60 | -1.82 | 0.072 | -2.30 | 0.10 |
| biological processes | 1.54 | 0.12 | 0.65 | 2.37 | 0.020 | 0.25 | 2.82 |

| | | | | | | | |
|-----------------|-------------|-------------|-------------|-------------|--------------|-------------|--------------|
| leisure | 0.48 | 0.02 | 1.05 | 0.46 | 0.649 | -1.60 | 2.55 |
| optimism | 5.90 | 0.13 | 2.21 | 2.67 | 0.009 | 1.51 | 10.28 |

Note. Baseline MJ is an abbreviation for past two-months frequency of marijuana use at baseline.

Statistically significant results at $p < .05$ are bold-faced.

Appendix A: Informed Consent



University of Texas at El Paso (UTEP) Institutional Review Board Informed Consent Form for Research Involving Human Subjects

Protocol Title: Current Opinions Project

Principal Investigator: Jon Amastae, Lawrence Cohn

UTEP: Languages and Linguistics, Psychology

1. Introduction

You are being asked to take part voluntarily in the research project described below. Please take your time making a decision. Before agreeing to take part in this research study, it is important that you read the consent form that describes the study. Please ask the study researcher or the study staff to explain any words or information that you do not clearly understand.

2. Why is this study being done?

You have been asked to take part in a research study that seeks to learn about students' opinions regarding the legalization of marijuana. The study also seeks to investigate the factors that influence a young adult's decision to initiate, increase, or decrease the recreational use of marijuana. Your participation should help us develop methods for providing better assistance to students who are ambivalent about their level of marijuana use or non-use. The research is being conducted under the direction of Dr. Jon Amastae and Dr. Lawrence Cohn at the University of Texas at El Paso.

Approximately 150 participants will be enrolling in this study at UTEP.

You are being asked to participate in this study because you are a university student between the ages of 18-28 who may have contemplated using marijuana or may have used it recreationally at some time.

If you are eligible to participate and you decide to enroll in this study, then we will ask you to complete an initial 25 minute survey followed by a 15–20 minute interview. The survey and

interview will focus on your opinions regarding the legalization of marijuana, your past use or non-use of marijuana, and your future intentions to initiate, increase, or decrease marijuana use. We will then ask you to return to our office two months later to complete a final 10-15 minute survey regarding marijuana use.

3. What is involved in the study?

If you agree to take part in this study then we will ask you to meet with our project assistants on two separate occasions. During the first 50 minute meeting we will ask you to complete a brief demographic survey, opinion survey, and marijuana use survey.

During the first meeting you will also be asked to participate in a brief, confidential, interview regarding your experience with marijuana (non-use, occasional use, frequent use, etc). We will ask you to discuss your perception of the benefits and risks of using marijuana, and we'll ask you to reflect on your own intentions to use or not use marijuana in the future. You will not be asked to provide your name, student ID number, or any other identifying information. Some participants will complete this interview in a face-to-face setting with one of our interviewers; other participants will complete the interview via a computer, with the participant sitting in front of a computer terminal in one of our project offices and the interviewer sitting in front of a different computer terminal in a different project office. Random assignment will be used to determine which participants will complete the interviews via computer. That is, we will essentially flip-a-coin to determine who completes the interview via computer or face-to-face settings. Face-to-face interviews will be audio recorded and then transcribed; the audio recording itself will then be erased or destroyed in order to ensure that there is no record of your voice completing the interview. Any identifying information that you accidentally provide during the course of the interview (e.g., the name of your high school) will also be deleted from the transcript. Our goal is to make you as comfortable as possible when discussing your views and behavior involving marijuana. The transcript of the interview will only be identified by the self-generated ID number that you provide us. Interviews that are completed via computer will automatically produce a transcript of the interview. Here, too, the transcript of the interview will only be identified by the self-generated ID number that you provide us. The computer interviews will be conducted only on project computers that cannot be linked to any participant.

Approximately two months after the first meeting we will ask you to return to our office to complete a final 10-15 minute survey again assessing your opinions regarding the legalization of marijuana, as well as assessing your own use or non-use of marijuana.

4. What are the risks and discomforts of the study?

There is a possibility that you will find the interview and survey questions uncomfortable because they address your own marijuana use or non-use. Remember that you can stop your involvement in this project at any time. If you begin to feel uncomfortable and want to end your participation, then you may do so at any time. Participants who complete session I (about 50 minutes) will be paid \$20; participants who complete Session II (about 10 minutes) will be paid \$30. At the end of Session II we will provide you with an information sheet listing local and national resources for individuals who want more scientific information about marijuana as well as information regarding counseling services, hotlines, and referral services.

All survey responses will be anonymous. You will **not** be asked to put your name, student ID number or other identifying information on the survey forms. Instead, we will ask you to generate your own ID number by responding to a series of questions. Your unique set of responses will serve as your ID number. Your interviews will also be identified using your self-generated ID number. Responses will remain confidential and identified by code number only. Data will only be reported in group form; individual data will not be available to other individuals or the participants. Under rare circumstances it is possible that a legal entity could request copies of our collection of surveys and transcripts. However, because you have not provided your name, student ID number, or other identifying information, it will be virtually impossible to associate a survey or transcribed interview with any specific participant.

5. What will happen if I am injured in this study?

The University of Texas at El Paso and its affiliates do not offer to pay for or cover the cost of medical treatment for research related illness or injury. No funds have been set aside to pay or reimburse you in the event of such injury or illness. You will not give up any of your legal rights by signing this consent form. You should report any such injury to Dr. Jon Amastae at 915-747-6803 or Lawrence Cohn at 915-747-6567 and to the UTEP Institutional Review Board (IRB) at (915-747-8841) or irb.orsp@utep.edu.

6. Are there benefits to taking part in this study?

Besides monetary payment, there will be no direct benefits to you for taking part in this study. You may benefit from your own self-reflections regarding your marijuana use or non-use.

7. What other options are there?

You have the option not to take part in this study. There will be no penalties involved if you choose not to take part in this study.

8. Who is paying for this study?

UTEP and Principal Investigators Amastae and Cohn are receiving funding from the National Institutes of Health to conduct this study.

9. What are my costs?

There are no direct costs. You will be responsible for travel to and from the research site and any other incidental expenses.

10. Will I be paid to participate in this study?

You will be paid \$50 for participation in this study. You will receive \$20 for completing the first session, and you will be paid \$30 for returning in 2 months to complete the 10-15 minute questionnaire that will be administered during the second session.

11. What if I want to withdraw, or am asked to withdraw from this study?

Taking part in this study is voluntary. You have the right to choose not to take part in this study. If you do not take part in the study, there will be no penalty.

If you choose to take part, you have the right to stop at any time. However, we encourage you to talk to a member of the research group so that they know why you are leaving the study. If there are any new findings during the study that may affect whether you want to continue to take part, you will be told about them.

The researcher may decide to stop your participation without your permission, if he or she thinks that being in the study may cause you harm or discomfort.

12. Who do I call if I have questions or problems?

You may ask any questions you have now. If you have questions later, you may contact Professor Amastae (915-747-6803, jamastae@utep.edu) or Professor Cohn (915-747-6567, Lcohn@utep.edu) or you may contact Ms. Lorraine Torres, Ed.D.,MS, MT(ASCP), CLS(NCA), Chair of the Institutional Review Board, University of Texas at El Paso (lorit@utep.edu; 915-747-7282).

If you have questions or concerns about your participation as a research subject, please contact the UTEP Institutional Review Board (IRB) at (915-747-8841) or irb.orsp@utep.edu.

13. What about confidentiality?

Your part in this study is confidential. None of the information will identify you by name. You will not be asked to put your name on the interview or surveys. Instead, we will ask you to generate a unique identification number based on several pieces of information, such as the name of your favorite actor or actress. We ask you to generate this type of identification number to increase the anonymity of your responses and increase your comfort level while completing the surveys.

All of the interviews will be transcribed. Some of the interviews will be audio recorded and subsequently transcribed, while other interviews will be conducted via a computer and thus transcribed automatically. However, we will not ask you to say your name during the interview; nor will your name be placed on the audio tape or transcription of the tape or computer exchange. The tape recording will be erased or destroyed after the transcription has been completed. The transcription will only be identified by the unique identification number that you generate (described above).

All surveys, audio recordings, and transcriptions will be kept in locked file cabinets in the Psychology Department or the Department of Languages and Linguistics. All participants in this project, including all personnel contracted for recruitment will sign a confidentiality and privacy statement stating that they will not share survey or interview information obtained from any specific participant with non-research personnel.

All electronic files on office computers confidential information will be kept in password-protected folders and backed up on the main UTEP server following UTEP back up schedules. No files containing confidential information will be allowed in any portable personal computer, CD-ROMs, flash drives, or any other portable media. Drs. Amastae & Cohn, with the assistance of project staff, will be responsible for the physical integrity of the data and the backup media for the entire project

All data files containing confidential information will have a unique password assigned by Drs. Amastae or Cohn. Project staff or professional transcribers who transcribe the audio recordings will also sign a confidentiality statement.

Every effort will be made to keep your information anonymous or confidential. Your anonymous survey and confidential interview may be released if required by law. Organizations that may inspect and/or copy your research records for quality assurance and data analysis include, but are not necessarily limited to:

- The sponsor or an agent for the sponsor
- Department of Health and Human Services
- UTEP Institutional Review Board

Because of the need to release information to these parties, absolute confidentiality cannot be guaranteed. The results of this research study may be presented at meetings or in publications; however, your identity will not be disclosed in those presentations.

14. Mandatory reporting

If information is revealed about child abuse or neglect, or potentially dangerous future behavior to others, the law requires that this information be reported to the proper authorities.

15. Authorization Statement

I have read each page of this paper about the study (or it was read to me). I know that being in this study is voluntary and I choose to be in this study. I know I can stop being in this study without penalty. I will get a copy of this consent form now and can get information on results of the study later if I wish.

Participant Name: _____ Date: _____

Participant Signature: _____ Time: _____

Appendix B: Self-Generated ID Number

Generate Your Own Identification Number:

We hope that you will respond to the remaining survey questions as accurately and as honestly as possible. Your responses will be COMPLETELY ANONYMOUS. Thus **DO NOT write your name** on this survey. Instead, we will ask you, again, to generate your own ID number by answering the seven (7) questions on the next page.

These seven items are the same questions that you recently answered when you completed our Eligibility Survey. Please provide the same answers that you provided last time!

Generate Your Own ID:

1. Which of the following is your favorite color?

- | | |
|--------------|---------------|
| 1. ___ Blue | 5. ___ Red |
| 2. ___ Green | 6. ___ Yellow |
| 3. ___ Black | 7. ___ White |
| 4. ___ Pink | 8. ___ Purple |

2. What was your favorite subject in High School?

- | | |
|-------------------------|------------------|
| 1. ___ Math/Science | 5. ___ History |
| 2. ___ Art/Music | 6. ___ English |
| 3. ___ Economics | 7. ___ Speech |
| 4. ___ Foreign Language | 8. ___ Electives |

3. What is your favorite type of T.V. show?

- | | |
|------------------------|---------------|
| 1. ___ Comedy | 5. ___ Horror |
| 2. ___ Science Fiction | 6. ___ Sports |
| 3. ___ Romance | 7. ___ Crime |
| 4. ___ Reality T.V | 8. ___ News |

4. What is your favorite type of car/truck?

- | | |
|-----------------|-------------------|
| 1. ___ Mercedes | 5. ___ Volkswagen |
| 2. ___ Volvo | 6. ___ Ford |
| 3. ___ Buick | 7. ___ Nissan |
| 4. ___ BMW | 8. ___ Toyota |

5. What is your favorite type of food?

- | | |
|------------------------|-------------------|
| 1. ___ Burgers/hotdogs | 5. ___ Italian |
| 2. ___ Chinese | 6. ___ Mexican |
| 3. ___ German | 7. ___ Vegetarian |
| 4. ___ Indian | 8. ___ Seafood |

6. What is your favorite type of music?

- | | |
|-------------------|--------------|
| 1. ___ Country | 5. ___ Metal |
| 2. ___ Classical | 6. ___ Pop |
| 3. ___ Electronic | 7. ___ Rap |
| 4. ___ Gospel | 8. ___ Rock |

7. What month were you born?

- | | |
|-----------------|------------------|
| 1. ___ January | 7. ___ July |
| 2. ___ February | 8. ___ August |
| 3. ___ March | 9. ___ September |
| 4. ___ April | 10. ___ October |
| 5. ___ May | 11. ___ November |
| 6. ___ June | 12. ___ December |

Appendix C: Eligibility Questionnaire

Date: _____

Eligibility Survey

Thank you for your interest in our “*Current Opinions*” project. During the past couple of years a national conversation has taken place regarding the use of marijuana, tobacco, and alcohol. Some communities are discussing restricting tobacco or alcohol use while other communities are discussing legalizing marijuana use. Such conversations have led many people think more carefully about their own use of these substances. Some people have thought about reducing their current use of one or more of these substances, while other people have thought about initiating or increasing their use of these substances.

We would like to learn more about your own opinions and behavior regarding marijuana use. To determine if you are eligible to participate in our project please complete the attached survey. Please respond to the questions as accurately and as honestly as possible. Your responses will be **COMPLETELY ANONYMOUS**. Thus **DO NOT** write your name on this survey or any other identifying information. Instead, we will ask you to generate your own ID number by answering the seven (7) questions below. Then complete the rest of the survey.

You can call our office tomorrow at **915-747-6430** to determine if your ID number is on the list of eligible participants; or you can come by our office and review the list yourself to determine if your self-generated ID is on the list. Please take a copy of your self-generated ID number with you before leaving our office today.

Generate Your Own Identification Number:

We hope that you will respond to the remaining survey questions as accurately and as honestly as possible. Your responses will be COMPLETELY ANONYMOUS. Thus **DO NOT write your name** on this survey. Instead, we will ask you, again, to generate your own ID number by answering the seven (7) questions on the next page.

These seven items are the same questions that you recently answered when you completed our Eligibility Survey. Please provide the same answers that you provided last time!

Generate Your Own ID:

1. Which of the following is your favorite color?

- | | |
|--------------|---------------|
| 1. ___ Blue | 5. ___ Red |
| 2. ___ Green | 6. ___ Yellow |
| 3. ___ Black | 7. ___ White |
| 4. ___ Pink | 8. ___ Purple |

2. What was your favorite subject in High School?

- | | |
|-------------------------|------------------|
| 1. ___ Math/Science | 5. ___ History |
| 2. ___ Art/Music | 6. ___ English |
| 3. ___ Economics | 7. ___ Speech |
| 4. ___ Foreign Language | 8. ___ Electives |

3. What is your favorite type of T.V. show?

- | | |
|------------------------|---------------|
| 1. ___ Comedy | 5. ___ Horror |
| 2. ___ Science Fiction | 6. ___ Sports |
| 3. ___ Romance | 7. ___ Crime |
| 4. ___ Reality T.V | 8. ___ News |

4. What is your favorite type of car/truck?

- | | |
|-----------------|-------------------|
| 1. ___ Mercedes | 5. ___ Volkswagen |
| 2. ___ Volvo | 6. ___ Ford |
| 3. ___ Buick | 7. ___ Nissan |
| 4. ___ BMW | 8. ___ Toyota |

5. What is your favorite type of food?

- | | |
|------------------------|-------------------|
| 1. ___ Burgers/hotdogs | 5. ___ Italian |
| 2. ___ Chinese | 6. ___ Mexican |
| 3. ___ German | 7. ___ Vegetarian |
| 4. ___ Indian | 8. ___ Seafood |

6. What is your favorite type of music?

- | | |
|-------------------|--------------|
| 1. ___ Country | 5. ___ Metal |
| 2. ___ Classical | 6. ___ Pop |
| 3. ___ Electronic | 7. ___ Rap |
| 4. ___ Gospel | 8. ___ Rock |

7. What month were you born?

- | | |
|-----------------|------------------|
| 1. ___ January | 7. ___ July |
| 2. ___ February | 8. ___ August |
| 3. ___ March | 9. ___ September |
| 4. ___ April | 10. ___ October |
| 5. ___ May | 11. ___ November |
| 6. ___ June | 12. ___ December |

Background Survey

Please answer the following questions.

1a. Age: ____ 1b. Gender: ____Male ____Female

2. During your **lifetime** have you ever **smoked cigarettes** (more than a few puffs)?
____Yes ____No

3. During your **lifetime** have you ever **drunk alcohol** (more than a few sips)?
____Yes ____No

4. During your **lifetime** have you ever **smoked** or **consumed marijuana**?
____Yes ____No

5. During the **past year**, how often have you **smoked** or **consumed marijuana**?
____never ____once or twice ____occasionally ____frequently

6. During the **past year**, approximately how many times (if any) have you **smoked** or **consumed marijuana**?

___0 ___1 ___2 ___3 ___4 ___5 ___6 ___7 ___8 ___9 ___10 ___11 ___12 ___13 ___14
___15-16 ___17-18 ___19-20 ___21-22 ___23-24 ___25-26 ___27-28 ___29-30 ___31-32 ___33-34
___35-36 ___37-38 ___39-40 ___41-42 ___43-44 ___45-46 ___47-48 ___49-50 ___more than 50 times

7. During the **past two months** how many times (if any) have you **smoked** or **consumed marijuana**?

___0 ___1 ___2 ___3 ___4 ___5 ___6 ___7 ___8 ___9 ___10 ___11 ___12 ___13 ___14
___15-16 ___17-18 ___19-20 ___21-22 ___23-24 ___25-26 ___27-28 ___29-30 ___31-32 ___33-34
___35-36 ___37-38 ___39-40 ___41-42 ___43-44 ___45-46 ___47-48 ___49-50 ___more than 50 times

Using the following scale, please indicate.....

8. How much have you thought about **changing** your marijuana use or non-use during the past year?

0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
Not Medium A
at all amount lot

9. How much have you thought about **increasing** your marijuana use or non-use during the past year?

0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
Not Medium A
at all amount lot

10. How much have you thought about **reducing** your marijuana use during the past year? *If you don't use, skip to question 13.*

0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
Not Medium A
at all amount lot

11. How much have you thought about **using stronger** or more potent marijuana during the past year?

0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
Not Medium A
at all amount lot

12. How much have you thought about **using weaker** or less potent marijuana during the past year?

0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
Not Medium A
at all amount lot

13. How much have you **thought about** taking a trip to a state where the purchase of recreational marijuana is legal (such as Colorado)?

0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
Not Medium A
at all amount lot

14. How **certain** are you about **maintaining** your current level of marijuana use or non-

Appendix D: Demographics Questionnaire

Please complete this one page Background Survey. Then remove this page from your packet to ensure the anonymity of your remaining responses!

Part I: Background Survey I

1. Age: _____

2. Gender: _____ Female (1) _____ Male (2)

3. How do you describe yourself?
 - _____ (1) African-American
 - _____ (2) Asian/ Asian-American/ Pacific Islander
 - _____ (3) Caucasian/ White (not of Hispanic origin)
 - _____ (4) Mexican American, Hispanic, Latino
 - _____ (5) Native American
 - _____ (6) Other (write in) _____

4. What is your approximate college level?
 - _____ (1) Freshman (0-29 credits)
 - _____ (2) Sophomore (30-59 credits)
 - _____ (3) Junior (60-89 credits)
 - _____ (4) Senior(90-120 credits)
 - _____ (5) Not sure

5. What was the first language that you learned?
 - _____ (1) English _____ (2) Spanish _____ (3) Other

6. What language do you consider your stronger language overall?
 - _____ (1) English _____ (2) Spanish _____ (3) Both English
and Spanish
 - _____ (4) Other

Appendix E: Drug Use Questionnaire

Part II: Behavior Survey

1. During your **lifetime** have you ever **smoked cigarettes** (more than a few puffs)?
___Yes ___No

2. During your **lifetime** have you ever **drunk alcohol** (more than a few sips)?
___Yes ___No

3. During your **lifetime** have you ever **smoked** or **consumed marijuana**?
___Yes ___No

4. During the **past year**, how often have you **smoked** or **consumed marijuana**?
___never ___once or twice ___occasionally ___frequently

5. What is the **potency** (strength) of **marijuana** that you typically consume?

0.....1.....2.....3.....4.....5.....6
Not Moderately Very
at all potent potent
potent

6. In general, how many **hits (puffs)** of **marijuana** do you consume per smoking occasion(session)?

___0 ___1 ___2 ___3 ___4 ___5 ___6 ___7 ___8 ___9 ___10 ___11 ___12 ___13
___14 ___15 ___16 ___17 ___18 ___19 ___20 ___more than 20 puffs

7. During the **past year**, approximately how many times(if any) have you **smoked** or **consumed marijuana**?

___0 ___1 ___2 ___3 ___4 ___5 ___6 ___7 ___8 ___9 ___10 ___11 ___12 ___13 ___14
___15-16 ___17-18 ___19-20 ___21-22 ___23-24 ___25-26 ___27-28 ___29-30 ___31-32 ___33-34
___35-36 ___37-38 ___39-40 ___41-42 ___43-44 ___45-46 ___47-48 ___49-50 ___more than 50 times

8. During the **past two months**, how many times (if any) have you **smoked or consumed marijuana**?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34
 35-36 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 times

9. During the **past two months**, how many joints of marijuana have you **smoked or consumed**?

none ¼ of a joint or less 1/2 a joint ¾ joint 1 joint 1 & ¼ joints 1 & ½ joints
 1 & ¾ joints 2 joints 2 & ¼ joints 2 & ½ joints 2 & ¾ joints 3 joints 3 & ½ joints
 4 5 6 7 8 9 10 11 12 13 14 15-16 17-18
 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34 35-36
 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 joints

10. During the **past two months**, approximately how many hits (puffs) of marijuana have you **smoked or consumed**?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34
 35-36 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 puffs

Future Intentions

11. During the **next two months** I anticipate (put a check-mark next to only one response):

increasing my marijuana use **a lot**
 increasing my marijuana use **a medium amount**
 increasing my marijuana use **a little**
 maintaining my marijuana use **at my current level**
 reducing my marijuana use **a little**
 reducing my marijuana use **a medium amount**
 reducing my marijuana use **a lot**

12. During the **next two months** I anticipate smoking or using marijuana:

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34
 35-36 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 times

Legalization Opinions

13. In your opinion, should the **medical use** of marijuana be made legal for adults?

Yes No Not sure No Opinion

14. In your opinion, should the **recreational use** of marijuana be made legal for adults?

Yes No Not sure No Opinion

15. In your opinion, should the medical and recreational use of marijuana by adults be **legal and regulated** in the same way that alcohol and tobacco are regulated?

Yes No Not sure No Opinion

Part II: Background Survey

16. During the past **two months** how many times (if any) have you used **marijuana-related substances** (for example, Spice)?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34
 35-36 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 times

17. During the **past year** how many times (if any) have you used **marijuana-related substances** (for example, Spice)?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34
 35-36 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 times

18. During the **past year** how many times (if any) have you drunk **alcohol AND** smoked **marijuana within two hours** of each other?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
 15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34
 35-36 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 times

19. During the **past two months** how many times (if any) have you drunk **alcohol AND**

smoked **marijuana within two hours** of each other?

___0 ___1 ___2 ___3 ___4 ___5 ___6 ___7 ___8 ___9 ___10 ___11 ___12 ___13 ___14
___15-16 ___17-18 ___19-20 ___21-22 ___23-24 ___25-26 ___27-28 ___29-30 ___31-32 ___33-34
___35-36 ___37-38 ___39-40 ___41-42 ___43-44 ___45-46 ___47-48 ___49-50 ___more than 50 times

35. In general, how many grams of **marijuana** do you typically **smoke** or **consume** per occasion (session)?

___none ___1/4 gram ___1/2 gram ___3/4 gram ___1gram ___1 & 1/4 grams ___1 & 1/2 grams
___1 & 3/4 grams ___2 grams ___2 & 1/4 grams ___2 & 1/2 grams ___2 & 3/4 grams ___3 grams ___3 & 1/2 grams
___4 ___5 ___6 ___7 ___8 ___9 ___10 ___11 ___12 ___13 ___14 ___15-16 ___17-18
___19-20 ___21-22 ___23-24 ___25-26 ___27-28 ___29-30 ___31-32 ___33-34 ___35-36
___37-38 ___39-40 ___41-42 ___43-44 ___45-46 ___47-48 ___49-50 ___more than 50 grams

36. During the **past two months**, how many grams of marijuana have you **smoked** or **consumed**?

___none ___1/4 gram ___1/2 gram ___3/4 gram ___1gram ___1 & 1/4 grams ___1 & 1/2 grams
___1 & 3/4 grams ___2 grams ___2 & 1/4 grams ___2 & 1/2 grams ___2 & 3/4 grams ___3 grams ___3 & 1/2 grams
___4 ___5 ___6 ___7 ___8 ___9 ___10 ___11 ___12 ___13 ___14 ___15-16 ___17-18
___19-20 ___21-22 ___23-24 ___25-26 ___27-28 ___29-30 ___31-32 ___33-34 ___35-36
___37-38 ___39-40 ___41-42 ___43-44 ___45-46 ___47-48 ___49-50 ___more than 50 grams

Appendix F: Perceived risk of DUI-SAM

Driving Intentions

20. In your opinion, how risky or dangerous would it be to drive a motor vehicle **once or twice** within two hours of using a **small amount of marijuana AND** drinking a **small amount of alcohol** (for example, one or two beers or glasses of wine)?

0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
Not at all Medium amount A lot

21. In your opinion, how risky or dangerous would it be to drive a motor vehicle **occasionally** within two hours of consuming a **small amount of marijuana AND** drinking a **small amount of alcohol** (for example, one or two beers or glasses of wine)?

0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
Not at all Medium amount A lot

22. In your opinion, how risky or dangerous would it be to drive a motor vehicle **frequently** within two hours of using a **small amount of marijuana AND** drinking a **small amount of alcohol** (for example, one or two beers or glasses of wine)?

0.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
Not at all Medium amount A lot

26. In your opinion, **how many alcoholic drinks** could **you** consume within a 2 hour period before your driving skills would be seriously affected?

___ 1/2 a drink ___ 1 drink ___ 1 & 1/2 drinks ___ 2 drinks ___ 2 and 1/2 drinks ___ 3 drinks ___ 4 drinks
___ 5 drinks ___ 6 drinks ___ 7 drinks ___ 8 drinks ___ 9 drinks ___ 10 or more drinks

27. In your opinion, **how much marijuana** could **you** consume within a 2 hour period before your driving skills would be seriously affected?

___ 0 ___ 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ 6 ___ 7 ___ 8 ___ 9 ___ 10 ___ 11 ___ 12 ___ 13
___ 14 ___ 15 ___ 16 ___ 17 ___ 18 ___ 19 ___ 20 more than 20 puffs

28. In your opinion, how many **alcoholic drinks** **AND** how much **marijuana** could you consume **during the same 2 hour period** before your driving skills would be seriously affected? Be sure to *write numbers on both blank space*

Number of alcoholic drinks: _____

AND Number of marijuana hits (puffs): ___

Appendix H:Driving Survey

Driving Survey

29. During the past 12 months, how often have **you driven a motor vehicle (car, truck, or motorcycle)**?

___never ___1-3 times ___4-6 times ___7 -12times ___ 13 or more times

30. During the past 12 months, how often did **you drive** a motor vehicle when you felt **high** or lightheaded after drinking **alcohol**?

___never ___1-3 times ___4-6 times ___7 -12times ___ 13 or more times

31. During the past 12 months, how often did **you drive** a motor vehicle after drinking **alcohol** to the point where you **would be in trouble** if the police had stopped you?

___never ___1-3 times ___4-6 times ___ 7-12 times ___13 or more times

32. During the past 12 months, how often did **you drive** a motor vehicle when you felt **high** or lightheaded after using **marijuana**?

___never ___1-3 times ___4-6 times ___7-12times ___ 13 or more times

33. During the past 12 months, how often did **you drive** a motor vehicle after consuming marijuana to the point where you **would be in trouble** if the police had stopped you?

___never ___1-3 times ___4-6 times ___ 7-12 times ___13 or more times

34. During the past 12 months, how often did **you drive** a motor vehicle when you **felt high** or lightheaded **after using both alcohol and marijuana** during the same two hour period?

___never ___1-3 times ___4-6 times ___ 7-12 times ___more than 13 times

Appendix I: Motivational Interviews

AUDIO TEMPLATE NON-USER

[Researcher enters room]:

Hi. As my colleague mentioned, there is a national conversation in regards to the legalization of marijuana use. We would like to talk about some of the decisions you may be thinking about making around marijuana use.

1) What are the decision you are thinking about making around marijuana use? (neutral)

If participant begins to focus solely on ‘legalization debate’ then steer discussion away from the debate itself and give a selective reflection of possible temptations to increase their own marijuana use or remain as a non-user.

-reflection

-reflection

2) Why would you like to try marijuana? (1.exploring the positive)

-reflection

-reflection

3) What caused you to considering using marijuana now? (2.exploring the positive)

-reflection

-reflection

4) Do any of your friends use?(neutral)

-reflection

-reflection

5) What are some of the reasons they like to use marijuana? SKIP TO 7 IF Q5 IS NO (3.exploring the positive)

-reflection

-reflection

6) You mentioned your friends like XYZ about marijuana, do any of those reasons appeal to you? (3.exploring the positive)

-reflection

-reflection

7) What other reasons appeal to you? (4.exploring the positive)

-reflection

-reflection

8) From a 0-10 scale, how likely is it that you will try marijuana in the next two months? 0 being not at all likely 10 being very likely.

9) What would cause you to move to a lower number? (If they answer a low number say: Why did you select that number?) (1.exploring the negative)

10)It's perfectly normal to feel two ways about changing your behavior. What makes you think twice about using marijuana? (2.exploring the negative)

-reflection

-reflection

11) What else concerns you about marijuana? (3. exploring the negative)

-reflection

-reflection

12) Has anything unusual or dangerous ever happened to your friends while smoking marijuana? If applicable (4. exploring the negative)

-reflection

-reflection

13) If they say yes to previous question: Do you see any of those possible outcomes applying to you?(4.exploring the negative)

-reflection

-reflection

14) What additional negative consequences might you experience if you began smoking marijuana? (5. Exploring the negative)

-reflection

-reflection

15) Same scale, how certain are you that you will try marijuana in the next two months? 0 being not at all certain and 10 being very certain

16) What would cause you to move to a higher number? (If they answer a high number say: Why did you select that number?) (5.exploring the positive)

-reflection

-reflection

17) What would you tell someone if they offered you marijuana? (neutral)

-reflection

-reflection

18) What do you plan to do in the next couple of months? (neutral)

-reflection

-reflection

19) What are your additional thoughts about using marijuana or not using marijuana in the next couple of months? (neutral)

CLOSING

Alright, let me see if I understood where you are at right now in regards to your marijuana use. (use to give summary of their change talk) On the one hand you'd like to try marijuana to see how it makes you feel, on the other, there are some concerns (e.g.....).
.....
..... Did I leave anything out? (SUMMARY to end session) hear their change talk coming from you)

You've provided us with a lot of useful information. We look forward to seeing you in two months and rewarding you for your valuable time on your next visit. Do you have any questions?

[End of interview]

I'll walk you out to the next room to pay you and get your contact information.

- 1) Where did you hear about this study?
- 2) Here is a copy of your self-generated ID and \$20. We will ask you to bring this sheet 2 months from now. We need your initials that you were paid.
- 3) You'll complete a 10 minute survey and be paid \$30 the next time. Can we get your best contact information: email/phone? See you in two months. Thank you once again.
Goodbye.

AUDIO TEMPLATE USER

[Researcher enters room]:

Hi. As my colleague mentioned, there is a national conversation in regards to the legalization of marijuana use. We would like to talk about some of the decisions you may be thinking about making around marijuana use.

1) What are the decision you are thinking about making around marijuana use? (neutral)

If participant begins to focus solely on ‘legalization debate’ then steer discussion away from the debate itself and give a selective reflection of possible temptations to increase their own marijuana use or possible reasons for reducing their own marijuana use.

-reflection

-reflection

2) What do you like about marijuana? (1.exploring the positive)

-reflection

-reflection

3) Why are you considering changing your marijuana use now?(2.exploring the positive)

4) Tell me more of what you like about marijuana.....(3.exploring the positive)

-reflection

-reflection

5) Do any of your friends use?(neutral)

-reflection

-reflection

6) What are some of the reasons they like to use marijuana? SKIP TO 7 IF Q5 IS NO (4. exploring the positive)

-reflection

-reflection

7) You mentions your friends like XYZ about marijuana, do any of those reasons appeal to you?

-reflection

-reflection

7) What other reasons appeal to you? (4.exploring the positive)

-reflection

-reflection

8) From a 0-10 scale, how likely is it that you will use marijuana in the next two months? 0 being not at all likely 10 being very likely.

-reflection

-reflection

9) What would cause you to move to a lower number? (If they answer a low number say: Why did you select that number?) (1.exploring the negative)

-reflection

-reflection

10) It's perfectly normal to feel two ways about changing your behavior. What makes you think twice about using? (2.exploring the negative)

-reflection

-reflection

12) What else concerns you about using marijuana? (3. exploring the negative)

-reflection

-reflection

13) Has anything unusual or dangerous ever happened to you or your friends while smoking marijuana? (4. exploring the negative)

-reflection

-reflection

14) What additional negative consequences might you experience if you continue smoking marijuana? (5. exploring the negative)

-reflection

-reflection:.

15) Same scale, how certain are you that you will use marijuana in the next two months? 0 being not at all certain and 10 being very certain

16) What would cause you to move to a higher number? (If they answer a high number say: Why did you select that number?) (5.exploring the positive)

17) What would you tell someone if they offered you marijuana (neutral)?

-reflection

-reflection

18) What do you plan to do in the next couple of months? (neutral)

-reflection

-reflection

19) What are your additional thoughts about using marijuana or not using marijuana in the next couple of months?(neutral

COMPUTER TEMPLATE NON-USER

Hi ...thanks again for participating in our project. If it is okay with you, a different researcher in the other room would like to talk to you about some of the decisions you may be thinking about making around marijuana use. What you decide to do with marijuana is completely up to you. Before the interview begins, I just want to tell you that what you say to us is confidential. So, please do not state your name or provide other identifying information

In fact, to make sure that you are completely comfortable discussing these issues the researcher will conduct the interview via computer. The researcher is in the next room and you will communicate with them via this computer. You type your responses as if you are responding in an instant messenger or chat room. As we noted in the consent form, we would like your permission to keep a record of this computer-conversation. The conversation cannot be traced to you as it will be conducted using only our own project computers, and you will not provide any identifying information. We are taking these steps to make sure that you are comfortable talking to the other researcher about your opinions and activities. OK?

[Researcher begins interview]:

Hi. As my colleague mentioned, there is a national conversation in regards to the legalization of marijuana use. We would like to talk about some of the decisions you may be thinking about making around marijuana use.

*1) What are the decision you are thinking about making around marijuana use? (neutral)

If participant begins to focus solely on ‘legalization debate’ then steer discussion away from the debate itself and give a selective reflection of possible temptations to increase their own marijuana use or remain as a non-user.

-reflection

-reflection

*2) Why would you like to try marijuana? (1.exploring the positive)

-reflection

-reflection

*3) What caused you to considering using marijuana now ? (2.exploring the positive)

-reflection

-reflection

4) Do any of your friends use?(neutral)

-reflection

-reflection

5) What are some of the reasons they like to use marijuana? SKIP TO 7 IF Q5 IS NO (3.exploring the positive)

-reflection

-reflection

6) You mentioned your friends like XYZ about marijuana, do any of those reasons appeal to you? (3.exploring the positive)

-reflection

-reflection

7) What other reasons appeal to you? (4.exploring the positive)

-reflection

-reflection

*8) From a 0-10 scale, how likely is it that you will try marijuana in the next two months? 0 being not at all likely 10 being very likely.

*9) What would cause you to move to a lower number? (If they answer a low number say: Why did you select that number?) (1.exploring the negative)

-reflection

-reflection

10)It's perfectly normal to feel two ways about changing your behavior. What makes you think twice about using marijuana? (2.exploring the negative)

-reflection

-reflection

*11) What else concerns you about marijuana? (3. exploring the negative)

-reflection

-reflection

*12) Has anything unusual or dangerous ever happened to your friends while smoking marijuana? If applicable (4. exploring the negative)

-reflection

-reflection

13) If they say yes to previous question: Do you see any of those possible outcomes applying to you?(4.exploring the negative)

-reflection

-reflection

14) What additional negative consequences might you experience if you began smoking marijuana? (5. Exploring the negative)

-reflection

-reflection

*15) Same scale, how certain are you that you will try marijuana in the next two months? 0 being not at all certain and 10 being very certain

*16) What would cause you to move to a higher number? (If they answer a high number say: Why did you select that number?) (5.exploring the positive)

-reflection

-reflection

*17) What would you tell someone if they offered you marijuana? (neutral)

-reflection

-reflection

*18) What do you plan to do in the next couple of months? (neutral)

-reflection

-reflection

19) What are your additional thoughts about using marijuana or not using marijuana in the next couple of months? (neutral)

CLOSING

Alright, let me see if I understood where you are at right now in regards to your marijuana use. (use to give summary of their change talk) On the one hand you'd like to try marijuana to see how it makes you feel, on the other, there are some concerns (e.g.....).....

..... Did I leave anything out? (SUMMARY to end session) hear their change talk coming from you)

You've provided us with a lot of useful information. We look forward to seeing you in two months and rewarding you for your valuable time on your next visit. Do you have any questions?

[End of interview: SAVE INTERVIEW AS #)ID _ _ _ _ _ - _ _]

Interviewer: Thank you once again. Please close the window of our conversation and turn off the screen. Please ring the bell to let the first researcher know you have finished the interview. The first researcher will pay you and will ask you for the best way to contact you for the next session.

COMPUTER TEMPLATE USER

Hi ...thanks again for participating in our project. If it is okay with you, a different researcher in the other room would like to talk to you about some of the decisions you may be thinking about making around marijuana use. What you decide to do with marijuana is completely up to you. Before the interview begins, I just want to tell you that what you say to us is confidential. So, please do not state your name or provide other identifying information

In fact, to make sure that you are completely comfortable discussing these issues the researcher will conduct the interview via computer. The researcher is in the next room and you will communicate with them via this computer. You type your responses as if you are responding in an instant messenger or chat room. As we noted in the consent form, we would like your permission to keep a record of this computer-conversation. The conversation cannot be traced to you as it will be conducted using only our own project computers, and you will not provide any identifying information. We are taking these steps to make sure that you are comfortable talking to the other researcher about your opinions and activities. OK?

[Researcher begins interview]:

Hi. As my colleague mentioned, there is a national conversation in regards to the legalization of marijuana use. We would like to talk about some of the decisions you may be thinking about making around marijuana use.

*1) What are the decisions you are thinking about making around marijuana use? (neutral)

If participant begins to focus solely on ‘legalization debate’ then steer discussion away from the debate itself and give a selective reflection of possible temptations to increase their own marijuana use or possible reasons for reducing their own marijuana use.

-reflection

-reflection

*2) What do you like about marijuana? (1.exploring the positive)

-reflection

-reflection

*3) Why are you considering changing your marijuana use now?(2.exploring the positive)

4) Tell me more of what you like about marijuana.....(3.exploring the positive)

-reflection

-reflection

5) Do any of your friends use?(neutral)

-reflection

-reflection

6) What are some of the reasons they like to use marijuana? SKIP TO 7 IF Q5 IS NO (4. exploring the positive)

-reflection

-reflection

7) You mentioned your friends like XYZ about marijuana, do any of those reasons appeal to you?

-reflection

-reflection

7) What other reasons appeal to you? (4.exploring the positive)

-reflection

-reflection

*8) From a 0-10 scale, how likely is it that you will use marijuana in the next two months? 0 being not at all likely 10 being very likely.

*9) What would cause you to move to a lower number? (If they answer a low number say: Why did you select that number?) (1.exploring the negative)

-reflection

-reflection

10) It's perfectly normal to feel two ways about changing your behavior. What makes you think twice about using? (2.exploring the negative)

-reflection

-reflection

*12) What else concerns you about using marijuana? (3. exploring the negative)

-reflection

-reflection

*13) Has anything unusual or dangerous ever happened to you or your friends while smoking marijuana? (4. exploring the negative)

-reflection

-reflection

14) What additional negative consequences might you experience if you continue smoking marijuana? (5. exploring the negative)

-reflection

-reflection:.

*15) Same scale, how certain are you that you will use marijuana in the next two months? 0 being not at all certain and 10 being very certain

*16) What would cause you to move to a higher number? (If they answer a high number say: Why did you select that number?) (5.exploring the positive)

*17) What would you tell someone if they offered you marijuana (neutral)?

-reflection

-reflection

*18) What do you plan to do in the next couple of months? (neutral) regarding marijuana use.

19) What are your additional thoughts about using marijuana or not using marijuana in the next couple of months?(neutral)

CLOSING

(use to give summary of their change talk)

Alright, let me see if I understood where you are at right now in regards to your marijuana use. On the one hand you like the way marijuana makes you feel, on the other, there are some concerns

.....
.....

Did I leave anything out? (SUMMARY to end session) hear their change talk coming from you)

You've provided us with a lot of useful information. We look forward to seeing you in two months and rewarding you for your valuable time on your next visit. Do you have any questions?

[End of interview: SAVE INTERVIEW AS #)ID _ _ _ _ _ - _ _]

Interviewer: Thank you once again. Please close the window of our conversation and turn off the screen. Please ring the bell to let the first researcher know you have finished the interview. The first researcher will pay you and will ask you for the best way to contact you for the next session.

Appendix J: Basil Task

Instructions:

In front of you, you'll see a bag of basil leaves. We are asking you to assume that the basil leaves are **moderately potent** marijuana leaves. Measure how much marijuana you typically smoke or consume **per occasion** (session). Note: Focus on the amount you consume not method of use. You can use the following sheets of filter paper to roll some joints and place them inside the ziplock bag. You can also pour the basil leaves directly into the ziplock bag. Just remember to pour either the joints or the basil leaves in the ziplock bag. If you don't use marijuana, leave the bag empty. Try to avoid spilling any content. Put the ziplock bag with the amount of marijuana you consume in the green box.

Appendix K: Two-Month Follow-Up Questionnaire

Session 2

Thank you for coming back to complete the study. Your final task will consist of completing a brief survey regarding marijuana use. Remember, your responses will be **anonymous**; that is, we will not ask you to write your name or any other identifying information on the survey.

Please note that a few of the questions on the initial survey are identical to the questions that you answered when you first visited our office. We apologize for the duplication!

Thanks... please let us know when you have completed the survey.

Generate Your Own Identification Number:

We hope that you will respond to the remaining survey questions as accurately and as honestly as possible. Your responses will be COMPLETELY ANONYMOUS. Thus **DO NOT write your name** on this survey. Instead, we will ask you, again, to generate your own ID number by answering the seven (7) questions on the next page.

These seven items are the same questions that you recently answered when you completed our Eligibility Survey. Please provide the same answers that you provided last time!

Generate Your Own ID:

1. Which of the following is your favorite color?

- | | |
|--------------|---------------|
| 1. ___ Blue | 5. ___ Red |
| 2. ___ Green | 6. ___ Yellow |
| 3. ___ Black | 7. ___ White |
| 4. ___ Pink | 8. ___ Purple |

2. What was your favorite subject in High School?

- | | |
|-------------------------|------------------|
| 1. ___ Math/Science | 5. ___ History |
| 2. ___ Art/Music | 6. ___ English |
| 3. ___ Economics | 7. ___ Speech |
| 4. ___ Foreign Language | 8. ___ Electives |

3. What is your favorite type of T.V. show?

- | | |
|------------------------|---------------|
| 1. ___ Comedy | 5. ___ Horror |
| 2. ___ Science Fiction | 6. ___ Sports |
| 3. ___ Romance | 7. ___ Crime |
| 4. ___ Reality T.V | 8. ___ News |

4. What is your favorite type of car/truck?

- | | |
|-----------------|-------------------|
| 1. ___ Mercedes | 5. ___ Volkswagen |
| 2. ___ Volvo | 6. ___ Ford |
| 3. ___ Buick | 7. ___ Nissan |
| 4. ___ BMW | 8. ___ Toyota |

5. What is your favorite type of food?

- | | |
|------------------------|-------------------|
| 1. ___ Burgers/hotdogs | 5. ___ Italian |
| 2. ___ Chinese | 6. ___ Mexican |
| 3. ___ German | 7. ___ Vegetarian |
| 4. ___ Indian | 8. ___ Seafood |

6. What is your favorite type of music?

- | | |
|-------------------|--------------|
| 1. ___ Country | 5. ___ Metal |
| 2. ___ Classical | 6. ___ Pop |
| 3. ___ Electronic | 7. ___ Rap |
| 4. ___ Gospel | 8. ___ Rock |

7. What month were you born?

- | | |
|-----------------|------------------|
| 1. ___ January | 7. ___ July |
| 2. ___ February | 8. ___ August |
| 3. ___ March | 9. ___ September |
| 4. ___ April | 10. ___ October |
| 5. ___ May | 11. ___ November |
| 6. ___ June | 12. ___ December |

Part II: Behavior Survey

1. During your **lifetime** have you ever **smoked** or **consumed marijuana**?

___ Yes ___ No

2. What is the **potency** (strength) of **marijuana** that you typically consume?

0.....1.....2.....3.....4.....5.....6
Not Moderately Very
at all potent potent
potent

3. In general, how many **hits (puffs)** of **marijuana** do you consume per smoking occasion(session)?

___0 ___1 ___2 ___3 ___4 ___5 ___6 ___7 ___8 ___9 ___10 ___11 ___12 ___13
___14 ___15 ___16 ___17 ___18 ___19 ___20 ___more than 20 puffs

4. During the **past two months**, how many times (if any) have you **smoked** or **consumed marijuana**?

___0 ___1 ___2 ___3 ___4 ___5 ___6 ___7 ___8 ___9 ___10 ___11 ___12 ___13 ___14
___15-16 ___17-18 ___19-20 ___21-22 ___23-24 ___25-26 ___27-28 ___29-30 ___31-32 ___33-34
___35-36 ___37-38 ___39-40 ___41-42 ___43-44 ___45-46 ___47-48 ___49-50 ___more than 50 times

5. During the **past two months**, how many joints of marijuana have you **smoked** or **consumed**?

___none ___1/4 of a joint or less ___1/2 a joint ___3/4 joint ___1 joint ___1 & 1/4 joints ___1 & 1/2 joints
___1 & 3/4 joints ___2 joints ___2 & 1/4 joints ___2 & 1/2 joints ___2 & 3/4 joints ___3 joints ___3 & 1/2 joints
___4 ___5 ___6 ___7 ___8 ___9 ___10 ___11 ___12 ___13 ___14 ___15-16 ___17-18
___19-20 ___21-22 ___23-24 ___25-26 ___27-28 ___29-30 ___31-32 ___33-34 ___35-36
___37-38 ___39-40 ___41-42 ___43-44 ___45-46 ___47-48 ___49-50 ___more than 50 joints

6. During the **past two months**, approximately how many hits (puffs) of marijuana have you **smoked or consumed**?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34
35-36 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 puffs

7. During the **past two months** I have (put a check-mark next to only one response):

increased my marijuana use **a lot**
 increased my marijuana use **a medium amount**
 increased my marijuana use **a little**
 maintained my marijuana use **at my current level**
 reduced my marijuana use **a little**
 reduced my marijuana use **a medium amount**
 reduced my marijuana use **a lot**

8. During the **past two months**, I have smoked or used marijuana:

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34
35-36 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 times

9. During the **past two months** how many times (if any) have you used **marijuana-related substances** (for example, Spice)?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34
35-36 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 times

10. During the **past two months** how many times (if any) have you drunk **alcohol** AND smoked **marijuana within two hours** of each other?

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14
15-16 17-18 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34
35-36 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 times

11. In general, how many grams of **marijuana** do you typically **smoke** or **consume** per occasion (session)?

none ¼ gram 1/2 gram 3/4 gram 1gram 1 & ¼ grams 1 & ½ grams
 1 & ¾ grams 2 grams 2 & ¼ grams 2 & ½ grams 2 & ¾ grams 3 grams 3 & ½ grams
 4 5 6 7 8 9 10 11 12 13 14 15-16 17-18
 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34 35-36
 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 grams

12. During the **past two months**, how many grams of marijuana have you **smoked** or **consumed**?

none ¼ gram 1/2 gram 3/4 gram 1gram 1 & ¼ grams 1 & ½ grams
 1 & ¾ grams 2 grams 2 & ¼ grams 2 & ½ grams 2 & ¾ grams 3 grams 3 & ½ grams
 4 5 6 7 8 9 10 11 12 13 14 15-16 17-18
 19-20 21-22 23-24 25-26 27-28 29-30 31-32 33-34 35-36
 37-38 39-40 41-42 43-44 45-46 47-48 49-50 more than 50 grams

Resources

University Counseling Center

202 Union West
El Paso, Texas 79968
915-747-5302
M-F 8am-5pm
Website: <http://sa.utep.edu/counsel/>

Substance Abuse and Mental Health Services Administration

Website: <http://samhsa.gov>

Alcoholics Anonymous

3318 Douglas Ave
(915) 562-4081 (24 hour answering service)
aaelpaso.org

Alcohólicos Anónimos

3020 Piedras
471 Resler
Central Office: (915) 351-1141 or (915) 838-6264
aadistrict7.com

NAMI (National Alliance on Mental Illness) El Paso

4615 Alameda Rm. 1157 (inside EPPC)
(915) 534-5478 or (915) 534-5476
1-800-950-NAMI
Website: nami.org/sites/NAMIEIPaso
Services: Support groups for client and clients family members of those who are mentally ill. Groups provided in English and Spanish A lending library provides educational videos and books to the family members. Person needs to call to inquire about the days and times of the groups.
Family education services - free all year round.

Narcotics Anonymous

Website: riograndena.org

VA Behavioral Healthcare Center

5001 N. Piedras (attached to William Beaumont Army Medical)
(915) 564-6100
M-F 8:00am – 4:45pm
Website: elpaso.va.gov
Services: Individual, and group counseling for veterans and their families. Drug/alcohol counseling, military sexual trauma, PTSD, some support groups for Iraq and Afghanistan returning veterans CWT (Counseling and work therapy) is provided as needed.Disabled

American Veterans Commission provides transportation, only during the morning vocational rehabilitation for those with disabilities. Bilingual therapists .

Aliviane Women and Children Treatment Program

7722 North Loop

(915) 782-4014

M-F 8:00am – 5:00pm (for assessment)

aliviane.org

Residential Program – Open 24 hours a day

Services: Individual and group therapy for drug/alcohol issues, dual diagnosis, and detox intervention. Individual, group and family therapy and intense case management, Bilingual Therapists available.

Inpatient average stay: 30 to 90 days. Accept children with their mother, however the limit is 3 children, ages 12 and under. Children’s therapist available. Must have custody of child and be TX resident.

PPW (Pregnant Postpartum Women): This program provides case management, GED, computer classes and job preparation. The program follows the patient for 6 months within the community.

Vita

Karla Deyanira Llanes was born in El Paso, Texas. Karla earned a Bachelor of Arts degree in Psychology at the University of Texas at El Paso, while working in Dr. Lawrence D. Cohn's lab. She pursued additional training by obtaining a Master of Arts degree in Experimental Psychology and a Ph.D. in Health Psychology at the University of Texas at El Paso. Her long-term goal is to teach at a university setting and conduct research in areas of judgment and decision-making, health communication, drug and disease prevention, and risk perception.

Email: kdllanes@miners.utep.edu