AN ASSESSMENT OF TRAFFIC SAFETY CULTURE RELATED TO DRIVING AFTER CANNABIS USE

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RESEARCH PROGRAMS

MDT

An assessment of traffic safety culture related to driving after cannabis use

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16. Abstract

The purpose of this project was to develop a better understanding of the traffic safety culture (i.e., shared values, beliefs, and attitudes) of driving under the influence of cannabis (DUIC). A survey was developed based on an augmented integrated model of behavior and was implemented using mailed and internet-based methods. Adults age 18 and older from the U.S. responded. Two states with legalized recreational use of cannabis (Colorado and Washington) were oversampled. The survey measured DUIC behavior, intention, willingness, attitudes, behavioral beliefs, perceived norms, and perceived control. About half of the individuals who had used cannabis in the past 12 months reported driving within four hours of use. Partial correlation coefficients showed that many components of the model correlated with willingness to DUIC. Significant differences in attitudes and beliefs were found between non-users of cannabis, users of cannabis, and those who DUIC. No differences in beliefs or attitudes were found between states with and without legalized recreational use laws nor between states with legalized medical use laws. Recommendations for strategies to reduce DUIC are provided.

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1 INTRODUCTION/BACKGROUND

This final report summarizes the methods, results, conclusions, and recommendations derived from a survey conducted to understand which specific aspects of traffic safety culture predict the decision to drive under the influence of cannabis (DUIC). Results of this formative study also examine the potential effect of existing legislation regarding possession and use of cannabis on DUIC and its predictors. Understanding the cultural factors that predict DUIC provides opportunities to develop interventions to address relevant risk factors.

This section provides background information about the definition of traffic safety culture, the theoretical basis for the behavioral model used to design the survey, and a brief review of some research informing the issue.

1.1 Traffic Safety Culture

Arguably, the greatest challenge of defining traffic safety culture is being too inclusive about what culture includes. Culture has been equated with the thoughts shared amongst a group of people, as well as with their common behaviors and generated artifacts (Cooper 2000, pp. 111-136; Luria and Rafaeli 2008, pp. 519-28). It is difficult to imagine what else remains in this world that such a definition does not already include (Myers, Nyce, and Deckker 2014, pp. 25-29). However, such an inclusive definition has limited utility because nothing is left for it to explain or predict other than itself: "it covers almost everything and thereby nothing" (Alvesson 2011, pp. 151-164).

In the context of traffic safety, the goal is to change behaviors affecting crash risk. Therefore, the concept of traffic safety culture must be able to explain and predict these behaviors rather than include them in its own definition: "if behaviors are the target of change, and the cultural forces behind behaviors are the topic of investigation, then behaviors must be understood as something informed but separate from culture" (Myers, Nyce, and Deckker 2014, p. 27). Based on this logic, Figure 1 depicts deliberate (willful and intentional) behaviors to be the outcome of culture, which is defined as the thoughts shared amongst people identifying with a particular group in the social environment. The social environment can be viewed as a "social system" comprised of a hierarchy of social layers (Figure 2). These layers define social categories, each representing a set of common attributes that differentiate them from other groups (Hornsey 2008, pp. 204-22; Hogg and Reid 2006, pp. 7-30). We belong to multiple groups within our social environment depending on our similarity to the common attributes associated with those groups. For example, one individual may be a parent (family layer), a delivery driver (workplace layer), and a resident of a specific community (community layer).

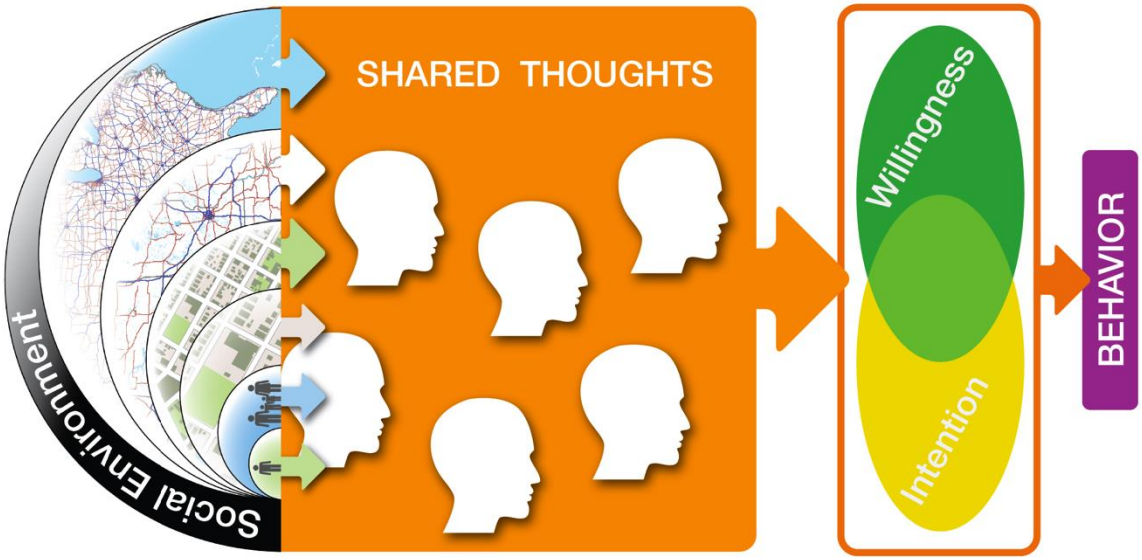

Figure 1. Definition of culture of shared thoughts amongst groups in social environment that influences deliberate behaviors.

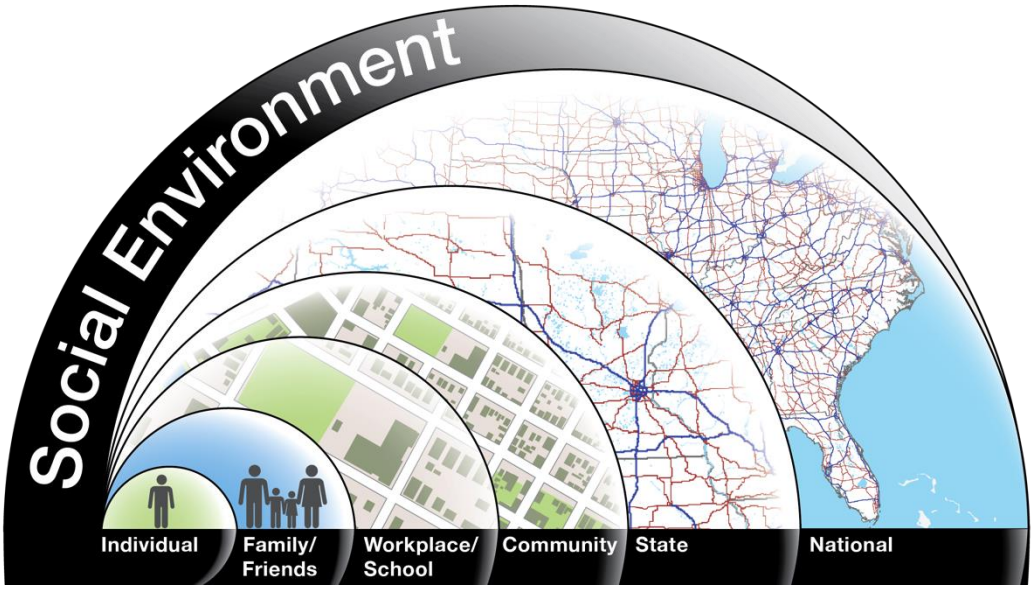

Figure 2. Levels of social grouping within the social environment.

Conceptualized in this way, "culture is in the mind of the people" (Geertz 1973, p. 86). In general, thoughts are our mental representations and interpretations of the physical and social environment (Figure 2). More specifically, thoughts include values (ideals to which group members collectively aspire) and beliefs (understanding of the physical and social environment). Values and beliefs are the foundation of other types of thoughts including our attitudes about behaviors, perceptions of normal behavior, and perceived control over our behavioral choices in the social and physical environment. Collectively, these thoughts influence our willingness and intention to behave in these environments.

It is important to note that the behaviors of drivers or road users are not the only behaviors relevant to traffic safety culture. For example, not wearing a seat belt is a road user behavior. However, a family (or workplace) establishing a rule about always wearing a seat belt is an important behavior or action that must be included as well.

In this context, we can now define traffic safety culture as *the values and beliefs shared among groups of road users and stakeholders that influence their decisions to behave or act in ways that affect traffic safety.*

1.2 Overview of Behavioral Model

Many values and beliefs are shared among road users and stakeholders. If the intention is to improve traffic safety, then it is critical to determine which values and beliefs influence behaviors relevant to traffic safety. Fortunately, several validated behavioral models that have already been established from prior research can be applied to this purpose: Value-Belief-Norm Theory (Stern 2000, pp. 407-424; Oreg and Katz-Gerro 2006, pp. 462-483), the Reasoned Action Approach (Fishbein and Ajzen 2010), and the Prototype Willingness Model (Gerrard et al. 2008, 29-61). Combining the substantive features of these different behavioral models into a single model results in a more comprehensive understanding (e.g., Glanz Rimer, and Viswanath 2008, Ch. 4). Figure 3 represents an augmented, integrated model that relates values and beliefs to behavior.

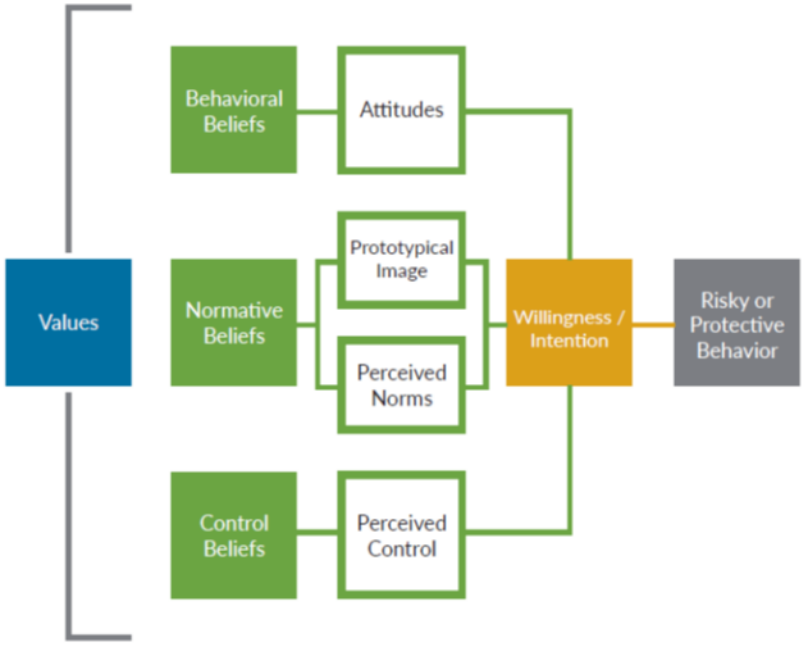

Figure 3. Integrated model used in this project to specify components of culture and their predicted influence on deliberate behaviors.

In this model, willingness and intention predict engagement in behavior. Willingness and intention are directly influenced by:

- The attitude (positive or negative) toward the behavior as evident by emotional reaction to the behavior and perceived utility of the behavior;

- The perception of what is typical (Perceived Descriptive Norm) or expected (Perceived Injunctive Norm) as well as the desirability of the image associated with the type of person typically associated with that behavior (Prototype Image); and,
- The perception of an individual's capacity and control to perform the behavior (Perceived Control).

In turn, each of these emerges from beliefs about the behavior:

- Attitudes are determined by behavioral beliefs about the consequences of a behavior (e.g., wearing a seat belt reduces injury in a crash) and how that consequence is evaluated (e.g., not being injured is important).
- Perceived descriptive norms are determined by our beliefs about what others typically do or, in other words, what is perceived as "normal." Perceived injunctive norms are determined by our beliefs about what others typically expect or approve. Beliefs about the attributes of people who typically commit a behavior determine the image of the prototypical person representing that behavior (Prototype Image).
- Perceived control is determined by control beliefs about various factors or conditions that may impact an individual's sense of being in control of the behavior.

The formation of a belief system depends on cultural values. Values are ideals to which people aspire (Joffe 2003, pp. 55-73). Values provide the criteria by which the desirability of different choices and possible outcomes are evaluated (Lee, Soutar, and Louviere 2007, pp. 1043-58). By defining what is considered important, values provide the impetus to develop beliefs about the physical and social environments relevant to achieving goals consistent with these values (Spates 1983, pp. 27-49).

Table 1 provides a brief description of each component of the model. It is important to note that the model does not inform how various beliefs are established. Beliefs may be informed by direct experience, vicarious experience, formal education, informal education, etc.

Table 1. Summary of Components of Integrated Behavioral Model

Attitudes	Subjective evaluation of an object or behavior in terms of emotional reaction (e.g., "Speeding is exciting") and perceived utility (e.g., "Seat belts are useless").
Behavioral Beliefs	Expectations about the physical and social consequences of a behavior (e.g., "If I speed, I will likely get an expensive fine," "If I drink and drive, my friends will exclude me").
Control Beliefs	Beliefs about individual (or personal) ability to engage or not engage in the behavior based on factors that are either internal or external to the individual (e.g., "Crashes are determined by fate," "I am comfortable not speeding even if everyone around me is").
Intention	The deliberate decision to commit a behavior in an anticipated situation (e.g., "I intend to wear my seat belt every time I am in a vehicle").
Normative Beliefs	Beliefs about (1) what behaviors are most common in a group (e.g., "All my friends speed"); (2) what important people in that group expect (e.g., "My parents expect me to wear a seat belt"); and (3) the shared characteristics of people perceived to typically engage (or abstain) in those behaviors. Descriptive norms describe what is common; injunctive norms describe what is expected.
Perceived Control	Perception of our ability to determine our own behaviors (e.g., "I can choose my own speed in traffic").
Perceived Norms	The behavior believed to be common and expected in a given context (e.g., wearing a seat belt when driving with parents).
Prototypical Image	The stereotype of people perceived to typically engage in the behavior (e.g., "People who speed are cool"). Prototypical image can be measured for both those who "always" engage in the behavior as well as for those who "never" engage in the behavior.
Values	Ideals to which we aspire that define the goals for our behavioral choices and direct the formation of our belief systems (e.g., "I must protect my family," "I desire a life without stress").
Willingness	The predisposition to commit a behavior if an unexpected situation arises (e.g., "I am more willing to speed if everyone else around me is speeding").

1.3 Cannabis and Driving

Research shows that cannabis is the most commonly used illicit drug in the United States. For example, a national survey showed that 8.4 percent of respondents aged 12 years and older reported using cannabis in the past month (CBHSQ 2015, p. 9). A recent study found that an estimated 4.6 percent of respondents drove within an hour of using marijuana (Arnold and Tefft 2016, pp. 1-19). The number of nighttime weekend drivers in the U.S. with marijuana in their system increased 48 percent (from 8.6 percent in 2007 to 12.6 percent in 2013-2014) (NHTSA, 2015, pp. 1-5).

Cannabis has been shown to have short-term effects on skills that are essential to driving including cognitive function such as decision making, and motor coordination resulting in an increase in a driver's risk of a traffic crash (World Health Organization 2016, pp. 1-62). In a meta-analysis of nine studies conducted by Asbridge et al. (2014 pp. 536-545) it was found that recent cannabis use about doubled one's risk of a traffic crash (OR 1.92 (95% CI: 1.35, 2.73)). Similarly, in studying the association between marijuana use and crash risk, Li et al., found an odds ratio of 2.66 (95% CI: 2.07, 3.41) (pooled analysis) in a meta-analysis of nine epidemiologic studies (2012, pp. 65-72). A systematic review and meta-analysis of 66 studies to better understand the risk of an accident associated with the use of drugs when driving was conducted by Elvik (2013, pp. 254-267). In this study, when looking specifically at cannabis, there were 42 estimates of risk, of which 10 for fatal accidents, 15 for injury accidents, and 17 for property damage only accidents (Elvik 2013, pp. 262). "The summary odds ratio indicates that the risk of becoming involved in an accident at any level of severity increases moderately (by about 25-50%) when using cannabis" (Elvik 2013, p. 262). Further, studies have demonstrated that tetrahydrocannabinol (THC) induces driving impairment and increases crash risk in a dose related manner (Ramaekers et al. 2004, pp. 109-119; Grotenhermen et al. 2007, pp. 1910-1917; Asbridge et al. 2014, pp. 395-404). Thus, DUIC is a significant public health concern (Swift, Jones, and Donnelly, 2010, pp. 573-586; Jones et al. 2006, pp. 854-861; McGuire et al. 2011, pp. 248-259; Fischer et al. 2014, pp. 185-200).

There is ongoing research to better understand factors that influence the decision to DUIC. For example, perception of risk may be an influencing factor in the decision to DUIC. There are varying cultural beliefs and perceptions regarding the effect of using marijuana on driving and the risk of causing a crash. For example, Arnold and Tefft found that 31.8 percent of drivers indicated that they did not know how using marijuana affects crash risk. Specifically, 6.2 percent believed the risk of causing a crash was not affected by the use of marijuana and 3.6 percent believed the risk of causing a crash was actually reduced by using marijuana (Arnold and Tefft 2016, pp. 1-19). "Drivers who reported using marijuana, and those who reported driving within an hour of use in the past year were less likely to believe that using marijuana increases crash risk, and more likely to believe that such use does not affect or decreases crash risk" (Arnold and Tefft 2016, p. 1).

Swift, Jones, and Donnelly (2010, pp. 573-586) found that the decision not to DUIC was related to beliefs about impairment to driving performance and perceived increase in crash risk to oneself and others. Other studies have looked at factors related to the decision to DUIC such as driver attitudes and risky driving behaviors (Fergusson, Horwood and Boden 2008, pp. 1345-1350), perceived risk of getting caught (Jones et al. 2006, pp. 854-861; Jones et al. 2007, pp. 83-86; Swift, Jones, and Donnelly 2010, pp. 573-586; Fisher et al. 2014, pp. 185-200), and intention to DUIC (Fisher et al. 2014, pp. 185-200).

Cultural beliefs and attitudes will also determine the types of policies and strategies that might be acceptable and effective in communities to improve traffic safety. To date, Washington DC and 23 states have legalized marijuana for medicinal purposes, and five states have passed laws allowing adults to personally possess and consume marijuana (National Organization for the Reform of Marijuana Laws, 2016). Those states include Colorado, Alaska, District of Columbia, Oregon, and Washington (National Organization for the Reform of Marijuana Laws, 2016). Changes in state laws regarding the decriminalization of cannabis may be one reason for increased cannabis use (Ferner 2015). The implication of changes in state laws and cannabis use is important because the consumption of cannabis may induce driving impairment that could increase crash

risk (Laberge and Ward 2004, pp. 971-989; Ramaekers, Berghaus and Drummer 2004, pp. 109-119; Grotenhermen et al. 2007, pp. 1910-1917; Asbridge et al. 2014, pp. 395-404).

Various models and theories have been developed to better understand and explain how legislation influences beliefs and attitudes beyond the traditional sanctions that are often imposed because of legislation (Geisinger 2002, pp. 35-73). For example, the Rational Choice Model of Norms suggests that law "teaches the community about the existing sentiment, thus causing community members to update their beliefs by making clearer to them what the existing community norm is" (Geisinger 2002, p. 54). Richard McAdam's Theories of Expressive Law considers how individual attitudes and beliefs are affected by laws; Robert Cooter's Theory of Norm Internalization focuses on how individual preferences are affected by laws; the Belief Change Theory of Expressive Law considers how laws affect behavioral decisions (Geisinger 2002, pp. 35-73).

A majority of the literature pertaining to legislative change affecting public opinion and beliefs on substances has focused on medical marijuana, particularly public use of the drug, attitudes, and views regarding use of the drug. For example, Schermeyer et al. (2014, pp. 145-155) found evidence of lower risk perception of the use of marijuana among all age groups after Colorado implemented medical marijuana legislation. Harper, Stumpf, and Kaufman (2012, pp. 207-212) found that although there was a lower risk perception of marijuana use in medical marijuana states, there was no evidence suggesting that the change in laws caused a change in risk perception. Cerda et al. (2012, p. 2227) looked at the relationship between state-level legalization of medical marijuana and marijuana use, abuse, and dependence and concluded that states that enacted medical marijuana laws had much higher rates of use and abuse; although just like previous studies, there was not strong enough evidence to establish that the enactment of the laws caused these changes.

No published research was found that specifically examined how state laws legalizing recreational use of marijuana influence cultural factors associated with DUIC. However, with the passage of legislation that legalizes recreational use of marijuana, there is growing interest in looking specifically at this type of legislation and its effect on traffic-related behaviors (Tefft, Arnold and Grabowski 2016, pp. 1-26; Banta-Green et al. 2016, pp. 1-35). As states are passing these laws, many are also establishing *per se* THC limits for driving under the influence (DUI). A *per* se limit establishes impairment based on a measure of the concentration of a substance as opposed a measure of cognitive or physical impairment. A recent study by Arnold and Tefft (2016, pp. 1-19) found "awareness of *per se* DUI laws for marijuana was low: in states that did have a *per se* law, only 48.5 percent were aware of it; in states without a *per se* law, 44.7 percent indicated incorrectly that their state had such a law. Irrespective of whether their state actually had a *per se* law for marijuana, more than half of all drivers reported that they did not know whether or not their state had such a law." Despite efforts to encourage states to adopt *per se* drugged driving laws, researchers have yet to identify a quantitative threshold for *per se* laws for THC following cannabis use that is supported by research evidence (Logan, Kacinko, and Beirness 2016, pp. 1-53) which may be leaving the public with ambiguity regarding the risks of DUIC. Changes in attitudes and use of marijuana have been associated with changes in legalization, but questions remain about how changes in legislation specifically impact DUIC.

It is timely to better understand the culture regarding the use of cannabis and driving. Understanding how cultural factors are related to the decision to DUIC and how changing laws can ultimately impact related behaviors can be useful to the public and to policy makers. Increased

use of cannabis among drivers may pose a barrier to achieving The National Toward Zero Deaths (TZD) initiative. The transformation of traffic safety culture is a primary element of the TZD strategy. A positive safety culture can significantly reduce crash fatalities and serious injuries.

1.4 Research Objectives

The project sought to answer four critical questions:

- How does traffic safety culture compare between users and non-users of cannabis?
- How does traffic safety culture correlate with the decision to drive under the influence of cannabis?
- How does traffic safety culture compare between states with and without legalized recreational use laws?
- How does traffic safety culture compare between states with and without legalized medical use laws?

For this project, traffic safety culture has been defined as the values and beliefs shared among groups of road users and stakeholders that influence their decisions to behave or act in ways that affect traffic safety (see above). An augmented, integrated behavior model (Figure 3) was used to identify potential beliefs to examine.

2 METHODS

2.1 Survey Development

The Driving Under the Influence of Cannabis (DUIC) Survey was developed based on an augmented form of the integrated behavioral model (Figure 3). Formative interviews were used to develop an initial survey which was then pilot tested using an online survey with convenience samples.

Eleven interviews were conducted with a convenience sample of known users of cannabis to inform the development of the survey. After reading an informed consent statement, the interviewer asked the following questions:

1. Please list what are the advantages of driving under the influence of cannabis.
2. Please list what are the disadvantages of driving under the influence.
3. Please list how you might (or do) feel when driving under the influence of cannabis.
4. Please list who would approve of you driving under the influence of cannabis.
5. Please list who would disapprove of you driving under the influence of cannabis.
6. What would make it easier or more likely for you to drive under the influence of cannabis?
7. What would make it harder or less likely for you to drive under the influence of cannabis?
8. What three adjectives best describe your image of the "Typical" person who often drives under the influence of cannabis.
9. What three adjectives best describe your image of the "Typical" person who never drives under the influence of cannabis.
10. Describe a situation in which you would be more likely to drive under the influence of cannabis.

The responses from the interviews were used to develop questions for each component of the behavioral model. DUIC behavior was measured using a conservative measure of driving within four hours of using cannabis (Fischer et al. 2014, pp. 185-200; Fischer et al. 2006, pp. 179-187). Additional behaviors measured included driving frequency and frequency of use of cannabis.

Willingness to DUIC was measured in six situations of varying risk: drive in an emergency, drive home on side streets, drive home on the highway, drive if you don't feel high, drive even though you still feel high, and drive when you had also been drinking. Attitude was measured using five semantic differentials (cool/uncool, dangerous/safe, stupid/sensible, pleasant/unpleasant, acceptable/ unacceptable). Semantic differential questions ask respondents to rate an item (in this case, a behavior) by selecting a choice between two opposite words. The respondent's selection is an indication of how they feel about the item based on the two words.

Six behavioral beliefs were derived from the interviews: three with positive expectancies ("if I drive after using marijuana, I will feel calmer / more alert / more cautious") and three with negative expectancies ("if I drive after using marijuana, I will be more likely to be arrested / my reaction time will be slower / I am more likely to be in an accident").

Prototypical images were measured using sematic differentials based on the interviews. Twelve pairs of words were used to describe the "typical" person who drives after using marijuana and the "typical" person who never drives after using marijuana.

Injunctive norms were assessed relative to five groups: friends, family, employer, law enforcement in my community, and most people in my community. Descriptive norms were assessed among two groups: "most people like you in your state" and "most people age 21 and older in your state."

Control beliefs were based on the interviews and assessed how likely individuals were to find themselves in the following situations within four hours of using marijuana: needing to drive to work or school; needing to drive to run errands; and needing to drive home (after using marijuana when out or at a party).

Values were measured using the most-least rank rate method (McCarty and Shrum 2000, pp. 271-298) applied to the Short Schwartz Value Survey (Lindeman and Verkasalo 2005, pp. 170-178). The most-least rank rate method asks participants to first rank the most important value and least important value among a list of 10 values. Subsequently, they are asked to rate the importance of each of the 10 values one at a time. McCarty and Shrum found that ranking the values first resulted in a greater variation in the ratings.

The survey was refined based on the results of an internet-based pilot test with a purchased panel from Qualtrics of 75 adults who had used cannabis in the past 30 days. The interviews, pilot survey, and final survey were reviewed and approved by the Institutional Review Board at Montana State University. A copy of the survey is included in Appendix A.

2.2 Survey Distribution

The survey was administered by two methods: a mailed paper version and an online version. The same survey instrument was used for each method. The online version was included to obtain responses from younger adults as mailed surveys often lack responses from this group. Because one research objective was to explore the differences in beliefs and behaviors between states with and without legalized recreational use of cannabis, Colorado and Washington were oversampled. In addition, Alaska, Oregon, and the District of Columbia were excluded from the study because they had recently passed laws legalizing recreational use of cannabis but were in various stages of implementation thus making it difficult to classify them as states with or without legalized recreational use.

2.2.1 Mailed Paper Survey

The Center for Health and Safety Culture (CHSC) contracted with a mailing provider for production and distribution of the paper survey. A four-point contact process was used to distribute the surveys using the U.S. Postal Service. The mailings included (1) a pre-survey letter from the CHSC; (2) a survey packet with a cover letter, survey, $2 cash incentive, and return envelope; (3) a reminder / thank-you postcard; and (4) a second survey packet with a cover letter, survey, and return envelope. All postage was hand-affixed.

A mailing list of a random sample of households from across the United States was purchased. This list of randomly selected households included 800 from Washington, 800 from Colorado, and 1,600 from all other states (excluding WA, CO, OR, AK, and the District of Columbia). To allow tracking of returned surveys by zip code, a unique tracking code was printed on each hand-stamped, self-addressed survey return envelope. The tracking code of each returned survey was recorded in a database. The zip code of the respondent was included with the survey information. All paper surveys were hand coded and compiled into an SPSS database. The online database and the paper survey database were merged into one database to allow for analysis of all data collected. A total of 418 surveys were returned as undeliverable. A total of 879 surveys were returned resulting in an overall response rate of 31.6 percent (= 879/(3200-418)).

2.2.2 Online Survey

Qualtrics was the online survey platform utilized. Two panels were purchased from Qualtrics. The first panel purchased was for individuals age 18 to 30 in all states (excluding WA, CO, OR, AK, and the District of Columbia). The panel survey was completed between February 15 and February 23, 2016 with a total of 735 completions. All these individuals received a small incentive to complete the survey provided by Qualtrics.

Because the focus of the research was on driving under the influence of cannabis, it was important to gather a significant number of responses from individuals who use cannabis. Therefore, a second panel was purchased including individuals age 18 to 30 residing in Colorado or Washington who reported using cannabis at least once in the past 30 days. This panel was completed between February 16 and March 15, 2016 with a total of 526 completions.

Table 2 summarizes the three surveys included in this report. The "Code" is used to identify each survey in the analysis section of this report.

Table 2. Summary of Surveys

Code	Demographic / Method	Geography	Qualification	Recruitment
Survey #1 Mailed (ages 21+, all states)	Adults age 18 and older Mail	states with legalized recreational marijuana use (Colorado, Washington)		1,600 randomly selected households $2 cash incentive
	Adults age 18 and older Mail	states without legalized recreational marijuana use (all states EXCEPT: AK, CO, WA, OR, Washington DC).		1,600 randomly selected households $2 cash incentive
Survey #2 Internet (ages 18-30, no CO WA)	Adults age 18- 30 Internet	states without legalized recreational marijuana use (all states EXCEPT: AK, CO, WA, OR, Washington DC).		Purchased panel
Survey #3 Internet (ages 18-30, CO & WA user)	Adults age 18- 30 Internet	states with legalized recreational marijuana use (Colorado, Washington)	30-day use of cannabis	Purchased panel

2.3 Cleaning

Prior to analyzing the data, the data set of responses was reviewed for inconsistencies and missing data. After review, 49 records were removed for inadequate response to questions (surveys with more than 75% of responses left blank) leaving 830 records. After all the surveys were loaded into a database (SPSS), they were tested for internal consistency. For example, if an individual indicated they had never driven a vehicle in the past 12 months and then indicated they had driven under the influence of cannabis in the past 12 months, the survey was flagged as inconsistent. In the mailed survey, 10 records (1.2 percent) were removed as inconsistent. In the internet survey of states excluding Alaska, Colorado, the District of Columbia, and Washington, 19 of 735 records (2.6 percent) were removed. In the internet survey of Colorado and Washington, 9 of 526 records (1.7 percent) were removed.

2.4 Demographics

2.4.1 Gender and Age

The distribution of respondents by gender and age from each survey method were compared to the general population using U.S. Census projections for 2015. For the mailed survey (#1), more females responded than males, and respondents tended to be older than the general population. Notably, only six individuals age 18 to 20 responded to the mailed survey.

Weights were developed to align distributions of gender and age with general population estimates. Because of the limited number of responses by those ages 18 to 20, the mailed survey only represents individuals age 21 and older. Table 3 shows the distribution of respondents by age and gender for the mailed survey before and after weighting.

Table 3. Distribution of Ages of Survey #1 (Mailed)

	U.S. Census			Survey Respondents					
				Unweighted			Weighted		
Age	Male	Female	Total	Male	Female	Total	Male	Female	Total
21 to 24 years	4.1%	3.9%	8.0%	0.6%	1.2%	1.8%	4.1%	3.9%	8.0%
25 to 34 years	9.5%	9.3%	18.7%	3.4%	6.1%	9.5%	9.4%	9.3%	18.7%
35 to 44 years	8.7%	8.8%	17.4%	6.7%	7.2%	14.0%	8.7%	8.8%	17.5%
45 to 54 years	9.2%	9.5%	18.7%	7.5%	10.7%	18.2%	9.3%	9.5%	18.8%
55 to 64 years	8.3%	8.9%	17.3%	11.2%	13.6%	24.8%	8.3%	8.9%	17.2%
65 to 74 years	5.3%	6.0%	11.4%	7.3%	11.1%	18.4%	5.3%	6.0%	11.3%
75 or older	3.4%	5.1%	8.5%	5.3%	8.0%	13.3%	3.5%	5.1%	8.6%
Total	48.5%	51.5%	100%	42.0%	58.0%	100%	48.6%	51.4%	100%

For the internet surveys (#2, #3), the distributions of age and gender were much closer to the general population. However, weights were still created to align the distributions to general population estimates based on gender and age. Weights for Survey #3 were based on the demographics of

Colorado and Washington. Table 4 and Table 5 show the distributions of respondents by age and gender for the internet surveys (Survey #2 and Survey #3). All results included in this report are based on weighted results.

Table 4. Distribution of Ages of Survey #2 (Internet)

Age	U.S. Census			Survey Respondents					
				Unweighted			Weighted		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
18	3.8%	3.6%	7.3%	2.5%	1.5%	4.1%	3.8%	3.5%	7.3%
19	3.8%	3.6%	7.5%	2.7%	1.8%	4.5%	3.8%	3.7%	7.4%
20	3.9%	3.7%	7.7%	1.7%	2.4%	4.1%	3.9%	3.8%	7.7%
21 to 24 years	16.4%	15.6%	32.0%	11.7%	14.2%	26.0%	16.4%	15.6%	32.0%
25 to 30 years	23.1%	22.4%	45.5%	30.9%	30.6%	61.5%	23.0%	22.5%	45.5%
Total	51.0%	49.0%	100.0%	49.4%	50.6%	100.0%	51.0%	49.0%	100.0%

Table 5. Distribution of Ages of Survey #3 (Internet, CO and WA)

Age	Unweighted			Weighted		
	Male	Female	Total	Male	Female	Total
18	2.3%	1.4%	3.7%	3.5%	3.3%	6.8%
19	1.9%	1.7%	3.7%	3.7%	3.3%	7.0%
20	1.7%	1.9%	3.7%	3.7%	3.3%	7.0%
21 to 24 years	15.7%	20.1%	35.8%	16.5%	14.9%	31.4%
25 to 30 years	27.9%	25.3%	53.2%	24.8%	23.1%	47.9%
Total	49.5%	50.5%	100.0%	52.1%	47.9%	100.0%

2.4.2 Geographical Area

Three questions were asked to assess the representativeness of the sample: geographical area where the respondent lives (e.g., urban, suburban, or rural), education attainment, and recent consumption of alcohol. The U.S. Census for 2010 indicated that the population across the U.S. was 71.2 percent urban (defined as having a population of 50,000 or more), 9.5 percent urban cluster (defined as having a population of 2,500 to 50,000), and 19.3 percent rural. Respondents may not have accurately differentiated between urban and suburban. The sample for the three surveys had similar levels of rural population except for Survey #3 which had a significantly larger rural population (Table 6). It is important to note that respondents to Survey #3 could only participate in the survey if they indicated they had used cannabis in the past 30 days and therefore may not represent the general population.

Table 6. Geographical Area

	Urban	Suburban	Rural
Mailed (age 21+, all states)	28.9%	49.5%	21.7%
Internet (18-30, no CO or WA)	29.1%	50.9%	20.0%
Internet (18-30, CO and WA, user)	19.0%	32.5%	48.5%

2.4.3 Education

In 2015, the U.S. Census estimated that 41 percent of adults age 25 and older had a high school education (only) or less; 59 percent had some college or more; 33 percent had a Bachelor's degree or more, and 12 percent had an advanced degree. Overall, survey respondents had higher education attainment than the general population (Table 7).

Table 7. Education Attainment

	High school or less	Technical or vocational school	Some college	College graduate	Post graduate work or advanced degree	Refused
Mailed (age 21+, all states)	12.6%	7.3%	22.4%	34.6%	22.6%	.5%
Internet (18-30, no CO WA)	19.0%	2.5%	36.2%	31.9%	10.4%	
Internet (18-30, CO WA, user)	21.7%	5.4%	41.2%	28.0%	3.5%	.2%

2.4.4 Alcohol Use

The National Survey on Drug Use and Health (NSDUH) estimates that 60 percent of adults age 18 to 25 and 57 percent of adults age 26 or older consumed alcohol in the past thirty days in 2014. Respondents to the survey indicated slightly higher levels of drinking than the general population (Table 8). It is important to note that respondents to Survey #3 are current users of cannabis and therefore do not represent the general population.

Table 8. Consumed Alcohol in the Past Thirty Days

	Yes	No	I don't know
Mailed (age 21+, all states)	68.5%	30.2%	1.3%
Internet (18-30, no CO WA)	60.5%	38.9%	0.6%
Internet (18-30, CO WA, user)	78.1%	21.7%	0.2%

2.4.5 Summary

Overall, more females responded to the survey than males, and the respondents tended to be older, more educated, and more likely to drink alcohol than the general population. Age and gender differences were controlled for by weighting. The proportion of respondents living in rural areas was

similar to the general population. Effects of geography, education attainment, and consumption of alcohol were examined with each analysis.

2.5 Scales

The survey was developed based on a behavioral model (Figure 1). When possible, multiple questions were used to measure each component of the model. A scale was created based on the responses to the questions for each component. The questions used for each component are summarized in Appendix B. Table 9 lists the internal reliability of the questions used to compose the scale for each survey method. Overall, the scales show very strong internal reliability.

Table 9. Summary of Scales and Internal Reliability

	Internal Reliability (Cronbach's Alpha)		
Scale	Mailed (age 21+, all states)	Internet (18-30, no CO WA)	Internet (18-30, CO WA, user)
Willingness	0.935	0.939	0.872
Attitude	0.905	0.930	0.932
Prototypical Image (always)	0.878	0.908	0.909
Prototypical Image (never)	0.941	0.932	0.932
Perceived Norms – injunctive	0.468	0.657	0.812
Perceived Norms – descriptive	0.784	0.880	0.936
Control Beliefs	0.931	0.946	0.833

3 RESULTS

3.1 Overview

First, the relative frequency distributions for each question on all three surveys were reviewed (see Appendix C). This provides a general overview about which values, beliefs, attitudes, and behaviors regarding driving under the influence of cannabis are "shared" within this sample – and therefore – indicate aspects of the prevailing traffic safety culture regarding DUIC.

Next, partial correlation coefficients based on the behavioral model were examined. These coefficients indicated to what degree each component of the model correlated while controlling for the other variables. These coefficients revealed which components were most predictive of DUIC behavior.

To isolate any potential effects of the survey method (e.g. mailed vs. internet), measures were examined separately for each survey.

Finally, using the guidance from the partial correlation coefficients, significant factors were analyzed in greater detail to answer the four questions posed for this project:

- *How does traffic safety culture compare between users and non-users of cannabis?*
    - Respondents for Survey #1 were divided into two groups: those that reported not using cannabis in the past 12 months ("non-users") and those that reported using cannabis in the past 12 months ("users"). The mean responses (i.e., averages) for each group were compared using T-tests. This process was repeated for all questions on the survey. To depict the differences between these two groups, the means of various model components were compared graphically.
    - The same process was used to compare the respondents to Survey #2. Because all the respondents to Survey #3 were cannabis users (i.e., had reported cannabis use in the past 30 days), respondents to Survey #3 were excluded from this analysis.
- *How does traffic safety culture correlate with the decision to drive under the influence of cannabis?*
    - Because one cannot drive under the influence of cannabis if one does not use cannabis, the analyses for this question were restricted to only examining individuals who reported using cannabis ("users"). "Users" for Survey #1 were divided into two groups: those that reported not driving within four hours of using cannabis in the past 12 months ("non-DUIC") and those that reported driving within four hours of using cannabis in the past 12 months ("DUIC"). The mean responses (i.e., averages) for each group were compared using T-tests to see if they were statistically significantly different. This process was repeated for all questions on the survey. To summarize the differences in the two groups, the means of various components were compared graphically.
    - The same process was used to compare the respondents to Survey #2 and Survey #3.

- In addition, the correlations between behavioral beliefs and attitude were examined. The correlations between normative beliefs and perceived norms (specifically, injunctive norms) were also examined.

- *How does traffic safety culture compare between states with and without legalized recreational use laws?*
  - Respondents for Survey #1 were divided into two groups: those that lived in Colorado or Washington (recreational use "legal") and those that lived in all other states (recreational use "illegal"). The mean responses (i.e., averages) for each group were compared using T-tests to see if they were statistically significantly different. This process was repeated for all questions on the survey. To summarize the differences in the two groups, the means of the scales were compared and summarized in a single table.
  - The same process was used to compare the respondents to Survey #2 and Survey #3 (only among cannabis "users" for Survey #2).
- *How does traffic safety culture compare between states with and without legalized medical use laws?*
  - Respondents for Survey #1 were divided into two groups: those that lived in states with legalized medical use of cannabis (medical use "legal") and those that lived in all other states (medical use "illegal"). Individuals living in Colorado and Washington were removed from this analysis. The means of each scale for each group were compared using T-tests to see if they were statistically significantly different.
  - The same process was used to compare the respondents to Survey #2.

3.2 Relative Frequencies

Appendix C contains the relative frequencies for all questions on the survey for each survey. In this section, a few items are highlighted.

Table 10 compares self-reported cannabis use in the past year by survey respondents with the results of the National Survey on Drug Use and Health (NSDUH) for 2013 and 2014. Respondents from Colorado and Washington were removed for this comparison because these states were oversampled in the survey. The prevalence of past year cannabis use among survey respondents is very similar to those levels measured by the NSDUH.

Table 10. Past Year Cannabis Use by Survey and Age

	DUIC Survey		National Survey on Drug Use and Health (2013, 2014)	
	Survey #1 Age 21 and older No CO or WA	Survey #2 Age 18 – 30 No CO or WA	Age 18 and older	Age 18 – 25
Cannabis Use in the Past Year	15.8%	32.0%	12.9%	31.8%

Table 11 summarizes the prevalence of driving within four hours of using cannabis among survey respondents. Table 12 summarizes the prevalence of driving within four hours of using cannabis among those who reported using cannabis in the past year. About half of respondents who reported using cannabis in the past year drove within four hours of using.

Table 11. Prevalence of Driving Within Four Hours of Using Cannabis by Survey

"Thinking back over the past 12 months, how often did you drive within four hours of using marijuana?"

	Never	Once or twice	3 to 6 times	7 to 11 times	Monthly	Weekly	Daily
Mailed (age 21+, all states)	90.5%	1.7%	1.1%	1.2%	.2%	2.2%	3.0%
Internet (18-30, no CO WA)	84.6%	3.5%	2.0%	1.8%	1.8%	3.8%	2.5%
Internet (18-30, CO WA, user)	46.6%	17.6%	6.0%	4.6%	8.9%	8.7%	7.5%

Table 12. Prevalence of Driving Within Four Hours of Using Cannabis Among Past-Year Users of Cannabis by Survey

"Thinking back over the past 12 months, how often did you drive within four hours of using marijuana?"

Survey	Never	Once or twice	3 to 6 times	7 to 11 times	Monthly	Weekly	Daily
Mailed (age 21+, all states)	57.7%	7.7%	4.9%	5.5%	1.1%	9.9%	13.2%
Internet (18-30, no CO WA)	51.8%	11.0%	6.1%	5.7%	5.7%	11.8%	7.9%
Internet (18-30, CO WA, user)	46.6%	17.6%	6.0%	4.6%	8.9%	8.7%	7.5%

Respondents were asked about whether driving under the influence of cannabis was legal or illegal in their state (Table 13). A significant portion of respondents did not know.

Table 13. Knowledge About DUIC Laws by Survey

"Is driving under the influence of marijuana legal or illegal in your state?"

Survey	Legal	Illegal	I don't know
Mailed (age 21+, all states)	1.6%	81.4%	17.0%
Internet (18-30, no CO WA)	2.0%	83.2%	14.9%
Internet (18-30, CO WA, user)	1.0%	86.7%	12.4%

3.3 Correlation with Behavioral Models

To develop a better understanding of which components of the behavioral model predict other components, partial correlation coefficients were calculated. Partial correlation coefficients show the correlation of one variable with another while holding other variables constant. A separate model was created for each survey. The models were only based on respondents who indicated they had used cannabis in the past 12 months.

3.3.1 Predicting DUIC Behavior Among Users of Cannabis

In addition to willingness to drive under the influence of cannabis, factors such as how often an individual drives and how often an individual uses cannabis were included in the analysis. Clearly, if one rarely drives, then one rarely drives under the influence of cannabis. Control beliefs can often directly influence engagement in behavior. Therefore, control beliefs were included in the analysis as well. Table 14 shows the partial correlation coefficients for the three surveys.

Table 14. Partial Spearman Correlation Coefficients With DUIC Among Users of Cannabis

	Partial Spearman Correlation Coefficients (Significance, p)		
	Survey #1 (df=190)	**Survey #2** (df=237)	**Survey #3** (df=553)
Q7. How often do you drive	0.33 (<0.001)	0.19 (0.004)	0.18 (<0.001)
Q8. How often do you use marijuana	0.40 (<0.001)	0.50 (<0.001)	0.27 (<0.001)
Willingness	0.53 (<0.001)	0.42 (<0.001)	0.50 (<0.001)
Control Beliefs	0.28 (<0.001)	0.0 (0.168)	0.31 (<0.001)

3.3.2 Predicting Willingness Among Users of Cannabis

Partial correlation coefficients of key components of the behavior model with willingness were calculated. Prototypical image did not contribute to the predictive ability of the model and was removed. Table 15 shows the partial correlation coefficients for the remaining cultural components in each survey.

Table 15. Partial Spearman Correlation Coefficients With Willingness Among Users of Cannabis

	Partial Spearman Correlation Coefficients (Significance, p)		
	Survey #1 (df=180)	**Survey #2** (df=237)	**Survey #3** (df=553)
Attitude	0.54 (<0.001)	0.31 (<0.001)	0.38 (<0.001)
Perceived Norms – injunctive	0.25 (0.001)	0.16 (0.016)	0.23 (<0.001)
Perceived Norms – descriptive	0.05 (0.469)	0.19 (0.003)	0.21 (<0.001)
Control Beliefs	0.33 (<0.001)	0.42 (<0.001)	0.30 (<0.001)

3.4 Comparing Traffic Safety Cultures

3.4.1 Overview

The following sections compare components of the behavioral model for different groups of respondents. The respondents were divided into different groups based on self-reported behavior to explore if these groups had different traffic safety cultures (i.e., different shared values, beliefs, and attitudes). The last section shows the differences between three groups graphically to reveal a deeper understanding of the differences.

3.4.2 Comparing the Traffic Safety Culture of Non-Users and Users of Cannabis

Respondents were divided into two groups: those that reported not using cannabis in the past 12 months ("non-users") and those that reported using cannabis in the past 12 months ("users"). The mean responses (i.e., averages) for each group were compared using T-tests to see if they were statistically significantly different. T-tests were used as the sample sizes are relatively large (similar results were found using the Mann-Whitney U test). To summarize the differences in the two groups, the means of the scales created based on the behavioral model were compared and summarized in single tables. As shown in Table 16, the scales for Survey #1 (the mailed survey of all states, respondents age 21 and older) are significantly different between non-users and users of cannabis. Larger values of the scale indicate a higher risk for DUIC behavior.

Similarly, a comparison of the scales between non-users and users of cannabis for Survey #2 (the internet survey of all states excluding Colorado and Washington, respondents age 18 to 30) showed significant differences (Table 17). Because Survey #3 only included users of cannabis, a comparison was not performed for Survey #3.

These results show that users of cannabis, in general, have very different beliefs and attitudes than non-users of cannabis about DUIC. Gender, age, geography, and education attainment did not affect the general pattern. These differences are discussed in greater depth below.

Table 16. Comparison of Means Between Non-Users and Users of Cannabis (Survey #1)

	Means[a]		
	Non-Users (n=624)	Users (n=182)	**Significance**
DUIC Behavior Q13. Thinking back over the past 12 months, how often did you drive within four hours of using marijuana? (1= never; 7= daily)	1.00	2.67	p<0.000 001
Intention Q16. Thinking of the next 12 months, how often do you intend to drive within four hours of using marijuana? (1= never; 7= daily)	1.05	2.63	p<0.000 001
Willingness	2.05	4.38	p<0.000 001
Attitude	1.58	3.29	p<0.000 001
Perceived Norms – injunctive	1.91	3.14	p<0.000 001
Perceived Norms – descriptive	3.34	4.62	p<0.000 001
Control Beliefs	1.25	3.45	p<0.000 001

a. Scales range from 1 to 7 (higher number is greater risk)

Table 17. Comparison of Means Between Non-Users and Users of Cannabis (Survey #2)

	Means[a]		
	Non-Users (n=485)	Users (n=227)	**Significance**
DUIC Behavior Q13. Thinking back over the past 12 months, how often did you drive within four hours of using marijuana? (1= never; 7= daily)	1.00	2.69	p<0.000 001
Intention Q16. Thinking of the next 12 months, how often do you intend to drive within four hours of using marijuana? (1= never; 7= daily)	1.07	2.61	p<0.000 001
Willingness	2.15	4.45	p<0.000 001
Attitude	1.82	3.46	p<0.000 001
Perceived Norms – injunctive	1.99	3.38	p<0.000 001
Perceived Norms – descriptive	3.25	4.96	p<0.000 001
Control Beliefs	1.33	3.79	p<0.000 001

a. Scales range from 1 to 7 (higher number is greater risk)

3.4.3 Comparing the Traffic Safety Culture of Those Who Do and Do Not Drive Under the Influence of Cannabis

Because one cannot drive under the influence of cannabis if one does not use cannabis, the respondents for these analyses were restricted to only examining individuals who reported using cannabis ("users").

"Users" were divided into two groups: those that reported not driving within four hours of using cannabis in the past 12 months ("non-DUIC") and those that reported driving within four hours of using cannabis in the past 12 months ("DUIC"). The mean responses (i.e., averages) for each group were compared using T-tests to see if they were statistically significantly different. T-tests were used as the sample sizes are relatively large (similar results were found using the Mann-Whitney U test). This process was repeated for all questions on the survey. The scales are compared in Table 18 (for Survey #1), Table 19 (for Survey #2), and Table 20 (for Survey #3). These results show that individuals who engage in DUIC, in general, have very different beliefs and attitudes than those who do not – even among users of cannabis. Gender, age, geography, and education attainment did not affect the general pattern. These differences are discussed in greater depth below.

Table 18. Comparison of Means Between No DUIC and DUIC Among Users of Cannabis (Survey #1)

	Means[a]		
	No DUIC (n=105)	DUIC (n=77)	**Significance**
DUIC Behavior Q13. Thinking back over the past 12 months, how often did you drive within four hours of using marijuana? (1= never; 7= daily)	1.00	4.94	p<0.000 001
Intention Q16. Thinking of the next 12 months, how often do you intend to drive within four hours of using marijuana? (1= never; 7= daily)	1.04	4.79	p<0.000 001
Willingness	3.26	5.92	p<0.000 001
Attitude	2.49	4.35	p<0.000 001
Perceived Norms – injunctive	2.35	4.21	p<0.000 001
Perceived Norms – descriptive	3.79	5.74	p<0.000 001
Control Beliefs	2.55	4.69	p<0.000 001

a. Scales range from 1 to 7 (higher number is greater risk)

Table 19. Comparison of Means Between No DUIC and DUIC Among Users of Cannabis (Survey #2)

	Means[a]		
	No DUIC (n=118)	DUIC (n=109)	**Significance**
DUIC Behavior Q13. Thinking back over the past 12 months, how often did you drive within four hours of using marijuana? (1= never; 7= daily)	1.00	4.52	p<0.000 001
Intention Q16. Thinking of the next 12 months, how often do you intend to drive within four hours of using marijuana? (1= never; 7= daily)	1.28	4.04	p<0.000 001
Willingness	3.40	5.58	p<0.000 001
Attitude	2.75	4.21	p<0.000 001
Perceived Norms – injunctive	2.73	4.08	p<0.000 001
Perceived Norms – descriptive	4.33	5.63	p<0.000 001
Control Beliefs	2.81	4.85	p<0.000 001

a. Scales range from 1 to 7 (higher number is greater risk)

Table 20. Comparison of Means Between No DUIC and DUIC Among Users of Cannabis (Survey #3)

	Means[a]		
	No DUIC (n=241)	DUIC (n=276)	**Significance**
DUIC Behavior Q13. Thinking back over the past 12 months, how often did you drive within four hours of using marijuana? (1= never; 7= daily)	1.00	4.15	p<0.000 001
Intention Q16. Thinking of the next 12 months, how often do you intend to drive within four hours of using marijuana? (1= never; 7= daily)	1.17	3.58	p<0.000 001
Willingness	3.28	5.36	p<0.000 001
Attitude	2.07	3.82	p<0.000 001
Perceived Norms – injunctive	2.57	3.94	p<0.000 001
Perceived Norms – descriptive	4.30	5.61	p<0.000 001
Control Beliefs	2.78	4.68	p<0.000 001

a. Scales range from 1 to 7 (higher number is greater risk)

3.4.4 Comparing the Traffic Safety Culture Between States With and Without Legal Recreational Cannabis Use

Respondents were divided into two groups: those that lived in Colorado or Washington (states where recreational use is "legal") and those that lived in all other states (states where recreational use is "illegal"). The mean responses (i.e., averages) for each group were compared using T-tests to see if they were statistically significantly different. T-tests were used as the sample sizes are relatively large (similar results were found using the Mann-Whitney U test). This process was repeated for all questions on the survey. To summarize the differences in the two groups, the means of the scales were compared and summarized in a single table.

The number of respondents on Survey #1 aged 21 to 24 in states where recreational cannabis use is illegal was very small. Therefore, the age was restricted to those ages 25 and older. As shown in Table 21, the scales are not significantly different between states with legalized recreational use laws and states without recreational use laws among those ages 25 and older for Survey #1.

Larger values of the scale indicate a higher risk for DUIC behavior. These results were confirmed by question-by-question comparisons that showed few statistically significant differences between the two groups. These results show that for individuals age 25 and older, the difference in the recreational use law does not correspond to a difference in beliefs and attitudes about DUIC.

Next, the comparison was limited to cannabis users in Survey #2 and Survey #3. As shown in Table 22, most of the scales are not significantly different between states with legalized recreational use laws and states without recreational use laws among those ages 18 to 30 who use cannabis. Larger values of the scale indicate a higher risk for DUIC behavior. These results were confirmed by question-by-question comparisons. These results show that for individuals age 18 to

30 who use cannabis, the difference in the recreational use law does not correspond to a difference in beliefs and attitudes about DUIC.

Table 21. Comparison of Means Between States With Legalized Recreational Use and States Without Legalized Recreational Use (Survey #1, Age 25 and Older)

	Means[a]		
	Legal (n=400)	Illegal (n=348)	**Significance**
DUIC Behavior Q13. Thinking back over the past 12 months, how often did you drive within four hours of using marijuana? (1= never; 7= daily)	1.28	1.38	NS
Intention Q16. Thinking of the next 12 months, how often do you intend to drive within four hours of using marijuana? (1= never; 7= daily)	1.28	1.45	NS
Willingness	2.52	2.49	NS
Attitude	1.88	1.95	NS
Perceived Norms – injunctive	2.16	2.19	NS
Perceived Norms – descriptive	3.72	3.55	NS
Control Beliefs	1.64	1.63	NS

a. Scales range from 1 to 7 (higher number is greater risk)
NS= Not statistically significantly different (e.g., p>0.01)

Table 22. Comparison of Means Between States With Legalized Recreational Use and States Without Legalized Recreational Use Among Users of Cannabis (Surveys #2 and #3)

	Means[a]		
	Legal (n=516)	Illegal (n=226)	**Significance**
DUIC Behavior Q13. Thinking back over the past 12 months, how often did you drive within four hours of using marijuana? (1= never; 7= daily)	2.68	2.69	NS
Intention Q16. Thinking of the next 12 months, how often do you intend to drive within four hours of using marijuana? (1= never; 7= daily)	2.46	2.61	NS
Willingness	4.39	4.45	NS
Attitude	3.00	3.46	*
Perceived Norms – injunctive	3.30	3.38	NS
Perceived Norms – descriptive	5.00	4.96	NS
Control Beliefs	3.79	3.79	NS

a. Scales range from 1 to 7 (higher number is greater risk)
*p<0.01, NS= Not statistically significantly different

3.4.5 Comparing the Traffic Safety Culture Between States With and Without Legal Medical Cannabis Use

Respondents were divided into two groups: those that lived in states with legalized medical use of cannabis (medical use "legal") and those that lived in all other states (medical use "illegal"). Individuals living in Colorado and Washington were removed from this analysis. The means of each scale for each group were compared using T-tests to see if they were statistically significantly different. T-tests were used as the sample sizes are relatively large (similar results were found using the Mann-Whitney U test). The number of respondents on Survey #1 aged 21 to 24 in states where medical cannabis use is legal was very small. Therefore, the age was restricted to those ages 25 and older.

As shown in Table 23, the scales are not significantly different between states with legalized medical use laws and states without medical use laws among those ages 25 and older (excluding Colorado and Washington) for Survey #1. Similarly, as shown in Table 24, the scales are not significantly different between states with legalized medical use laws and states without medical use laws among those ages 18 to 30 (excluding Colorado and Washington) for Survey #2. Larger values of the scale indicate a higher risk for DUIC behavior. These preliminary results show that the difference in the medical use law does not correspond to a difference in beliefs and attitudes about DUIC.

Table 23. Comparison of Means Between States With Legalized Medical Use and States Without Legalized Medical Use (Survey #1, Age 25 and Older, Excluding CO and WA)

	Means[a]		
	Legal (n=146)	Illegal (n=209)	**Significance**
DUIC Behavior Q13. Thinking back over the past 12 months, how often did you drive within four hours of using marijuana? (1= never; 7= daily)	1.42	1.36	NS
Intention Q16. Thinking of the next 12 months, how often do you intend to drive within four hours of using marijuana? (1= never; 7= daily)	1.62	1.35	NS
Willingness	2.43	2.51	NS
Attitude	1.87	2.01	NS
Perceived Norms – injunctive	2.29	2.14	NS
Perceived Norms – descriptive	3.55	3.52	NS
Control Beliefs	1.65	1.62	NS

a. Scales range from 1 to 7 (higher number is greater risk)
NS= Not statistically significantly different (e.g., p>0.01)

Table 24. Comparison of Means Between States With Legalized Medical Use and States Without Legalized Medical Use (Survey #2, Excluding CO and WA)

	Means[a]		
	Legal (n=263)	Illegal (n=449)	**Significance**
DUIC Behavior Q13. Thinking back over the past 12 months, how often did you drive within four hours of using marijuana? (1= never; 7= daily)	1.61	1.50	NS
Intention Q16. Thinking of the next 12 months, how often do you intend to drive within four hours of using marijuana? (1= never; 7= daily)	1.68	1.49	NS
Willingness	3.00	2.81	NS
Attitude	2.36	2.33	NS
Perceived Norms – injunctive	2.54	2.37	NS
Perceived Norms – descriptive	3.83	3.77	NS
Control Beliefs	2.23	2.04	NS

a. Scales range from 1 to 7 (higher number is greater risk)
NS= Not statistically significantly different (e.g., p>0.01)

3.4.6 Traffic Safety Cultural Summary

To better understand how shared values, beliefs, and attitudes vary between non-users of cannabis, users of cannabis who do not drive under the influence of cannabis, and people who do drive under the influence of cannabis, the means for each group were compared using graphs for Survey #1. These graphs reveal clear patterns of how these three groups differ.

Each graph shows the mean (i.e., average) for components revealed in the behavioral model. The bar on the graph indicates the mean value for each group with a 95 percent confidence level. For each graph, the level of risk increases from left to right (noted by the increasing shade of red). When the bar of one group overlaps the bar of another group, the means are not statistically significantly different. Figure 4 provides a summary of the basic components of the behavioral model. The three groups have very different shared beliefs about driving under the influence of cannabis.

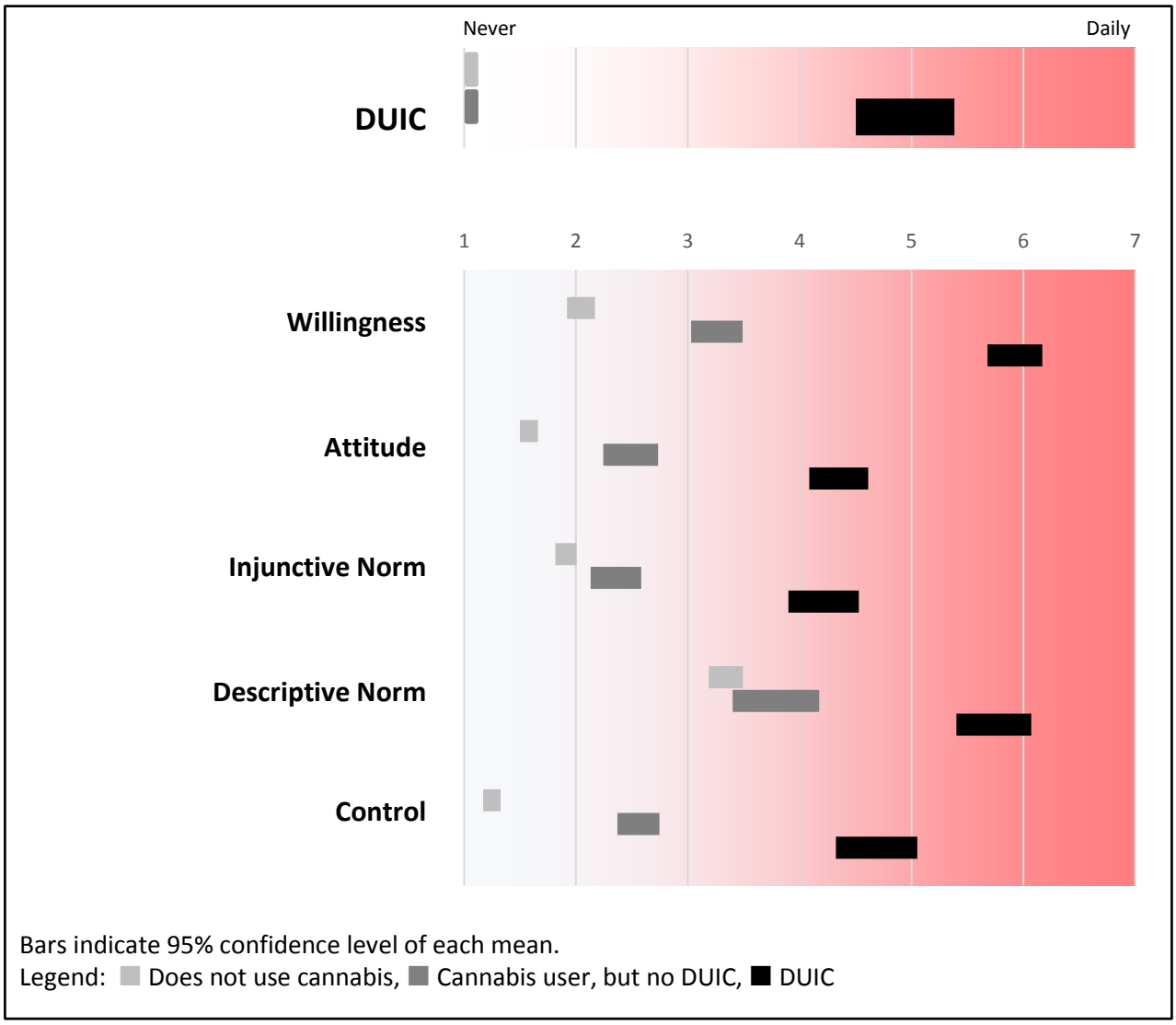

Figure 4. Summary of Means Based on Behavior (Survey #1)

3.4.6.1 Traffic Safety Cultural Summary – Attitude

Figure 5 shows the overall attitude about driving under the influence of cannabis as well as each semantic differential that was used to measure the attitude. The middle of the graph represents a neutral attitude; the left side represents a negative attitude about driving under the influence of cannabis (green); and the right side represents a positive attitude (red).

From this figure, it is apparent that individuals who drive under the influence of cannabis have positive attitudes about such behavior by believing it is safe, sensible, pleasant, and acceptable. These positive attitudes can be considered "risky" because they are consistent with increased DUIC behavior as revealed in the behavioral model developed in Section 3.3).

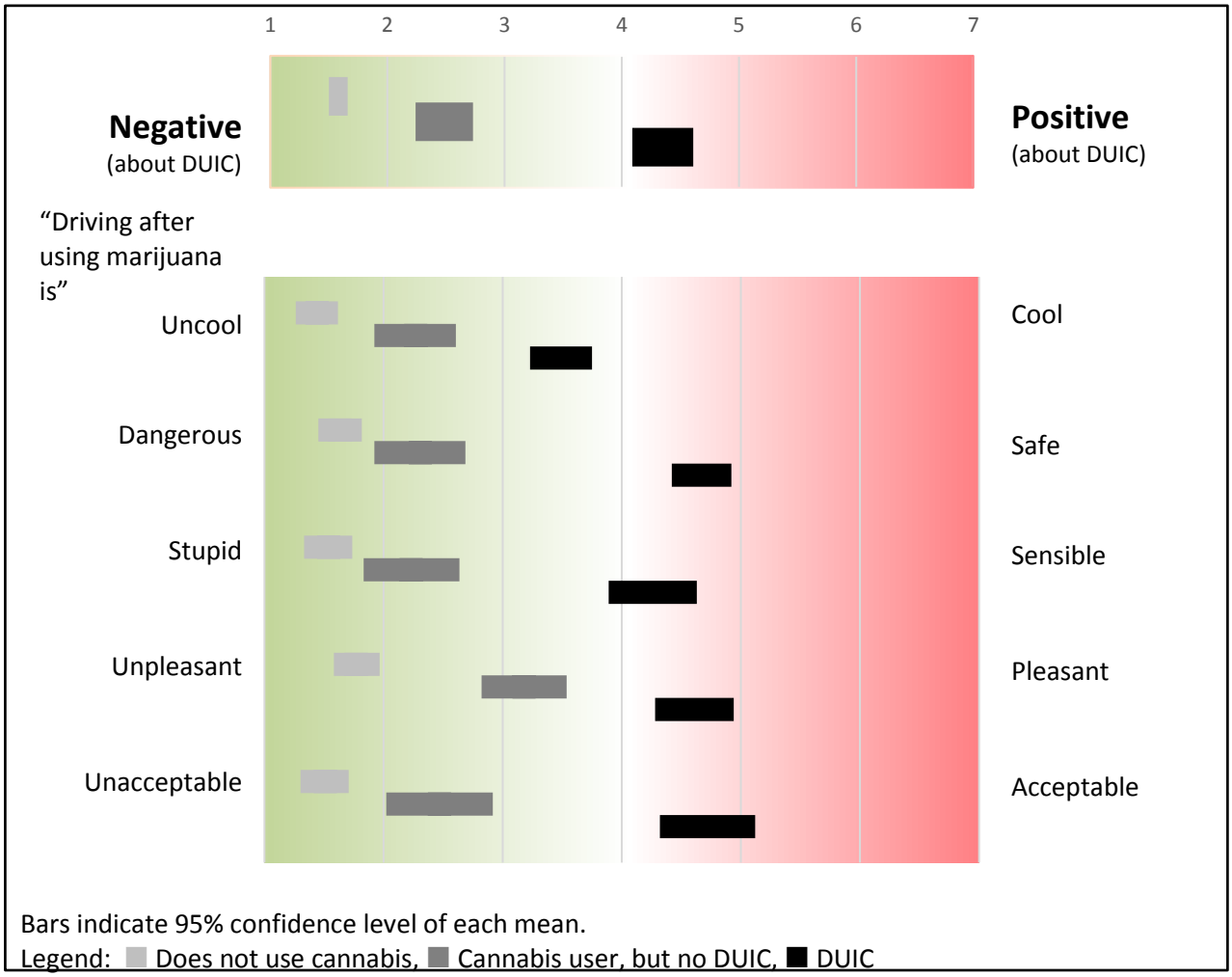

Figure 5. Means of Attitude by Behavior (Survey #1)

Behavioral beliefs inform attitudes. The correlation between each behavioral belief about driving under the influence of cannabis and attitude can provide a greater understanding of this relationship. Table 25 shows the correlation coefficients between six behavioral beliefs (three beliefs with positive expectancies and three beliefs with negative expectancies) and attitude for each of the three surveys (among users of cannabis). All correlations were statistically significant at very high levels ($p<0.000001$).

As expected, the beliefs with positive expectancies about DUIC are correlated positively with attitudes about DUIC, and those with negative expectancies are negatively correlated with attitude. The magnitude of the correlation coefficients is similar for all beliefs.

Table 25. Spearman Correlation Coefficients Between Six Behavioral Beliefs and Attitude Scale Among Users of Cannabis

	Spearman Correlation Coefficient with Attitude Scale (p<0.000 001)		
Behavioral Beliefs	**Survey #1** (n=190)	**Survey #2** (n=242)	**Survey #3** (n=517)
Q25A. "If I drive after using marijuana, I will feel calmer."-You	.66	.66	.69
Q26A. "If I drive after using marijuana, I will be more alert."-You	.76	.59	.61
Q27A. "If I drive after using marijuana, I will be more cautious." -You	.44	.50	.51
Q28A. "If I drive after using marijuana, I will be more likely to get arrested."-You	-.38	-.50	-.45
Q29A. "If I drive after using marijuana, my reaction time will be slower."-You	-.66	-.54	-.62
Q30A. "If I drive after using marijuana, I am more likely to be in an accident."-You	-.62	-.55	-.62

These correlation coefficients show that individuals who had a positive attitude about DUIC were more likely to feel that they would be calmer, more alert, and more cautious if they drove after using marijuana. Similarly, those individuals who had a negative attitude about DUIC were less likely to feel this way. Furthermore, individuals who had a positive attitude about DUIC were less likely to feel they would be arrested, that their reaction time would be slower, and that they would be in an accident if they drove after using marijuana.

The overall strong correlation between these beliefs and attitude (and the strong relationship between attitude and intention/willingness) indicates that changing these beliefs may be important in addressing DUIC behavior.

3.4.6.2 Traffic Safety Cultural Summary – Perceived Norms – Injunctive

Injunctive norms are beliefs about what an individual considers as acceptable to others. The correlation analyses revealed that injunctive norms are important predictors of intention/willingness. As Figure 6 demonstrates, the injunctive norms of the three groups are very different. Individuals who engage in driving after using cannabis are much more likely to report that it is acceptable to others. In particular, they feel it is acceptable to their friends, and they believe it is acceptable to most people in their community.

It is important to note that these are the perceptions of individuals about what they believe others feel. The results from this survey measuring the attitude about DUIC show that most people (80 percent – see Appendix C, Attitudes, Acceptable – Unacceptable, Survey #1) believe it is unacceptable to drive after using cannabis. Changing these perceptions among individuals who DUIC may be important to change their behavior.

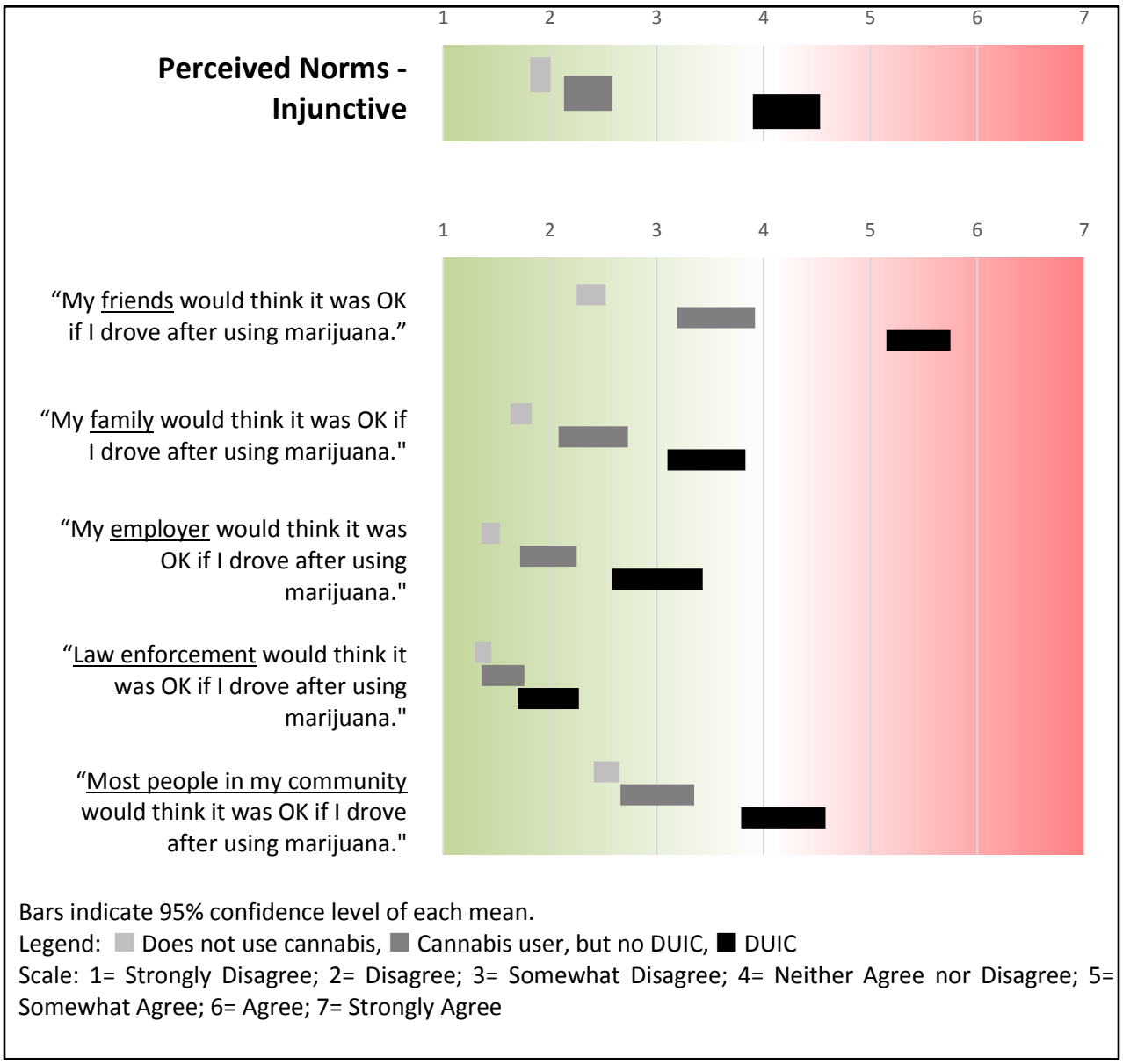

Figure 6. Means of Injunctive Norms by Behavior (Survey #1)

3.4.6.3 Traffic Safety Cultural Summary – Perceived Norms – Descriptive

While injunctive norms address what people believe is acceptable to others, descriptive norms are beliefs about what is typical among others (e.g., what "most people" do). Figure 7 shows that all three groups significantly overestimated the prevalence of driving after using cannabis. However, individuals engaging in DUIC had much higher perceptions of prevalence than others. Based on the results of this survey, the overwhelming majority of individuals (91 percent – see Appendix C, Behaviors, Q13) never drive after using cannabis (as the majority of adults do not use cannabis). Correcting these misperceptions may be important to address DUIC behavior.

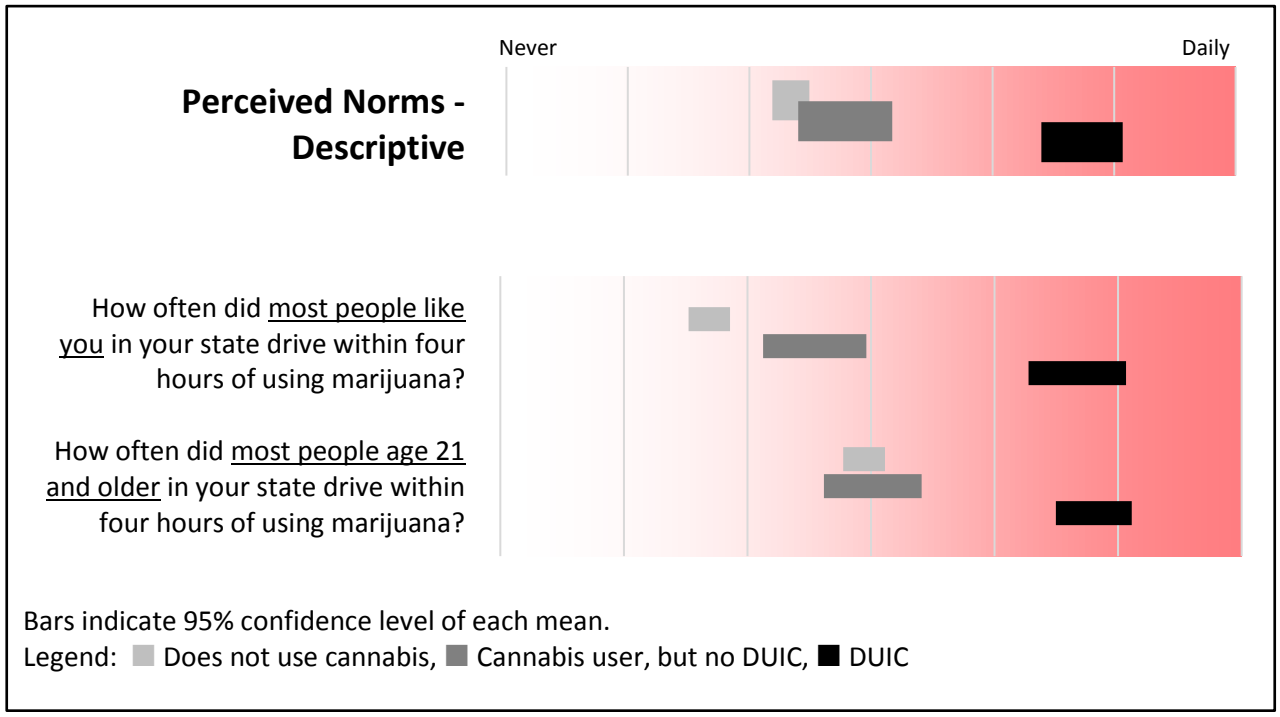

Figure 7. Means of Descriptive Norms by Behavior (Survey #1)

3.4.6.4 Traffic Safety Cultural Summary – Control Beliefs

To better understand to what degree people believed they were in control of driving under the influence of cannabis, respondents were asked how likely they were to be in various situations that may require them to drive after using cannabis. Figure 8 summarizes these responses for the three groups.

In all three cases, the responses were very different among the three groups. Individuals who drive after using cannabis were more likely to be in a situation of needing to drive to work or school, needing to run errands, or needing to drive home after using cannabis when at a party. These results show that DUIC behavior is likely in a variety of circumstances which will be important in developing interventions.

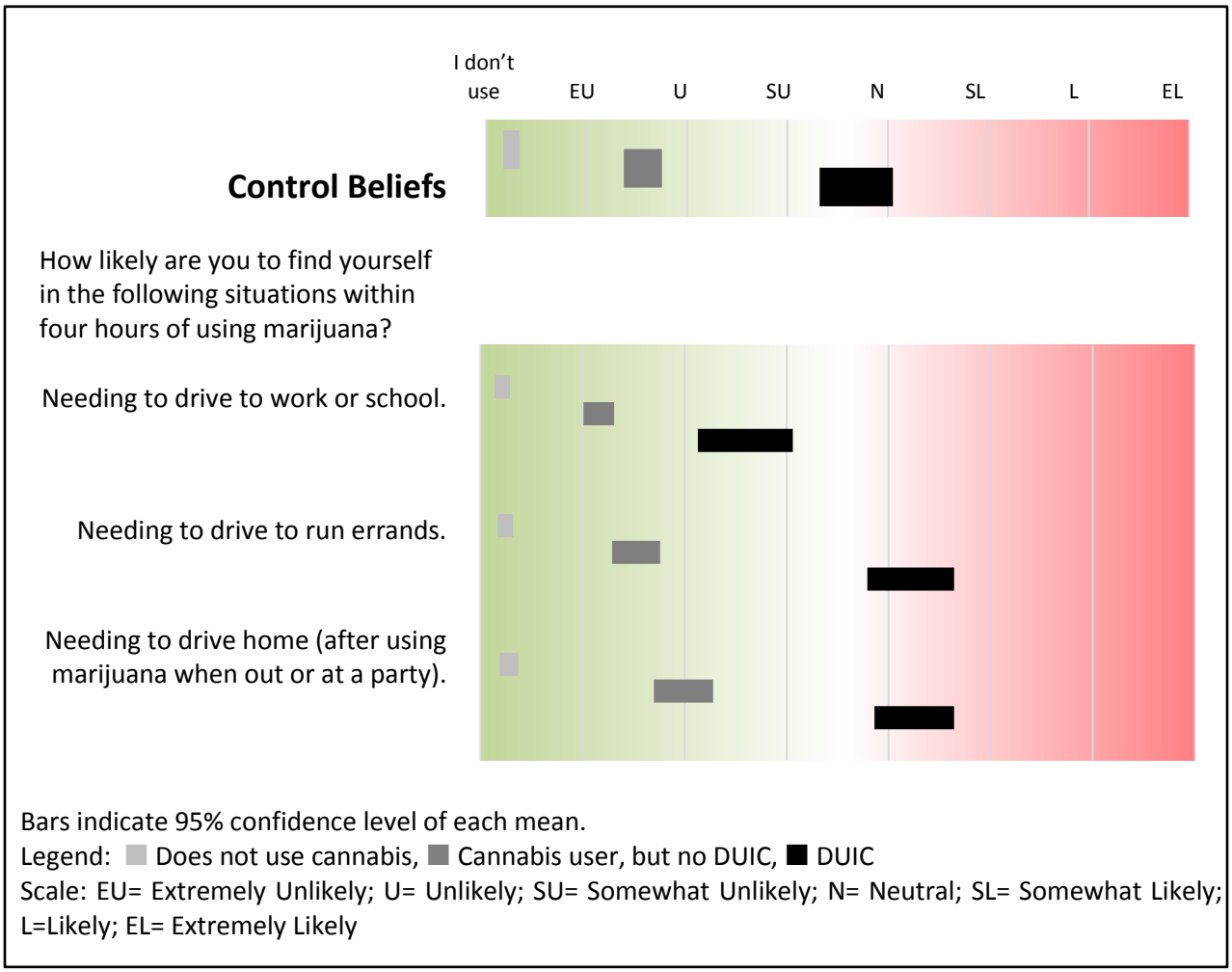

Figure 8. Means of Control Beliefs by Behavior (Survey #1)

3.4.6.5 Traffic Safety Cultural Summary – General Values

The survey also used a general values scale to measure the dominant values of respondents. Figure 9 shows the means for 10 general values for each of the three groups. The distance from the center of the graph indicates the strength of the value. While the general pattern of values is similar among all three groups, users of cannabis and those who DUIC are less likely to value conformity, tradition, and security and more likely to value enjoyment in life, stimulation, and self-direction. Understanding these values can be useful when designing interventions that seek to resonate with existing values.

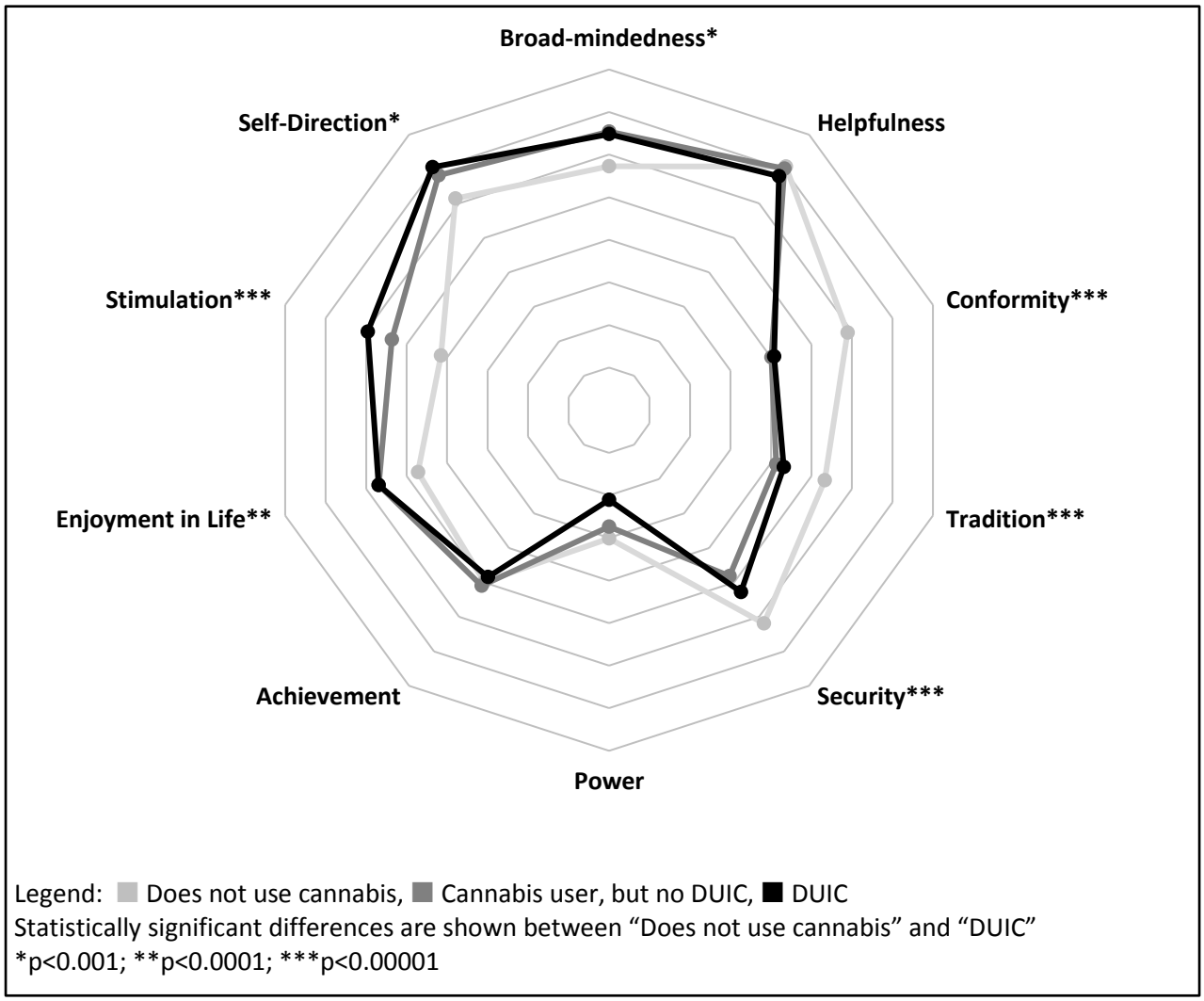

Figure 9. Means of Values by Behavior (Survey #1)

4 CONCLUSIONS AND RECOMMENDATIONS

A survey was successfully implemented that provides additional understanding into the culture around driving under the influence of cannabis (DUIC). The relative frequency analysis provided an initial understanding into the range of values, beliefs, and attitudes about DUIC. In particular, about half of the individuals reporting use of cannabis in the past year indicated they had driven one or more times within four hours of using cannabis. In addition, about one in six respondents did not know if their state had a law about driving under the influence of cannabis.

Correlation analyses revealed that the components measured in the behavioral model strongly correlated with self-reported DUIC behavior. A comparison of the means of these components among different groups revealed important differences in shared values, beliefs, and attitudes. Additional analyses answered four questions about the culture of DUIC:

- *How does traffic safety culture compare between users and non-users of cannabis?*
    - All three implementations of the survey showed significant differences in beliefs and attitudes about DUIC between users and non-users of cannabis. In particular:
        - Users of cannabis had a greater intention to DUIC, greater willingness to DUIC in a variety of circumstances, a more positive attitude about DUIC, hold normative beliefs (both injunctive and descriptive) that are more supportive of DUIC, and experience more situations where they are likely to DUIC.
- *How does traffic safety culture correlate with the decision to drive under the influence of cannabis?*
    - All three implementations of the survey showed significant differences in beliefs and attitudes among users of cannabis about DUIC between those who in engage in DUIC and those who do not. In particular:
        - Those who DUIC have a positive attitude about DUIC, hold normative beliefs (both injunctive and descriptive) that are supportive of DUIC, and experience more situations where they are likely to DUIC. Six different behavioral beliefs about DUIC were strongly correlated with attitude and provide more insights. Specifically, those who DUIC were more likely to feel calmer, more alert, and more cautious if they drive after using cannabis compared to those who do not DUIC. They were less likely to feel that they would be arrested, that their reaction time would be slower, or that they would be in an accident compared to those who do not DUIC.
- *How does traffic safety culture compare between states with and without legalized recreational use laws?*
    - Results from this survey did not reveal significant differences in values, beliefs, or attitudes between states with and without legalized recreational use of cannabis. This finding does not preclude such differences existing; however, among the items measured on this survey, no differences were found. More time may be required to see an impact in beliefs and attitudes.

- *How does traffic safety culture compare between states with and without legalized medical use laws?*
    - Results from this survey did not reveal significant differences in values, beliefs, or attitudes between states with and without legalized medical use of cannabis. This finding does not preclude such differences existing; however, among the items measured on this survey, no differences were found.

Based on these results, several recommendations can be made.

Recommendation #1: Interventions should be developed to address the beliefs of those who use cannabis.

An intervention is an intentional experience specifically designed to change beliefs. Interventions can include a wide variety of activities including classroom instruction (in a driver's education program, for example), experiential activities like driving simulators, education campaigns, one-on-one counseling, etc. Furthermore, as laws and policies about DUIC are developed and enforced, these efforts can include education to change the beliefs revealed in this study.

The specific beliefs to be addressed include:

- Knowledge of existing DUIC laws
    - About one in six individuals did not know whether DUIC was illegal in their state or not. Educating the general public about current laws is an important opportunity to also address the beliefs noted below.

- Attitudes about DUIC
    - Individuals who drive after using cannabis have positive attitudes about DUIC. Specifically, they feel it is safe, sensible, pleasant, and acceptable. These positive attitudes may promote DUIC behavior. Based on this survey, these attitudes are informed by six behavioral beliefs. Research needs to be compiled (or, perhaps even conducted) to better understand to what degree cannabis use impacts driving. Specifically:
        - Individuals reported that they feel calmer, more alert, and more cautious when they drive under the influence of cannabis. Is this reflected in their performance or is this merely their perception?
        - Furthermore, individuals reported that they are not likely to get arrested, that their reaction time will not be slower, and that they are not more likely to be in an accident when they drive under the influence of cannabis. Are these beliefs accurate?

      Educational materials and interventions need to be designed to address these beliefs. In some cases, research results may not be available and additional research may need to be conducted.

- Perceived norms
    - Individuals who drive after using cannabis have different perceptions about whether such behavior is acceptable to others (injunctive norms) and is common (descriptive norms). Accurate information about the acceptability and prevalence of DUIC needs to be included in all conversations about cannabis, driving, and DUIC interventions. Safety advocates can unintentionally increase inaccurate

perceptions about norms by using such language as "there is an epidemic of DUIC" or "everyone seems to think it is OK to drive under the influence of cannabis." While such language can raise attention and concern, it can also foster beliefs that increase DUIC behavior.

Recommendation #2: Interventions should be designed for a variety of settings.

This survey revealed that those who DUIC do so in a variety of situations. Specifically, they are more likely to be in situations where they need to drive to run errands or drive home after using cannabis when out or at a party (and for some, even driving to work or school). Therefore, efforts to address DUIC cannot only address social settings, but should address DUIC in a variety of contexts. DUIC policies should be developed by schools and workplaces. Education should not only address using cannabis in a social setting, but should address driving in any situation.

Recommendation #3: Interventions should seek to align with existing values.

Those who use cannabis and drive under the influence are more likely to value enjoyment in life, stimulation, and self-direction and less likely to value security, tradition, and conformity. Therefore, interventions need to be designed that align with these values to increase the likelihood of acceptance.

These recommendations should be considered in light of limitations of this study. The study was entirely based on self-reported information. While the internal consistency of the data reported and the quality of the models developed were very high, self-reported data are subject to biases whereby respondents may be less likely to share unlawful or socially undesirable information. The survey does not represent the views of individuals unable to read or write, those without a permanent household address, or those not proficient in English. Furthermore, the survey does not represent the views of those people who elected not to participate.

The results reported above cannot establish or prove causality described in the behavioral model. While extensive other research has demonstrated causality of the items in the behavioral model used to inform this survey, these results only reveal correlation and cannot establish causality in this case.

This survey reveals many areas of potential future research. A conservative indicator of DUIC behavior was used in this study (i.e., driving within four hours of use). Additional research needs to explore the nature of cannabis use and how the use corresponds to DUIC. For example, individuals can smoke, use vaporizers, or eat cannabis (in food or drinks). These methods of use may influence the duration of impairment. Furthermore, individuals may use cannabis while driving. Additional research also should explore the sources of information people use to inform their beliefs about DUIC. These sources may include their own experiences, the experiences of close friends, or various educational or informational resources. This area of research should also explore the role of cannabis retailers in informing DUIC beliefs and attitudes.

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6 APPENDIX A

6.1 Survey Instrument

Roadway Safety Survey

Your voice matters. The Center for Health and Safety Culture is asking for your input. We are learning about driving after using marijuana and need your help. Regardless of whether you use marijuana or not, we are interested in your thoughts.

Each and every survey is very important to us. Your participation is voluntary, and we will only share summary results. Your responses are confidential, anonymous and cannot be associated with your identity. This research study has been approved by the Montana State University Institutional Review Board. If you have questions about the approval of this study, please contact cherylj@montana.edu.

Thank you for taking this survey!

We would like to begin by asking a few questions about what you value.

1. Please review the following list of values and mark with an "X" the ONE that is MOST IMPORTANT to you. ▽		2. Now mark with an "X" the ONE that is LEAST IMPORTANT to you. ▽
	Broad-mindedness (that is, beauty of nature and arts, social justice, a world at peace, equality)	
	Helpfulness (that is, honesty, forgiveness, loyalty, responsibility)	
	Conformity (that is, obedience, honoring parents and elders, self-discipline, politeness)	
	Tradition (that is, respect for tradition, humbleness, accepting one's position in life, devotion)	
	Security (that is, national security, family security, social order, cleanliness)	
	Power (that is, social power, authority, wealth)	
	Achievement (that is, success, capability, ambition, influence on people and events)	
	Enjoyment in life (that is, gratification of desires, self-indulgence)	
	Stimulation (that is, daring, a varied and challenging life, an exciting life)	
	Self-Direction (that is, creativity, freedom, curiosity, independence, choosing one's own goals)	

3. With the same list, please rate how important each of the following is to you.	Opposed to my Principles	Not Important (1)	(2)	(3)	(4)	(5)	(6)	(7)	Of Supreme Importance (8)
Broad-mindedness (that is, beauty of nature and arts, social justice, a world at peace, equality)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Helpfulness (that is, honesty, forgiveness, loyalty, responsibility)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Conformity (that is, obedience, honoring parents and elders, self-discipline, politeness)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Tradition (that is, respect for tradition, humbleness, accepting one's position in life, devotion)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Security (that is, national security, family security, social order, cleanliness)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Power (that is, social power, authority, wealth)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Achievement (that is, success, capability, ambition, influence on people and events)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Enjoyment in life (that is, gratification of desires, self-indulgence)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Stimulation (that is, daring, a varied and challenging life, an exciting life)	☐	☐	☐	☐	☐	☐	☐	☐	☐
Self-Direction (that is, creativity, freedom, curiosity, independence, choosing one's own goals)	☐	☐	☐	☐	☐	☐	☐	☐	☐

Please continue on the next page

Next, we ask a few questions about safety on our roads and highways.

	Not at all Concerned (1)	(2)	(3)	(4)	(5)	(6)	Extremely Concerned (7)
4. How concerned are you about safety on roads and highways?	☐	☐	☐	☐	☐	☐	☐

How much do you agree or disagree with the following statements?

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
5. "I believe the only acceptable number of deaths and serious injuries on our roadways is zero."	☐	☐	☐	☐	☐	☐	☐
6. "I believe the only acceptable number of deaths and serious injuries among my family and friends on our roadways is zero."	☐	☐	☐	☐	☐	☐	☐

Next, we want to ask you questions about marijuana. For this survey, we are considering all forms of marijuana (cannabis, pot, "grass") including hashish and hash oil. It may be smoked (including vaping) or added to foods (edibles) or drinks.

	Never	Once or Twice	3 to 6 Times	7 to 11 Times	Monthly	Weekly	Daily
7. Thinking back over the past 12 months, how often did you drive a vehicle?	☐	☐	☐	☐	☐	☐	☐
8. Thinking back over the last 12 months, how often did you use marijuana?	☐	☐	☐	☐	☐	☐	☐
9. Thinking of the next 12 months, how often do you intend to use marijuana?	☐	☐	☐	☐	☐	☐	☐

10. Suppose recreational marijuana use became legal in your state (that is, an individual could use marijuana without violating the law). Would your use of marijuana increase, decrease or stay the same?

I would not use marijuana	Significantly Decrease	Decrease	Somewhat Decrease	Stay the Same	Somewhat Increase	Increase	Significantly Increase
☐	☐	☐	☐	☐	☐	☐	☐

11. How do you view your marijuana use? ☐ Recreational ☐ Medical ☐ Both ☐ I don't use marijuana

12. Thinking back over the past 12 months, when was the last time you drove a vehicle within four hours of using marijuana?

Never	More than 1 Year Ago	6 Months Ago to 1 Year Ago	3 to 6 Months Ago	1 to 2 Months Ago	This Month	This Week	Today / Yesterday
☐	☐	☐	☐	☐	☐	☐	☐

	Never	Once or Twice	3 to 6 Times	7 to 11 Times	Monthly	Weekly	Daily
13. Thinking back over the past 12 months, how often did you drive within four hours of using marijuana?	☐	☐	☐	☐	☐	☐	☐
14. In your opinion, how often did most people like you in your state drive within four hours of using marijuana in the past 12 months?	☐	☐	☐	☐	☐	☐	☐
15. In your opinion, how often did most people age 21 and older in your state drive within four hours of using marijuana in the past 12 months?	☐	☐	☐	☐	☐	☐	☐
16. Thinking of the next 12 months, how often do you intend to drive within four hours of using marijuana?	☐	☐	☐	☐	☐	☐	☐

17. Just for this question, suppose recreational marijuana use became legal in your state (that is, an individual could use marijuana without violating the law). However, driving under the influence of marijuana was illegal. In this case, would you be more or less likely to drive within four hours of using marijuana in the next 12 months?

I would not use marijuana	Much Less Likely	Less Likely	Somewhat Less Likely	No Change	Somewhat More Likely	More Likely	Much More Likely
☐	☐	☐	☐	☐	☐	☐	☐

18. Suppose you are in a situation where you have used marijuana within the past 4 hours (even if you are not a user of marijuana). How willing would you be to drive in the following situations?

	I would never use marijuana	Not at all Willing (1)	(2)	(3)	(4)	(5)	(6)	Extremely Willing (7)
Drive in an emergency	☐	☐	☐	☐	☐	☐	☐	☐
Drive home on side streets	☐	☐	☐	☐	☐	☐	☐	☐
Drive home on the highway	☐	☐	☐	☐	☐	☐	☐	☐
Drive if you don't feel high	☐	☐	☐	☐	☐	☐	☐	☐
Drive even though you still feel high	☐	☐	☐	☐	☐	☐	☐	☐
Drive when you had also been drinking	☐	☐	☐	☐	☐	☐	☐	☐

Please continue on the next page

19. In your opinion, how willing would most people age 21 and older in your state be to drive in the following situations after having used marijuana within the past 4 hours? *Even if you are not sure, give your best guess.*

	Not at all Willing (1)	(2)	(3)	(4)	(5)	(6)	Extremely Willing (7)
Drive in an emergency	☐	☐	☐	☐	☐	☐	☐
Drive home on side streets	☐	☐	☐	☐	☐	☐	☐
Drive home on the highway	☐	☐	☐	☐	☐	☐	☐
Drive if they don't feel high	☐	☐	☐	☐	☐	☐	☐
Drive even though they still feel high	☐	☐	☐	☐	☐	☐	☐
Drive when they had also been drinking	☐	☐	☐	☐	☐	☐	☐

In this section, we ask about your beliefs about driving after using marijuana.

20. Is recreational use of marijuana by adults age 21 and older legal or illegal in your state?

☐ Legal ☐ Illegal ☐ I don't know

21. Is medicinal use of marijuana by adults age 21 and older legal or illegal in your state?

☐ Legal ☐ Illegal ☐ I don't know

22. Is driving under the influence of marijuana legal or illegal in your state?

☐ Legal ☐ Illegal ☐ I don't know

23. Each row shows a range of feelings about driving after using marijuana. Please select one box on each row that best shows how you feel about driving after using marijuana. Boxes toward the middle of a row indicate a neutral feeling. Boxes closest to a word indicate a stronger feeling.

Cool	☐	☐	☐	☐	☐	☐	☐	Uncool
Dangerous	☐	☐	☐	☐	☐	☐	☐	Safe
Stupid	☐	☐	☐	☐	☐	☐	☐	Sensible
Pleasant	☐	☐	☐	☐	☐	☐	☐	Unpleasant
Acceptable	☐	☐	☐	☐	☐	☐	☐	Unacceptable

24. In your opinion, how would most people age 21 and older in your state feel about driving after using marijuana?

Cool	☐	☐	☐	☐	☐	☐	☐	Uncool
Dangerous	☐	☐	☐	☐	☐	☐	☐	Safe
Stupid	☐	☐	☐	☐	☐	☐	☐	Sensible
Pleasant	☐	☐	☐	☐	☐	☐	☐	Unpleasant
Acceptable	☐	☐	☐	☐	☐	☐	☐	Unacceptable

Regardless of whether you use marijuana or not, how much do you agree or disagree with the following statements? And how do you think most people age 21 and older in your state would respond?
Even if you are not sure, give your best guess.

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
25a. You: "If I drive after using marijuana, I will feel calmer."	☐	☐	☐	☐	☐	☐	☐
25b. How would most people age 21 and older in your state respond: "If I drive after using marijuana, I will feel calmer."	☐	☐	☐	☐	☐	☐	☐
26a. You: "If I drive after using marijuana, I will be more alert."	☐	☐	☐	☐	☐	☐	☐
26b. Most people age 21 and older in your state: "If I drive after using marijuana, I will be more alert."	☐	☐	☐	☐	☐	☐	☐
27a. You: "If I drive after using marijuana, I will be more cautious."	☐	☐	☐	☐	☐	☐	☐
27b. Most people age 21 and older in your state: "If I drive after using marijuana, I will be more cautious."	☐	☐	☐	☐	☐	☐	☐
28a. You: "If I drive after using marijuana, I will be more likely to get arrested."	☐	☐	☐	☐	☐	☐	☐
28b. Most people age 21 and older in your state: "If I drive after using marijuana, I will be more likely to get arrested."	☐	☐	☐	☐	☐	☐	☐
29a. You: "If I drive after using marijuana, my reaction time will be slower."	☐	☐	☐	☐	☐	☐	☐
29b. Most people age 21 and older in your state: "If I drive after using marijuana, my reaction time will be slower."	☐	☐	☐	☐	☐	☐	☐
30a. You: "If I drive after using marijuana, I am more likely to be in an accident."	☐	☐	☐	☐	☐	☐	☐
30b. Most people age 21 and older in your state: "If I drive after using marijuana, I am more likely to be in an accident."	☐	☐	☐	☐	☐	☐	☐

Please continue on the next page

31. Each row shows a range of feelings about the "typical" person who drives after using marijuana. Please select one box on each row that best shows how you feel. Boxes toward the middle of a row indicate a neutral feeling, whereas boxes closest to a word indicate stronger feeling.

The "typical" person who drives after using marijuana is...

Relaxed	☐	☐	☐	☐	☐	☐	☐	Anxious
Calm	☐	☐	☐	☐	☐	☐	☐	Manic
Distracted	☐	☐	☐	☐	☐	☐	☐	Focused
Self-involved	☐	☐	☐	☐	☐	☐	☐	Concerned about others
Cautious	☐	☐	☐	☐	☐	☐	☐	Reckless
Stupid	☐	☐	☐	☐	☐	☐	☐	Smart
Safe	☐	☐	☐	☐	☐	☐	☐	Unsafe
Paranoid	☐	☐	☐	☐	☐	☐	☐	Confident
Cool	☐	☐	☐	☐	☐	☐	☐	Uncool
Risk-taker	☐	☐	☐	☐	☐	☐	☐	Cautious
Irresponsible	☐	☐	☐	☐	☐	☐	☐	Responsible
Lawful	☐	☐	☐	☐	☐	☐	☐	Unlawful

32. The "typical" person who **NEVER** drives after using marijuana is...

Relaxed	☐	☐	☐	☐	☐	☐	☐	Anxious
Calm	☐	☐	☐	☐	☐	☐	☐	Manic
Distracted	☐	☐	☐	☐	☐	☐	☐	Focused
Self-involved	☐	☐	☐	☐	☐	☐	☐	Concerned about others
Cautious	☐	☐	☐	☐	☐	☐	☐	Reckless
Stupid	☐	☐	☐	☐	☐	☐	☐	Smart
Safe	☐	☐	☐	☐	☐	☐	☐	Unsafe
Paranoid	☐	☐	☐	☐	☐	☐	☐	Confident
Cool	☐	☐	☐	☐	☐	☐	☐	Uncool
Risk-taker	☐	☐	☐	☐	☐	☐	☐	Cautious
Irresponsible	☐	☐	☐	☐	☐	☐	☐	Responsible
Lawful	☐	☐	☐	☐	☐	☐	☐	Unlawful

This section asks questions about your perceptions of what others think, as well as how different situations may impact your decisions.

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree
33. "My friends would think it was OK if I drove after using marijuana."	☐	☐	☐	☐	☐	☐	☐
34. "My family would think it was OK if I drove after using marijuana."	☐	☐	☐	☐	☐	☐	☐
35. "My employer would think it was OK if I drove after using marijuana."	☐	☐	☐	☐	☐	☐	☐
36. "Law enforcement in my community would think it was OK if people drove after using marijuana."	☐	☐	☐	☐	☐	☐	☐
37. "Most people in my community think it is OK to drive after using marijuana."	☐	☐	☐	☐	☐	☐	☐
38. "Most people who are important to me think it is OK to drive after using marijuana."	☐	☐	☐	☐	☐	☐	☐
39. "Most people in my community expect people not to drive after using marijuana."	☐	☐	☐	☐	☐	☐	☐
40. "Most people who are important to me expect me not to drive after using marijuana."	☐	☐	☐	☐	☐	☐	☐
41. "It's up to me whether I drive after using marijuana."	☐	☐	☐	☐	☐	☐	☐
42. "If I really wanted to, I could choose to never drive after using marijuana."	☐	☐	☐	☐	☐	☐	☐
43. "Situations come up that are out of my control that require me to drive after using marijuana."	☐	☐	☐	☐	☐	☐	☐

How likely are you to find yourself in the following situations within four hours of using marijuana?

	I don't use marijuana	Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely
44. Needing to drive to work or school	☐	☐	☐	☐	☐	☐	☐	☐
45. Needing to drive to run errands	☐	☐	☐	☐	☐	☐	☐	☐
46. Needing to drive home (after using marijuana when out or at a party)	☐	☐	☐	☐	☐	☐	☐	☐

47. Before deciding to use marijuana, how likely are you to think about whether you will need to drive?

I don't use marijuana	Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely
☐	☐	☐	☐	☐	☐	☐	☐

Please continue on the next page

This last section asks a few questions to help us understand who took the survey.

D1. What best describes where you live? ☐ Urban ☐ Suburban ☐ Rural

D2. What is the highest level of education that you completed?

- ☐ High school or less
- ☐ Technical or vocational school
- ☐ Some college
- ☐ College graduate
- ☐ Post graduate work or advanced degree
- ☐ Refused

D3. What is your gender / sex? _____

D4. What is your age?

18	19	20	21-24	25-34	35-44	45-54	55-64	65-74	75 or older
☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

D5. During the past 30 days, have you had at least one drink of any alcoholic beverage such as beer, wine, a malt beverage, or liquor? ☐ Yes ☐ No ☐ I don't know

Is there anything else you would like us to know?

Thank you!

Please fold the completed survey in half and return it in the envelope provided to:

Center for Health and Safety Culture
PO Box 170548
Bozeman, MT 59717

7 APPENDIX B

7.1 Survey Scales

Table 26. Summary of Scales and Internal Reliability

Scale[1]	Internal Reliability (Cronbach's Alpha) Mailed (age 21+, all states)	Internet (18-30, no CO WA)	Internet (18-30, CO WA, user)
Willingness **Q18.** Suppose you are in a situation where you have used marijuana within the past 4 hours. How willing would you be to drive in the following situations? **A.** Drive in an emergency **B.** Drive home on side streets **C.** Drive home on the highway **D.** Drive if you don't feel high **E.** Drive even though you still feel high **F.** Drive when you had also been drinking	0.935	0.939	0.872
Attitude **Q23.** Each row shows a range of feelings about driving after using marijuana. Please select one box on each row that best shows how you feel about driving after using marijuana. **A**. Cool: Uncool[2] **B**. Dangerous: Safe **C**. Stupid: Sensible **D**. Pleasant: Unpleasant[2] **E**. Acceptable: Unacceptable[2]	0.905	0.930	0.932
Prototypical Image (always) **Q31.** The "typical" person who drives after using marijuana is... **A.** Relaxed: Anxious[2] **B.** Calm: Manic[2] **C.** Distracted: Focused[2] **D.** Self-involved: Concerned about others[2] **E.** Cautious: Reckless[2] **F.** Stupid: Smart [2] **G.** Safe: Unsafe[2] **H.** Paranoid: Confident **I.** Cool: Uncool[2] **J.** Risk-taker: Cautious **K.** Irresponsible: Responsible **L.** Lawful: Unlawful[2]	0.878	0.908	0.909

1. Scales are computed by averaging responses across items. All items use 7 point ranges.
2. Items are reverse coded.

Table 26. Summary of Scales and Internal Reliability (continued)

Scale[1]	Internal Reliability (Cronbach's Alpha)		
	Mailed (age 21+, all states)	Internet (18-30, no CO WA)	Internet (18-30, CO WA, user)
Prototypical Image (never) **Q31.** The "typical" person who NEVER drives after using marijuana is... **A.** Relaxed: Anxious[2] **B.** Calm: Manic[2] **C.** Distracted: Focused[2] **D.** Self-involved: Concerned about others[2] **E.** Cautious: Reckless[2] **F.** Stupid: Smart [2] **G.** Safe: Unsafe[2] **H.** Paranoid: Confident **I.** Cool: Uncool[2] **J.** Risk-taker: Cautious **K.** Irresponsible: Responsible **L.** Lawful: Unlawful[2]	0.941	0.932	0.932
Perceived Norms – injunctive **Q38.** "Most people who are important to me think it is OK to drive after using marijuana." **Q40.** "Most people who are important to me expect me not to drive after using marijuana."[2]	0.468	0.657	0.812
Perceived Norms – descriptive **Q14.** In your opinion, how often did most people like you in your state drive within four hours of using marijuana in the past 12 months? **Q15.** In your opinion, how often did most people age 21 and older in your state drive within four hours of using marijuana in the past 12 months?	0.784	0.880	0.936
Control Beliefs **Q44.** How likely are you to find yourself in the following situations within four hours of using marijuana? **A.** Needing to drive to work or school **B.** Needing to drive to run errands **C.** Needing to drive home (after using marijuana when out or at a party)	0.931	0.946	0.833

1. Scales are computed by averaging responses across items. All item use 7 point ranges.
2. Items are reverse coded.

8 APPENDIX C

8.1 Statistical Report

The frequency responses to all questions asked on the three surveys are reported below. The mailed survey is indicated by "M (age 21+, all states)." The internet survey of individuals ages 18 to 30 in all states excluding Colorado and Washington is indicated by "I (18-30, no CO WA)." The internet survey of individuals ages 18 to 30 in Colorado and Washington who reported using cannabis in the past 30 days is indicated by "I (18-30, CO WA, user)."

Table 27. Cannabis Use and Driving Under the Influence Behaviors

Q7. Thinking back over the past 12 months, how often did you drive a vehicle?

Survey	Never	Once or twice	3 to 6 times	7 to 11 times	Monthly	Weekly	Daily
M (age 21+, all states)	6.8%	.6%	1.2%	.5%	1.7%	11.3%	77.9%
I (18-30, no CO WA)		3.0%	3.9%	3.8%	3.8%	17.2%	68.4%
I (18-30, CO WA, user)		4.3%	5.6%	2.5%	4.1%	21.7%	61.8%

Q8. Thinking back over the past 12 months, how often did you use marijuana?

Survey	Never	Once or twice	3 to 6 times	7 to 11 times	Monthly	Weekly	Daily
M (age 21+, all states)	77.6%	4.5%	4.2%	2.0%	3.1%	3.6%	5.0%
I (18-30, no CO WA)	68.0%	8.7%	3.9%	2.8%	3.9%	5.5%	7.2%
I (18-30, CO WA, user)		8.1%	14.1%	7.4%	15.7%	24.6%	30.2%

Q11. How do you view your marijuana use?

Survey	Recreational	Medical	Both	I don't use marijuana
M (age 21+, all states)	12.2%	3.6%	9.3%	74.9%
I (18-30, no CO WA)	14.3%	5.3%	17.4%	62.9%
I (18-30, CO WA, user)	45.6%	7.2%	47.2%	

Q12. Thinking back over the past 12 months, when was the last time you drove a vehicle within four hours of using marijuana?

Survey	Never	More than 1 Year Ago	6 months Ago to 1 Year Ago	3 to 6 Months Ago	1 to 2 Months Ago	This Month	This Week	Today / Yesterday
M (age 21+, all states)	88.2%	2.2%	1.4%	.9%	.6%	1.2%	2.5%	3.1%
I (18-30, no CO WA)	81.7%	1.5%	2.5%	2.8%	3.2%	2.4%	3.2%	2.5%
I (18-30, CO WA, user)	44.7%	6.4%	7.7%	4.1%	7.4%	13.5%	8.7%	7.5%

Q13. Thinking back over the past 12 months, how often did you drive within four hours of using marijuana?

Survey	Never	Once or twice	3 to 6 times	7 to 11 times	Monthly	Weekly	Daily
M (age 21+, all states)	90.5%	1.7%	1.1%	1.2%	.2%	2.2%	3.0%
I (18-30, no CO WA)	84.6%	3.5%	2.0%	1.8%	1.8%	3.8%	2.5%
I (18-30, CO WA, user)	46.6%	17.6%	6.0%	4.6%	8.9%	8.7%	7.5%

Table 28. Intention

Q9. Thinking of the next 12 months, how often do you intend to use marijuana?

Survey	Never	Once or twice	3 to 6 times	7 to 11 times	Monthly	Weekly	Daily
M (age 21+, all states)	77.3%	5.6%	3.4%	2.3%	2.0%	5.0%	4.3%
I (18-30, no CO WA)	69.0%	9.8%	3.2%	2.1%	3.8%	6.5%	5.6%
I (18-30, CO WA, user)	1.7%	10.4%	10.6%	7.0%	15.9%	27.1%	27.3%

Q10. Suppose recreational marijuana use became legal in your state (that is, an individual could use marijuana without violating the law). Would your use of marijuana increase, decrease or stay the same?

Survey	I would not use mari-juana	Significantly Decrease	Decrease	Somewhat Decrease	Stay the Same	Somewhat Increase	Increase	Significantly Increase
M (age 21+, all states)	64.5%			.5%	25.8%	6.5%	2.1%	.6%
I (18-30, no CO WA)	47.8%	.6%	.8%	.6%	23.9%	16.5%	5.1%	4.8%
I (18-30, CO WA, user)	3.7%	5.2%	12.8%	76.6%	1.2%		.2%	.4%

Q16. Thinking of the next 12 months, how often do you intend to drive within four hours of using marijuana?

Survey	Never	Once or twice	3 to 6 times	7 to 11 times	Monthly	Weekly	Daily
M (age 21+, all states)	90.1%	1.9%	.7%	1.1%	.2%	3.2%	2.7%
I (18-30, no CO WA)	84.1%	4.1%	1.7%	.8%	3.4%	3.1%	2.8%
I (18-30, CO WA, user)	57.4%	12.2%	4.3%	2.7%	7.9%	7.9%	7.5%

Q17. Just for this question, suppose recreational marijuana use became legal in your state (that is, an individual could use marijuana without violating the law). However, driving under the influence of marijuana was illegal. In this case, would you be more or less likely to drive within four hours of using marijuana in the next 12 months?

Survey	I would not use mari-juana	Much Less Likely	Less Likely	Somewhat Less Likely	No Change	Somewhat More Likely	More Likely	Much More Likely
M (age 21+, all states)	69.9%	6.6%	4.1%		17.4%	1.0%	.1%	.9%
I (18-30, no CO WA)	54.9%	13.3%	3.7%	3.4%	20.1%	2.8%	1.1%	.7%
I (18-30, CO WA, user)	1.9%	.6%	2.5%	51.9%	4.7%	7.9%	26.7%	3.7%

Table 29. Willingness

Q18. Suppose you are in a situation where you have used marijuana within the past 4 hours. How willing would you be to drive in the following situations?

A. Drive in an emergency

Survey	I would never use marijuana	Not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Extremely willing (7)
M (age 21+, all states)	43.8%	10.0%	5.3%	4.3%	4.7%	5.2%	8.9%	17.8%
I (18-30, no CO WA)	40.4%	5.6%	4.2%	3.8%	4.8%	10.4%	10.5%	20.2%
I (18-30, CO WA, user)	.4%	8.1%	6.0%	6.2%	8.1%	13.7%	13.7%	43.8%

B. Drive home on side streets

Survey	I would never use marijuana	Not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Extremely willing (7)
M (age 21+, all states)	45.3%	21.0%	8.0%	5.6%	4.6%	4.4%	4.3%	6.8%
I (18-30, no CO WA)	41.2%	15.3%	8.7%	7.0%	8.0%	6.2%	5.2%	8.4%
I (18-30, CO WA, user)	.8%	26.4%	12.4%	9.1%	9.5%	13.0%	9.9%	19.0%

C. Drive home on the highway

Survey	I would never use marijuana	Not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Extremely willing (7)
M (age 21+, all states)	46.5%	28.5%	9.2%	2.0%	3.2%	2.0%	3.0%	5.7%
I (18-30, no CO WA)	41.7%	26.8%	7.6%	7.3%	4.5%	3.5%	2.7%	6.0%
I (18-30, CO WA, user)	1.0%	42.0%	14.1%	6.8%	10.1%	6.6%	7.7%	11.8%

D. Drive if you don't feel high

Survey	I would never use marijuana	Not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Extremely willing (7)
M (age 21+, all states)	46.3%	16.0%	5.7%	3.8%	6.4%	4.6%	7.2%	10.0%
I (18-30, no CO WA)	41.0%	11.1%	8.6%	6.5%	7.0%	8.6%	6.3%	11.0%
I (18-30, CO WA, user)	.8%	15.1%	10.3%	8.9%	9.1%	11.0%	16.2%	28.6%

E. Drive even though you still feel high

Survey	I would never use marijuana	Not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Extremely willing (7)
M (age 21+, all states)	46.8%	31.8%	6.7%	3.7%	3.1%	2.2%	1.5%	4.1%
I (18-30, no CO WA)	42.1%	28.2%	9.6%	5.6%	4.6%	2.8%	2.4%	4.6%
I (18-30, CO WA, user)	1.2%	44.9%	14.7%	11.0%	6.6%	4.6%	7.7%	9.3%

F. Drive when you had also been drinking

Survey	I would never use marijuana	Not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Extremely willing (7)
M (age 21+, all states)	45.4%	46.4%	4.7%	1.0%	1.0%	.4%	.9%	.2%
I (18-30, no CO WA)	44.2%	45.6%	3.1%	1.8%	1.7%	1.1%	1.4%	1.1%
I (18-30, CO WA, user)	7.8%	80.8%	4.1%	3.3%	2.1%	1.0%	0.4%	0.6%

Table 30. Perceived Willingness

Q19. In your opinion, how willing would most people age 21 and older in your state be to drive in the following situations after having used marijuana within in the past 4 hours?

A. Drive in an emergency

Survey	Most would be not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Most would be extremely willing (7)
M (age 21+, all states)	5.8%	6.1%	3.5%	11.4%	11.9%	16.2%	45.0%
I (18-30, no CO WA)	6.2%	4.1%	4.9%	10.0%	16.4%	18.0%	40.4%
I (18-30, CO WA, user)	2.5%	2.7%	2.9%	5.8%	13.5%	21.2%	51.4%

B. Drive home on side streets

Survey	Most would be not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Most would be extremely willing (7)
M (age 21+, all states)	7.2%	5.9%	7.2%	17.3%	17.1%	21.3%	24.0%
I (18-30, no CO WA)	7.6%	3.9%	9.7%	17.1%	18.4%	24.3%	19.1%
I (18-30, CO WA, user)	3.5%	4.1%	8.3%	10.3%	19.1%	28.0%	26.7%

C. Drive home on the highway

Survey	Most would be not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Most would be extremely willing (7)
M (age 21+, all states)	9.5%	12.5%	10.7%	18.1%	18.8%	14.0%	16.5%
I (18-30, no CO WA)	9.6%	11.2%	16.3%	20.4%	18.8%	10.7%	13.1%
I (18-30, CO WA, user)	6.6%	9.7%	15.4%	18.0%	18.3%	15.6%	16.4%

D. Drive if they don't feel high

Survey	Most would be not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Most would be extremely willing (7)
M (age 21+, all states)	6.3%	4.5%	5.2%	8.7%	13.7%	21.8%	39.8%
I (18-30, no CO WA)	6.8%	3.2%	6.9%	12.7%	16.3%	22.6%	31.5%
I (18-30, CO WA, user)	2.9%	3.1%	4.1%	8.7%	12.6%	22.3%	46.3%

E. Drive even though they still feel high

Survey	Most would be not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Most would be extremely willing (7)
M (age 21+, all states)	9.2%	13.3%	13.1%	21.7%	17.0%	10.6%	15.1%
I (18-30, no CO WA)	10.1%	11.4%	15.7%	20.2%	17.6%	12.9%	12.1%
I (18-30, CO WA, user)	6.2%	8.9%	15.5%	17.4%	23.6%	13.2%	15.3%

F. Drive when they had also been drinking

Survey	Most would be not at all willing (1)	(2)	(3)	(4)	(5)	(6)	Most would be extremely willing (7)
M (age 21+, all states)	14.1%	21.0%	16.9%	17.5%	10.3%	9.1%	11.1%
I (18-30, no CO WA)	17.1%	15.0%	20.4%	21.1%	12.1%	6.7%	7.6%
I (18-30, CO WA, user)	14.9%	22.8%	25.9%	14.1%	11.6%	5.4%	5.2%

Table 31. Attitudes

23. Please select one box on each row that best shows how you feel about driving after using marijuana.

A.

Survey	Cool	2	3	4	5	6	Uncool
M (age 21+, all states)	.8%	.5%	1.4%	16.0%	4.5%	6.4%	70.4%
I (18-30, no CO WA)	3.9%	2.2%	3.4%	13.2%	7.4%	12.8%	57.0%
I (18-30, CO WA, user)	3.9%	5.0%	3.7%	24.1%	11.4%	16.2%	35.7%

B.

Survey	Dangerous	2	3	4	5	6	Safe
M (age 21+, all states)	63.6%	9.8%	8.0%	9.1%	3.5%	2.3%	3.8%
I (18-30, no CO WA)	51.7%	13.2%	11.1%	10.1%	6.2%	3.7%	4.1%
I (18-30, CO WA, user)	31.3%	13.9%	17.6%	15.7%	7.5%	9.3%	4.6%

C.

Survey	Stupid	2	3	4	5	6	Sensible
M (age 21+, all states)	65.7%	8.8%	7.9%	11.9%	1.6%	2.0%	2.0%
I (18-30, no CO WA)	54.0%	13.4%	10.7%	11.8%	4.2%	3.7%	2.3%
I (18-30, CO WA, user)	35.0%	10.8%	15.1%	22.1%	8.5%	4.4%	4.1%

D.

Survey	Pleasant	2	3	4	5	6	Unpleasant
M (age 21+, all states)	2.8%	3.4%	4.4%	18.3%	3.4%	9.5%	58.2%
I (18-30, no CO WA)	4.5%	5.5%	7.7%	16.2%	7.9%	13.8%	44.4%
I (18-30, CO WA, user)	8.9%	9.1%	9.3%	18.0%	13.2%	14.1%	27.3%

E.

Survey	Acceptable	2	3	4	5	6	Unacceptable
M (age 21+, all states)	1.4%	3.5%	3.6%	12.0%	5.5%	7.6%	66.4%
I (18-30, no CO WA)	4.6%	3.2%	5.5%	13.5%	10.4%	11.8%	50.9%
I (18-30, CO WA, user)	7.0%	5.0%	10.1%	20.5%	12.8%	13.5%	31.1%

Table 32. Perceived Attitude

Q24. In your opinion, how would most people age 21 and older in your state feel about driving after using marijuana?

A.

Survey	Cool	2	3	4	5	6	Uncool
M (age 21+, all states)	11.0%	11.1%	11.1%	32.6%	10.1%	9.3%	14.8%
I (18-30, no CO WA)	15.3%	9.7%	20.3%	22.9%	10.0%	9.1%	12.7%
I (18-30, CO WA, user)	12.2%	12.8%	15.1%	31.4%	11.2%	7.8%	9.5%

B.

Survey	Dangerous	2	3	4	5	6	Safe
M (age 21+, all states)	14.8%	11.5%	13.4%	26.1%	14.3%	12.5%	7.3%
I (18-30, no CO WA)	13.2%	12.9%	14.5%	26.1%	15.9%	10.1%	7.3%
I (18-30, CO WA, user)	10.3%	9.3%	18.0%	25.0%	18.2%	12.2%	7.0%

C.

Survey	Stupid	2	3	4	5	6	Sensible
M (age 21+, all states)	16.2%	9.6%	13.2%	35.2%	11.7%	7.8%	6.3%
I (18-30, no CO WA)	13.2%	11.1%	17.1%	26.1%	18.1%	7.9%	6.5%
I (18-30, CO WA, user)	10.1%	11.4%	19.8%	28.7%	16.5%	7.6%	6.0%

D.

Survey	Pleasant	2	3	4	5	6	Unpleasant
M (age 21+, all states)	9.3%	10.1%	11.1%	37.4%	11.1%	8.6%	12.5%
I (18-30, no CO WA)	10.4%	13.1%	20.4%	28.4%	8.4%	8.6%	10.8%
I (18-30, CO WA, user)	11.6%	15.6%	18.5%	24.9%	12.1%	10.0%	7.3%

E.

Survey	Acceptable	2	3	4	5	6	Unacceptable
M (age 21+, all states)	10.9%	14.4%	15.3%	24.8%	10.7%	10.7%	13.2%
I (18-30, no CO WA)	11.5%	13.0%	21.2%	22.3%	12.8%	8.1%	11.1%
I (18-30, CO WA, user)	12.2%	15.3%	19.5%	25.7%	9.3%	10.6%	7.4%

Table 33. Behavioral Beliefs (Positive Expectancies)

Q25A. "If I drive after using marijuana, I will feel calmer."-You

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	42.6%	16.7%	5.6%	15.8%	10.9%	5.3%	3.1%
I (18-30, no CO WA)	41.5%	14.2%	7.5%	15.2%	10.0%	6.0%	5.6%
I (18-30, CO WA, user)	23.0%	18.2%	12.6%	14.9%	14.9%	8.3%	8.1%

Q25B. "If I drive after using marijuana, I will feel calmer."-Most people age 21 and older in your state

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	8.7%	9.1%	11.5%	19.9%	29.7%	15.4%	5.8%
I (18-30, no CO WA)	5.9%	5.6%	12.6%	20.2%	27.1%	17.7%	10.8%
I (18-30, CO WA, user)	3.3%	8.7%	11.4%	22.2%	28.6%	17.2%	8.5%

Q26A. "If I drive after using marijuana, I will be more alert."-You

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	52.8%	17.9%	9.1%	12.5%	4.6%	1.6%	1.5%
I (18-30, no CO WA)	49.6%	14.8%	8.2%	13.1%	5.9%	4.1%	4.4%
I (18-30, CO WA, user)	27.6%	19.9%	14.7%	14.9%	9.5%	7.1%	6.4%

Q26B. "If I drive after using marijuana, I will be more alert."-Most people age 21 and older in your state

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	13.8%	16.3%	18.8%	22.1%	17.9%	7.8%	3.2%
I (18-30, no CO WA)	11.9%	12.2%	17.7%	25.0%	16.7%	10.4%	6.2%
I (18-30, CO WA, user)	8.1%	14.0%	19.2%	24.8%	17.6%	12.4%	3.9%

Q27A. "If I drive after using marijuana, I will be more cautious. -You

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	41.7%	14.4%	4.2%	12.2%	13.2%	7.3%	7.1%
I (18-30, no CO WA)	38.7%	13.5%	7.2%	13.1%	10.3%	6.9%	10.4%
I (18-30, CO WA, user)	16.8%	10.4%	8.9%	12.3%	18.5%	14.3%	18.9%

Q27B. "If I drive after using marijuana, I will be more cautious. -Most people age 21 and older in your state

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	10.9%	13.9%	12.8%	16.7%	26.4%	14.6%	4.7%
I (18-30, no CO WA)	9.6%	8.1%	14.0%	22.6%	23.0%	14.5%	8.1%
I (18-30, CO WA, user)	3.9%	6.2%	11.2%	19.0%	25.7%	23.0%	11.0%

Table 34. Behavioral Beliefs (Negative Expectancies)

Q28A. "If I drive after using marijuana, I will be more likely to get arrested."-You

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	6.6%	4.8%	4.6%	15.5%	11.5%	23.2%	33.7%
I (18-30, no CO WA)	4.2%	1.8%	4.1%	13.5%	7.4%	25.3%	43.7%
I (18-30, CO WA, user)	4.4%	3.9%	6.2%	16.6%	16.8%	24.2%	27.9%

Q28B. "If I drive after using marijuana, I will be more likely to get arrested."-Most people age 21 and older in your state

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	6.3%	10.9%	12.2%	23.4%	20.1%	15.0%	12.0%
I (18-30, no CO WA)	3.7%	5.3%	11.5%	20.8%	21.9%	19.8%	16.9%
I (18-30, CO WA, user)	2.1%	7.5%	9.3%	23.4%	25.0%	19.0%	13.7%

Q29A. "If I drive after using marijuana, my reaction time will be slower."-You

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	3.6%	2.6%	2.1%	11.9%	9.2%	24.6%	46.0%
I (18-30, no CO WA)	5.5%	2.8%	3.5%	10.8%	13.5%	19.9%	44.0%
I (18-30, CO WA, user)	5.2%	6.4%	6.2%	13.3%	18.2%	24.2%	26.5%

Q29B. "If I drive after using marijuana, my reaction time will be slower."-Most people age 21 and older in your state

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	3.3%	9.9%	13.3%	20.8%	21.9%	17.0%	13.7%
I (18-30, no CO WA)	5.1%	5.9%	12.7%	26.4%	24.2%	15.0%	10.7%
I (18-30, CO WA, user)	3.3%	7.4%	13.8%	21.7%	28.9%	16.1%	8.9%

Q30A. "If I drive after using marijuana, I am more likely to be in an accident."-You

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	4.7%	5.6%	6.2%	15.4%	11.1%	23.0%	34.1%
I (18-30, no CO WA)	7.0%	3.2%	4.1%	13.3%	12.6%	20.6%	39.0%
I (18-30, CO WA, user)	9.3%	7.7%	9.7%	22.2%	15.3%	17.0%	18.8%

Q30B. "If I drive after using marijuana, I am more likely to be in an accident."-Most people age 21 and older in your state

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	5.9%	13.3%	14.8%	26.6%	18.1%	12.2%	9.1%
I (18-30, no CO WA)	6.5%	7.9%	15.7%	27.0%	19.7%	13.9%	9.4%
I (18-30, CO WA, user)	5.8%	10.7%	17.8%	30.2%	19.2%	9.7%	6.6%

Table 35. Prototypical Image

Q31. Each row shows a range of feelings about the "typical" person who drives after using marijuana. Please select one box on each row that best shows how you feel. The “typical” person who drives after using marijuana is...

A.

Survey	Relaxed	2	3	4	5	6	Anxious
M (age 21+, all states)	13.0%	17.3%	20.4%	20.9%	10.7%	6.9%	10.7%
I (18-30, no CO WA)	12.9%	14.5%	21.1%	19.0%	11.2%	7.2%	14.2%
I (18-30, CO WA, user)	12.5%	15.1%	21.2%	16.2%	15.6%	9.7%	9.7%

B.

Survey	Calm	2	3	4	5	6	Manic
M (age 21+, all states)	11.9%	18.6%	23.8%	25.1%	8.1%	3.5%	8.9%
I (18-30, no CO WA)	11.9%	17.0%	24.4%	19.4%	11.1%	6.0%	10.2%
I (18-30, CO WA, user)	12.5%	17.8%	30.3%	19.5%	9.5%	4.1%	6.4%

C.

Survey	Distracted	2	3	4	5	6	Focused
M (age 21+, all states)	26.5%	21.5%	14.3%	22.1%	8.1%	5.2%	2.4%
I (18-30, no CO WA)	22.3%	16.3%	19.4%	22.9%	10.2%	5.2%	3.8%
I (18-30, CO WA, user)	11.0%	14.5%	22.2%	18.3%	15.3%	11.8%	6.9%

D.

Survey	Self-involved	2	3	4	5	6	Concerned about others
M (age 21+, all states)	28.0%	19.5%	15.5%	24.3%	7.5%	3.5%	1.6%
I (18-30, no CO WA)	23.8%	17.6%	17.0%	23.3%	9.8%	4.5%	3.9%
I (18-30, CO WA, user)	9.7%	13.5%	20.1%	29.7%	12.2%	8.5%	6.4%

E.

Survey	Cautious	2	3	4	5	6	Reckless
M (age 21+, all states)	4.3%	9.4%	12.2%	21.7%	17.5%	14.0%	20.9%
I (18-30, no CO WA)	7.2%	7.2%	12.9%	18.8%	17.7%	16.4%	19.8%
I (18-30, CO WA, user)	10.8%	17.2%	22.2%	18.6%	15.1%	9.5%	6.6%

F.

Survey	Stupid	2	3	4	5	6	Smart
M (age 21+, all states)	37.9%	15.7%	13.1%	22.9%	6.5%	1.8%	2.1%
I (18-30, no CO WA)	31.8%	16.9%	17.3%	20.5%	6.9%	4.1%	2.5%
I (18-30, CO WA, user)	14.9%	13.0%	21.1%	33.7%	8.5%	5.0%	3.9%

Table 35. Prototypical Image (continued)

Q31. Each row shows a range of feelings about the "typical" person who drives after using marijuana. Please select one box on each row that best shows how you feel. The “typical” person who drives after using marijuana is...

G.

Survey	Safe	2	3	4	5	6	Unsafe
M (age 21+, all states)	2.3%	3.3%	7.2%	19.4%	14.2%	17.2%	36.4%
I (18-30, no CO WA)	4.2%	3.7%	7.3%	18.7%	16.9%	20.2%	29.1%
I (18-30, CO WA, user)	5.2%	7.1%	9.3%	24.7%	21.8%	18.1%	13.7%

H.

Survey	Paranoid	2	3	4	5	6	Confident
M (age 21+, all states)	19.2%	15.9%	15.4%	31.3%	9.3%	5.6%	3.3%
I (18-30, no CO WA)	18.8%	13.2%	17.2%	26.3%	12.9%	7.7%	3.8%
I (18-30, CO WA, user)	15.1%	16.2%	22.2%	22.0%	14.1%	5.8%	4.6%

I.

Survey	Cool	2	3	4	5	6	Uncool
M (age 21+, all states)	3.4%	6.0%	6.0%	33.2%	6.3%	11.4%	33.7%
I (18-30, no CO WA)	3.9%	5.9%	9.4%	24.1%	14.1%	13.9%	28.7%
I (18-30, CO WA, user)	3.9%	6.9%	10.4%	33.8%	14.3%	15.3%	15.4%

J.

Survey	Risk-taker	2	3	4	5	6	Cautious
M (age 21+, all states)	30.9%	16.8%	14.0%	21.9%	8.4%	5.0%	2.9%
I (18-30, no CO WA)	28.2%	15.9%	20.4%	18.0%	8.4%	5.5%	3.7%
I (18-30, CO WA, user)	13.6%	10.7%	23.6%	17.6%	14.9%	12.0%	7.6%

K.

Survey	Irresponsible	2	3	4	5	6	Responsible
M (age 21+, all states)	40.9%	16.0%	13.5%	20.2%	5.3%	2.5%	1.6%
I (18-30, no CO WA)	37.0%	14.6%	15.3%	18.8%	7.0%	4.2%	3.1%
I (18-30, CO WA, user)	18.9%	13.7%	24.9%	21.6%	9.1%	7.7%	4.1%

L.

Survey	Lawful	2	3	4	5	6	Unlawful
M (age 21+, all states)	2.1%	3.9%	3.9%	16.9%	9.1%	15.5%	48.7%
I (18-30, no CO WA)	3.9%	2.3%	3.5%	16.0%	11.3%	19.7%	43.3%
I (18-30, CO WA, user)	2.9%	4.2%	8.1%	16.8%	17.8%	20.8%	29.3%

Table 35. Prototypical Image (continued)

Q32. The "typical" person who NEVER drives after using marijuana is...

A.

Survey	Relaxed	2	3	4	5	6	Anxious
M (age 21+, all states)	26.7%	15.9%	10.0%	32.1%	6.2%	4.4%	4.6%
I (18-30, no CO WA)	31.2%	17.6%	12.1%	20.1%	8.0%	5.2%	5.9%
I (18-30, CO WA, user)	25.7%	15.7%	14.7%	20.1%	9.3%	6.2%	8.3%

B.

Survey	Calm	2	3	4	5	6	Manic
M (age 21+, all states)	26.6%	18.5%	12.4%	32.2%	4.6%	2.2%	3.4%
I (18-30, no CO WA)	32.3%	19.0%	14.2%	21.3%	6.7%	2.5%	3.9%
I (18-30, CO WA, user)	26.2%	16.7%	16.5%	21.1%	10.1%	4.3%	5.2%

C.

Survey	Distracted	2	3	4	5	6	Focused
M (age 21+, all states)	10.3%	8.0%	12.3%	28.1%	8.1%	12.8%	20.2%
I (18-30, no CO WA)	6.3%	5.2%	11.4%	19.8%	14.3%	17.0%	25.9%
I (18-30, CO WA, user)	6.9%	5.8%	13.7%	23.0%	13.9%	15.4%	21.2%

D.

Survey	Self-involved	2	3	4	5	6	Concerned about others
M (age 21+, all states)	9.9%	5.1%	9.7%	29.2%	10.1%	13.2%	22.8%
I (18-30, no CO WA)	6.5%	5.3%	9.3%	25.8%	13.7%	15.6%	23.8%
I (18-30, CO WA, user)	8.5%	8.1%	11.6%	27.3%	12.4%	13.6%	18.4%

E.

Survey	Cautious	2	3	4	5	6	Reckless
M (age 21+, all states)	25.5%	19.6%	13.4%	25.9%	6.4%	3.2%	6.1%
I (18-30, no CO WA)	29.7%	19.4%	17.6%	18.6%	8.9%	2.7%	3.2%
I (18-30, CO WA, user)	23.6%	17.8%	15.5%	22.5%	9.3%	7.0%	4.3%

F.

Survey	Stupid	2	3	4	5	6	Smart
M (age 21+, all states)	8.1%	5.7%	2.5%	28.3%	9.5%	16.3%	29.5%
I (18-30, no CO WA)	5.2%	3.8%	5.8%	23.0%	15.3%	16.9%	30.1%
I (18-30, CO WA, user)	6.2%	4.3%	6.0%	26.9%	14.1%	17.4%	25.0%

G.

Survey	Safe	2	3	4	5	6	Unsafe
M (age 21+, all states)	29.7%	19.1%	11.5%	22.2%	4.9%	5.6%	7.0%
I (18-30, no CO WA)	32.9%	17.1%	16.7%	20.2%	5.2%	3.7%	4.2%
I (18-30, CO WA, user)	29.0%	19.7%	16.2%	22.6%	5.0%	2.9%	4.6%

Table 35. Prototypical Image (continued)

Q32. The "typical" person who NEVER drives after using marijuana is...

H.

Survey	Paranoid	2	3	4	5	6	Confident
M (age 21+, all states)	6.6%	5.2%	4.7%	34.0%	11.5%	16.3%	21.6%
I (18-30, no CO WA)	7.4%	4.4%	8.0%	24.7%	17.0%	16.0%	22.5%
I (18-30, CO WA, user)	7.4%	5.4%	7.7%	26.7%	13.9%	17.8%	21.1%

I.

Survey	Cool	2	3	4	5	6	Uncool
M (age 21+, all states)	21.8%	10.7%	8.5%	46.7%	2.4%	1.4%	8.4%
I (18-30, no CO WA)	24.1%	12.1%	12.9%	35.9%	6.0%	3.8%	5.2%
I (18-30, CO WA, user)	20.5%	11.6%	13.9%	40.6%	3.7%	4.4%	5.2%

J.

Survey	Risk-taker	2	3	4	5	6	Cautious
M (age 21+, all states)	6.3%	5.7%	4.8%	24.2%	14.2%	19.0%	25.7%
I (18-30, no CO WA)	4.9%	2.7%	6.0%	22.2%	17.0%	19.4%	27.8%
I (18-30, CO WA, user)	5.2%	3.7%	6.0%	25.5%	17.4%	19.5%	22.6%

K.

Survey	Irresponsible	2	3	4	5	6	Responsible
M (age 21+, all states)	6.7%	4.4%	4.1%	20.1%	11.8%	18.9%	34.1%
I (18-30, no CO WA)	6.0%	3.2%	7.0%	17.6%	16.9%	16.7%	32.5%
I (18-30, CO WA, user)	5.6%	2.3%	6.0%	19.5%	17.4%	19.7%	29.4%

L.

Survey	Lawful	2	3	4	5	6	Unlawful
M (age 21+, all states)	39.5%	16.9%	8.0%	20.5%	3.7%	4.0%	7.4%
I (18-30, no CO WA)	38.1%	15.2%	13.2%	18.4%	5.1%	3.9%	6.0%
I (18-30, CO WA, user)	40.8%	16.4%	10.3%	18.4%	5.6%	3.5%	5.0%

Table 36. Perceived Norms

Q38. "Most people who are important to me think it is OK to drive after using marijuana."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	52.8%	18.8%	6.7%	10.2%	5.7%	3.8%	2.0%
I (18-30, no CO WA)	42.6%	20.9%	8.4%	11.7%	7.0%	5.1%	4.4%
I (18-30, CO WA, user)	19.4%	17.6%	11.4%	15.3%	17.8%	11.2%	7.2%

Q40. "Most people who are important to me expect me not to drive after using marijuana."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	5.1%	3.0%	2.6%	8.6%	7.7%	23.3%	49.8%
I (18-30, no CO WA)	3.2%	4.5%	4.8%	12.9%	6.9%	21.2%	46.5%
I (18-30, CO WA, user)	3.7%	7.7%	10.6%	18.1%	11.0%	24.7%	24.1%

Q14. In your opinion, how often did most people like you in your state drive within four hours of using marijuana?

Survey	Never	Once or twice	3 to 6 times	7 to 11 times	Monthly	Weekly	Daily
M (age 21+, all states)	36.1%	19.2%	10.5%	5.6%	5.2%	7.9%	15.4%
I (18-30, no CO WA)	29.3%	15.1%	12.5%	6.0%	8.8%	12.8%	15.4%
I (18-30, CO WA, user)	6.2%	11.6%	12.0%	6.4%	14.1%	17.0%	32.7%

Q15. In your opinion, how often did most people age 21 and older in your state drive within four hours of using marijuana?

Survey	Never	Once or twice	3 to 6 times	7 to 11 times	Monthly	Weekly	Daily
M (age 21+, all states)	11.2%	18.5%	15.2%	10.0%	9.9%	16.0%	19.2%
I (18-30, no CO WA)	15.7%	14.6%	15.2%	9.0%	11.0%	14.3%	20.2%
I (18-30, CO WA, user)	4.8%	10.8%	9.8%	7.3%	14.5%	20.8%	31.9%

Table 37. Normative Beliefs

Q33. "My friends would think it was OK if I drove after using marijuana."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	38.8%	19.4%	5.0%	10.7%	14.2%	7.1%	4.8%
I (18-30, no CO WA)	31.1%	16.2%	8.6%	12.2%	14.2%	9.3%	8.4%
I (18-30, CO WA, user)	9.3%	11.0%	5.8%	9.7%	22.2%	21.8%	20.3%

Q34. "My family would think it was OK if I drove after using marijuana."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	56.0%	20.0%	8.8%	6.1%	4.9%	2.3%	1.8%
I (18-30, no CO WA)	61.5%	12.0%	7.5%	7.0%	4.5%	4.1%	3.5%
I (18-30, CO WA, user)	37.7%	20.1%	11.0%	8.9%	8.7%	6.2%	7.4%

Q35. "My employer would think it was OK if I drove after using marijuana."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree	I don't have an employer
M (age 21+, all states)	69.8%	15.9%	1.8%	8.5%	.9%	1.5%	1.6%	
I (18-30, no CO WA)	45.4%	9.8%	4.2%	6.8%	2.1%	2.4%	1.8%	27.4%
I (18-30, CO WA, user)	52.8%	16.4%	7.5%	13.7%	3.4%	3.6%	2.7%	

Q36. "Law enforcement in my community would think it was OK if people drove after using marijuana."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	74.9%	16.0%	3.1%	4.1%	.5%	.2%	1.2%
I (18-30, no CO WA)	65.0%	19.2%	3.1%	8.1%	1.4%	2.2%	.8%
I (18-30, CO WA, user)	60.5%	22.6%	6.0%	7.7%	1.5%	1.0%	.6%

Q37. "Most people in my community think it is OK to drive after using marijuana."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	30.3%	24.8%	12.0%	17.3%	8.0%	4.9%	2.7%
I (18-30, no CO WA)	26.7%	22.8%	13.5%	16.0%	10.4%	6.6%	3.9%
I (18-30, CO WA, user)	14.9%	16.1%	11.8%	23.0%	17.2%	12.0%	5.0%

Q39. "Most people in my community expect people not to drive after using marijuana."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	5.4%	4.0%	5.8%	13.0%	14.7%	28.1%	29.1%
I (18-30, no CO WA)	3.7%	5.5%	6.0%	14.2%	14.0%	27.4%	29.2%
I (18-30, CO WA, user)	3.7%	7.5%	10.0%	17.4%	18.7%	25.7%	17.0%

Table 38. Perceived Control

Q41. "It's up to me whether I drive after using marijuana."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	14.7%	6.1%	3.0%	9.4%	7.5%	18.7%	40.6%
I (18-30, no CO WA)	7.6%	6.0%	3.7%	13.6%	12.5%	18.8%	37.7%
I (18-30, CO WA, user)	1.0%	2.5%	2.3%	5.6%	9.9%	25.1%	53.6%

Q42. "If I really wanted to, I could choose to never drive after using marijuana."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	3.4%	.7%	1.6%	5.0%	2.6%	20.5%	66.2%
I (18-30, no CO WA)	2.2%	2.4%	2.2%	6.9%	7.3%	16.8%	62.1%
I (18-30, CO WA, user)	.8%	1.7%	1.9%	4.8%	4.8%	23.2%	62.7%

Q43. "Situations come up that are out of my control that require me to drive after using marijuana."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	41.7%	16.1%	3.6%	17.9%	9.7%	6.9%	4.1%
I (18-30, no CO WA)	27.4%	15.8%	9.1%	20.3%	12.8%	8.9%	5.8%
I (18-30, CO WA, user)	10.1%	17.4%	7.4%	19.6%	19.6%	14.9%	11.0%

Table 39. Control Beliefs

Q44A. How likely are you to find yourself in the following situations within four hours of using marijuana:
Needing to drive to work or school

Survey	I don't use marijuana	Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely
M (age 21+, all states)	72.7%	17.1%	3.3%	1.0%	2.6%	.7%	1.6%	1.0%
I (18-30, no CO WA)	61.2%	20.1%	5.3%	2.7%	3.1%	3.1%	3.1%	1.4%
I (18-30, CO WA, user)	2.7%	52.3%	14.9%	6.9%	6.8%	6.6%	5.4%	4.4%

Q44B. How likely are you to find yourself in the following situations within four hours of using marijuana:
Needing to drive to run errands

Survey	I don't use marijuana	Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely
M (age 21+, all states)	72.5%	10.8%	4.7%	1.1%	3.4%	3.3%	3.3%	1.0%
I (18-30, no CO WA)	60.8%	16.7%	4.4%	4.1%	4.2%	3.9%	3.1%	2.8%
I (18-30, CO WA, user)	1.0%	35.8%	18.4%	7.9%	8.7%	13.9%	8.9%	5.4%

Q44C. How likely are you to find yourself in the following situations within four hours of using marijuana:
Needing to drive home (after using marijuana when out or at a party)

Survey	I don't use marijuana	Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely
M (age 21+, all states)	72.0%	8.8%	4.0%	2.0%	4.9%	4.3%	2.9%	1.0%
I (18-30, no CO WA)	60.7%	12.4%	4.6%	5.9%	4.6%	5.1%	3.2%	3.5%
I (18-30, CO WA, user)	1.0%	31.1%	16.8%	7.2%	9.7%	17.4%	9.3%	7.5%

Q47. Before deciding to use marijuana, how likely are you to think about whether you will need to drive?

Survey	I don't use marijuana	Extremely Unlikely	Unlikely	Somewhat Unlikely	Neutral	Somewhat Likely	Likely	Extremely Likely
M (age 21+, all states)	68.0%	2.2%	2.6%	1.5%	1.5%	2.3%	8.6%	13.4%
I (18-30, no CO WA)	56.1%	5.3%	2.9%	3.6%	5.9%	6.2%	8.3%	11.6%
I (18-30, CO WA, user)		8.7%	7.7%	7.9%	13.3%	8.3%	22.6%	31.3%

Table 40. Knowledge of State Laws

Q20. Is recreational use of marijuana by adults age 21 and older legal or illegal in your state?

Survey	Legal	Illegal	I don't know
M (age 21+, all states)	55.1%	40.3%	4.7%
I (18-30, no CO WA)	4.5%	85.8%	9.7%
I (18-30, CO WA, user)	98.8%	1.2%	

Q21. Is medicinal use of marijuana by adults age 21 and older legal or illegal in your state?

Survey	Legal	Illegal	I don't know
M (age 21+, all states)	67.7%	20.2%	12.0%
I (18-30, no CO WA)	28.8%	41.1%	30.1%
I (18-30, CO WA, user)	98.5%	.2%	1.4%

Q22. Is driving under the influence of marijuana legal or illegal in your state?

Survey	Legal	Illegal	I don't know
M (age 21+, all states)	1.6%	81.4%	17.0%
I (18-30, no CO WA)	2.0%	83.2%	14.9%
I (18-30, CO WA, user)	1.0%	86.7%	12.4%

Table 41. Values

Q1. Please review the following list of values and identify the ONE that is MOST IMPORTANT to you.

Survey	Broad-mindedness	Help-fulness	Con-formity	Tradition	Security	Power	Achieve-ment	Enjoyment in life	Stimulation	Self-Direction
M (age 21+, all states)	26.6%	30.1%	5.1%	5.9%	8.5%	.1%	2.5%	3.2%	1.2%	16.7%
I (18-30, no CO WA)	16.9%	28.7%	2.9%	7.0%	5.3%	2.8%	6.3%	15.3%	1.7%	13.1%
I (18-30, CO WA, user)	18.5%	20.1%	1.9%	2.3%	2.5%	1.7%	6.0%	21.6%	3.5%	21.8%

Q2. Please review the following list of values and identify the ONE that is LEAST IMPORTANT to you.

Survey	Broad-mindedness	Help-fulness	Con-formity	Tradition	Security	Power	Achieve-ment	Enjoyment in life	Stimulation	Self-Direction
M (age 21+, all states)	6.5%	.1%	9.5%	8.7%	.6%	50.1%	1.9%	7.2%	14.1%	1.2%
I (18-30, no CO WA)	6.3%	1.5%	17.7%	12.9%	2.7%	43.3%	1.1%	1.7%	10.7%	2.1%
I (18-30, CO WA, user)	4.1%	.8%	26.4%	15.1%	3.3%	42.4%	1.4%	1.4%	4.5%	.8%

Table 41. Values (continued)

Q3. Please rate how important each of the follow is to you.

Q3A. Broad-mindedness

Survey	Opposed to my principles	Not Important (1)	(2)	(3)	(4)	(5)	(6)	(7)	Of supreme Importance (8)
M (age 21+, all states)	.6%	3.4%	4.4%	4.5%	9.0%	13.8%	17.2%	19.3%	27.8%
I (18-30, no CO WA)	.8%	3.4%	4.2%	3.8%	9.8%	15.8%	21.6%	17.1%	23.4%
I (18-30, CO WA, user)	.4%	1.5%	3.1%	5.4%	7.7%	11.8%	18.1%	23.1%	28.9%

Q3B. Helpfulness

Survey	Opposed to my principles	Not Important (1)	(2)	(3)	(4)	(5)	(6)	(7)	Of supreme Importance (8)
M (age 21+, all states)	.2%	.2%	.6%	1.0%	2.4%	7.0%	12.7%	27.6%	48.2%
I (18-30, no CO WA)		2.0%	1.1%	1.5%	5.3%	6.0%	18.0%	26.4%	39.6%
I (18-30, CO WA, user)	.2%	.2%	.6%	3.3%	6.4%	6.9%	14.5%	27.0%	40.9%

Q3C. Conformity

Survey	Opposed to my principles	Not Important (1)	(2)	(3)	(4)	(5)	(6)	(7)	Of supreme Importance (8)
M (age 21+, all states)	2.1%	3.0%	7.7%	7.8%	10.7%	12.2%	15.0%	19.4%	22.1%
I (18-30, no CO WA)	4.4%	7.9%	8.0%	9.1%	12.2%	14.6%	15.7%	16.6%	11.5%
I (18-30, CO WA, user)	8.7%	11.2%	9.7%	10.3%	14.5%	13.7%	11.0%	10.8%	10.1%

Q3D. Tradition

Survey	Opposed to my principles	Not Important (1)	(2)	(3)	(4)	(5)	(6)	(7)	Of supreme Importance (8)
M (age 21+, all states)	1.8%	3.4%	9.3%	9.4%	14.3%	15.7%	16.0%	14.1%	15.9%
I (18-30, no CO WA)	3.2%	6.6%	7.4%	9.7%	14.0%	15.3%	17.7%	15.3%	10.7%
I (18-30, CO WA, user)	4.1%	10.1%	11.4%	12.2%	13.2%	16.6%	13.0%	9.9%	9.7%

Q3E. Security

Survey	Opposed to my principles	Not Important (1)	(2)	(3)	(4)	(5)	(6)	(7)	Of supreme Importance (8)
M (age 21+, all states)	.4%	1.1%	3.4%	6.1%	11.1%	14.4%	18.1%	20.9%	24.4%
I (18-30, no CO WA)	.1%	2.2%	3.8%	7.4%	11.9%	18.0%	22.9%	17.7%	15.9%
I (18-30, CO WA, user)	1.2%	3.7%	5.6%	11.6%	17.8%	14.7%	18.5%	17.8%	9.3%

Table 41. Values (continued)

Q3. Please rate how important each of the follow is to you.

Q3F. Power

Survey	Opposed to my principles	Not Important (1)	(2)	(3)	(4)	(5)	(6)	(7)	Of supreme Importance (8)
M (age 21+, all states)	6.3%	25.0%	20.1%	12.7%	14.5%	9.3%	6.5%	3.4%	2.2%
I (18-30, no CO WA)	6.5%	18.4%	13.4%	13.6%	13.8%	9.7%	9.4%	9.4%	5.8%
I (18-30, CO WA, user)	11.2%	18.2%	14.5%	12.2%	13.7%	11.4%	9.3%	5.6%	3.9%

Q3G. Achievement

Survey	Opposed to my principles	Not Important (1)	(2)	(3)	(4)	(5)	(6)	(7)	Of supreme Importance (8)
M (age 21+, all states)	.6%	4.6%	7.1%	9.8%	16.9%	17.3%	19.1%	13.7%	10.9%
I (18-30, no CO WA)	.1%	2.4%	5.1%	6.3%	11.7%	15.4%	20.2%	20.6%	18.1%
I (18-30, CO WA, user)	1.0%	2.3%	4.2%	6.8%	11.8%	15.4%	22.4%	18.3%	17.8%

Q3H. Enjoyment in life

Survey	Opposed to my principles	Not Important (1)	(2)	(3)	(4)	(5)	(6)	(7)	Of supreme Importance (8)
M (age 21+, all states)	2.3%	6.6%	6.9%	8.8%	13.6%	16.2%	18.7%	15.0%	11.8%
I (18-30, no CO WA)	.6%	1.8%	3.1%	2.2%	6.9%	12.1%	18.0%	22.9%	32.5%
I (18-30, CO WA, user)	.4%	1.4%	1.4%	2.1%	5.8%	7.2%	15.9%	26.7%	39.1%

Q3I. Stimulation

Survey	Opposed to my principles	Not Important (1)	(2)	(3)	(4)	(5)	(6)	(7)	Of supreme Importance (8)
M (age 21+, all states)	1.6%	9.7%	9.3%	11.8%	14.4%	17.6%	18.1%	10.0%	7.5%
I (18-30, no CO WA)	2.0%	4.2%	5.3%	7.3%	13.2%	15.9%	24.9%	16.7%	10.5%
I (18-30, CO WA, user)	.8%	2.5%	3.1%	6.2%	9.3%	16.6%	25.5%	22.2%	13.9%

Q3J. Self-direction

Survey	Opposed to my principles	Not Important (1)	(2)	(3)	(4)	(5)	(6)	(7)	Of supreme Importance (8)
M (age 21+, all states)	.5%	1.1%	1.9%	3.2%	8.2%	10.0%	20.5%	24.6%	30.1%
I (18-30, no CO WA)	.3%	1.5%	1.5%	4.6%	9.4%	13.1%	20.5%	24.4%	24.6%
I (18-30, CO WA, user)		1.0%	1.4%	3.5%	5.0%	15.3%	16.6%	22.4%	34.8%

Table 42. Concern for Traffic Safety

Q4. How concerned are you about safety on roads and highways?

Survey	Not at all Concerned (1)	(2)	(3)	(4)	(5)	(6)	Extremely Concerned (7)
M (age 21+, all states)	.1%	1.5%	2.8%	6.7%	16.2%	24.3%	48.4%
I (18-30, no CO WA)	.8%	2.2%	5.3%	10.7%	25.1%	24.0%	31.7%
I (18-30, CO WA, user)	1.4%	3.5%	6.0%	9.9%	26.3%	25.1%	27.9%

Q5. "I believe the only acceptable number of deaths and serious injuries on our roadways is zero."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	6.3%	7.9%	6.9%	12.2%	13.3%	26.0%	27.6%
I (18-30, no CO WA)	3.2%	4.9%	10.3%	9.7%	14.9%	24.6%	32.4%
I (18-30, CO WA, user)	3.3%	6.8%	9.3%	11.6%	14.1%	26.7%	28.1%

Q6. "I believe the only acceptable number of deaths and serious injuries among my family and friends on our roadways is zero."

Survey	Strongly Disagree	Disagree	Somewhat Disagree	Neither Agree nor Disagree	Somewhat Agree	Agree	Strongly Agree
M (age 21+, all states)	4.5%	5.8%	4.1%	9.3%	6.5%	24.6%	45.2%
I (18-30, no CO WA)	1.1%	2.8%	3.1%	8.7%	6.6%	20.1%	57.5%
I (18-30, CO WA, user)	1.5%	2.9%	4.3%	7.4%	9.1%	20.5%	54.4%