UNIVERSITY OF TWENTE

Implicit and explicit determinants of cannabis consumption

The role of intoxication, attitude and implicit processes.

Bachelorthese

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Summary

Cannabis consumption is still a relevant topic in public. Even though people are aware of the negative consequences of cannabis, they still make use of it. One significant reason why people do not stop using cannabis or still use it, is, that most of the consumers are not always aware of their behavior. The habits they have underlie automatic, implicit processes which cause cognitive and memorial biases. Those biases can change the reaction and attention towards typical stimulus-related cues. Furthermore the research tries to find out whether implicit bias decrease after saturation, due to the consumption of the deserved product. Next to those implicit processes, also explicit processes as attitude towards cannabis plays an important role in cannabis related behavior.

The research includes participants who make regular use of cannabis. A questionnaire was taken together with two IATs, to measure the implicit processes of the candidates. One IAT was taken before the intoxication with cannabis and one after.

During this cross-sectional study it was found out that attitude plays an important role in predicting cannabis use, as well as smoking behavior and gender of the participants. There was no support to the theory that implicit processes decrease in their strength as a predictor for cannabis use after intoxication. Even though this research did not show enough proof to relate implicit processes with cannabis use, it does give a lot if hints regarding future research on cannabis related topics and new ways of thinking.

Table of Contents

1. Introduction

Just as alcohol, caffeine and nicotine, there is a high prevalence of individuals, who make use of cannabis. In the year 2007 almost 5 percent of the 15 to 64 year-old people in the Netherlands used cannabis in the last 30 days, whereas there is a higher percentage for the younger ones at the age of 15 to 29(11%) , than for users at the age 30 or older (3%) (CBS, 2014).

Longitudinal studies show that a consequent use of cannabis can lead to 'respiratory problems, general malaise, neurocognitive problems, and lower academic achievement and functioning' (Brook, Stimmel, Zhang, & Brook, 2008). Referring to Brook et al. (2008) the younger the users are, the higher the side effects of the drugs can be. It is said that cannabis use at a young age is associated with social problems, higher risk taking in e.g. general and violence behavior (Brook, Balka, & Whiteman, 1999) and as already mentioned in lower academic achievements (Lynskey, & Hall, 2000). There is also research who states that cannabis counts as an independent risk factor for schizophrenia (Andréasson, Engström, Allebecka, & Rydberg, 1987).

Even though most of the users of marihuana are aware of the negative consequences they still use the drug. The question that follows is why does it happen? In recent studies a number of dual-process theories play an important role in the behavior of individuals in relation to substance use (Cousijn, Snoek, & Wiers, 2013; Richardson, & Hardesty, 2012). Within dual-process theories distinction is made between implicit and explicit processes, which imply the fact that individuals are not always aware of the things they do (implicit) and multiple actions are made unconscious (Metz-Göckel, 2010). According to Richardson and Hardesty (2012) implicit processes consist amongst other things of impulsivity, risk-taking and short-term thinking, while explicit processes, that can be controlled, enfold careful considerations of risks, long-term thinking of planning, and prosocial behaviors. This implies, in relation to drug abuse, that a high level of substance use is caused by impulsivity and through unconscious processes (Richardson, & Hardesty, 2012). According to Johnston et al. (1992), boys are at a greater risk to use drugs as cannabis and alcohol than adolescent girls. Reason for that could be a higher impulsivity and higher risk-taking thinking (Richardson, & Hardesty, 2012).

As stated by multiple researches the implicit processes play a major part in drug use. According to Stacy and Wiers (2010) the addiction to repeated drug-use can be attributed to

the imbalance between the substance-oriented motivational system and the compromised reflective system. The motivational system is responsible for fast automatic processes that evaluate stimuli in how great their emotional and motivational significance is. While making use of specific drugs it is said that this system becomes conditioned to certain 'substance-related cues' (Cousijn et al., 2013). In this case substance related cues means that the respondents, who are used to regular cannabis use, become sensitized regarding to cues that they relate with cannabis. Those cues can for example be words ('smoking', or 'joint'), or pictures (image of cannabis herb, or 'long paper'). This motivational system stands on the opposite of the reflective system that regulates the reaction of the person on the current situation. It makes use of the knowledge and former experience of the person. As mentioned by Stacy and Wiers (2010), the reflective system by cannabis users has slower regulation processes and with this it is more difficult for users to control their impulses. To come out of this automated processes it is necessary to have sufficient executive resources. According to Bechara (2005) people who made constant use of substances have a lack of this ability that hinders a constant break of cannabis use. There are different terms used for cognitive biases as mentioned before. This research concentrates on memory bias in cannabis- abusing individuals. Memory biases are characterized by an influence on the recall of stored memories due to certain circumstances (Cousijn et al., 2013). In this case the circumstances are a constant use of cannabis and it will be looked after how this will affect the recall of memories. This recall can show both, positive and negative biases towards cannabis. According to further research as by Wiers et al (2010) it can be expected that participants can restore memory faster if it is related to an addicted substance than if it is neutral.

During recent research it was found that respondents who are addicted to alcohol use have higher biases towards the substance immediately before the substance use than after drinking alcohol. This is declared by the fact that the so-called "craving" (motivational process) for the substance before the use is higher than directly after the use, due to the fact that the individual is satisfied (Schoenmaker, & Wiers, 2010). To find out if cannabis-users show a similar effect in memory bias, a test that measures implicit processes is used. One regular test that is used is the Implicit Association Task (IAT). In this research the IAT is used to see if there is an effect of cannabis use on the memory biases. The classical IAT is mostly used to let participants classify words in target categories and attribute categories, which include positive and negative words. In this case the target categories are made up of cannabis-related and workplace-related words. The tasks wants to find out whether there are any pro-cannabis or

contra-cannabis bias of the participants in categorizing cannabis-related words in either positive- or negative-marked directions (Meade, 2009).

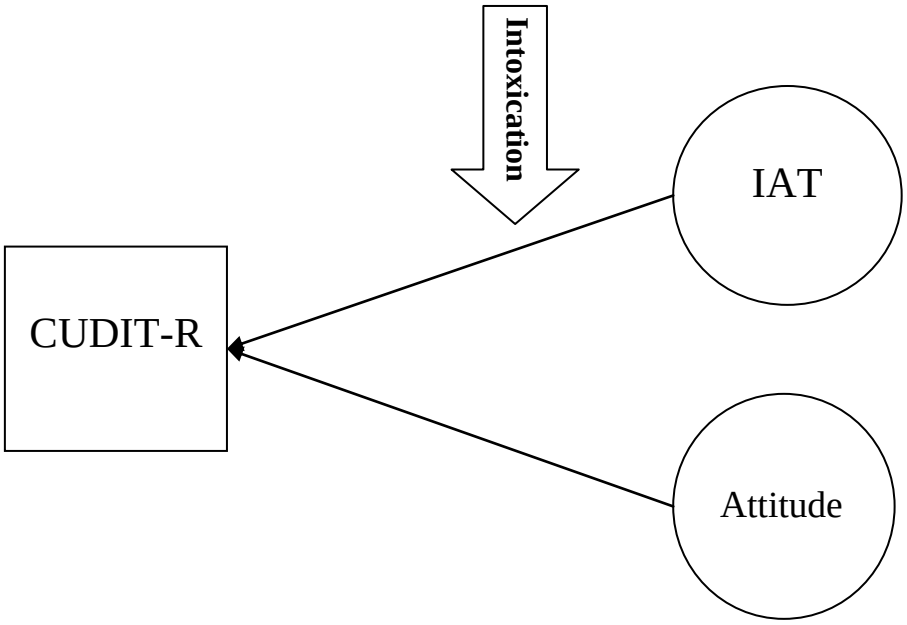
Next to the implicit processes, the explicit processes as attitude also play an important part in cannabis use (Armitage et al., 1999). As stated by Petraitis, Flay and Miller (1995) there is a special experimental phase people go through until they begin using (illicit) drugs. This phase is called the stage of experimental substance use (ESU) and contains amongst others the beliefs about which costs and benefits a substance holds. The user makes a hold of what the positive effects of the drug can be and those are more valued than the possible costs of the drug (Petraitis et al., 1995). As it does imply a certain positive or negative attitude towards cannabis, the research will also focus on the pro-cannabis attitude of the participants. Although the research only focuses on explicit processes as attitude it is important to hold in mind that also the social environment, like social norms, culture, and the family situation can lead to drug use. It is stated that there is a higher chance for adolescents to use drugs if they are part of the minority of the society (Petraitis et al., 1995).

With regard to the research, there is also attention on the physical effect of cannabis. The active component of cannabis is the chemical Δ^9- tetrahydrocannabinol (Δ^9-THC) that is the main cause of the effect of cannabis (Kalad, 2009). The most common psychological effects of cannabis are said to be a sensitization of the sensory experiences, a feeling of release and the illusion that time is slowing down. Cannabis causes an indirect release of dopamine in the human brain that leads to an experience of pleasure in the user's sensation (Kalad, 2009). The drug can be both eaten and inhaled, while the more common way is to inhale the drug through smoking. This research is concentrated on drug use through smoking that mostly includes the use of nicotine. Although the focus is on the direct effect of cannabis use, the addiction to nicotine, which is in the tobacco, can have a certain effect on the study and the results. According to Pesta, Angadi, Burtscher, and Roberts (2013) nicotine use has high effect on the cognitive functions, including learning and memory, reaction time and fine motor abilities. It could strain the results in measuring the implicit processes. With this in mind it is also looked at the smoking behavior of the participants.

This study implies two purposes. At first it wants to find out which determinants have main effect on using cannabis. As diagramed in figure 1, it is tried to find out whether attitude and implicit biases, as measured with the IAT, can count as a predictor of cannabis use. The second purpose of this study is to see whether there is any difference between the IAT before

and after the treatment with cannabis. It is looked whether the implicit processes are a stronger determinant of cannabis use and if this effect decrease when saturated.

Figure 1. relationships of CUDIT-R, Attitude, IAT



If there is proof that a huge part of addictive behavior depends on implicit processes and in detail on the cognitive and memory biases that are changing during cannabis consumption, the results can be used for further work with addicted respondents trying to get clean.

Relating to the purpose, there are two research questions:

a. Does the difference between the IATs decreases when in an intoxicated state?

b. Is an implicit memory bias towards cannabis (measured with IAT) a stronger determinant of cannabis use than the attitude toward cannabis?

According to the first research question the following hypotheses can be made:

1. There is a higher bias of the IAT noticeable made in a sober state than made after the use of cannabis.

According to the second research question the following hypotheses can be made:

2. *A positive correlation can be noticed between cannabis use and the score of the IAT0.*

3. *A positive correlation between attitude and the score of an IAT0 can be noticed.*

4. The score of the IAT in a sober state is a stronger predictor for cannabis use than Attitude.

5. Heavy-smoking participants score significant higher on cannabis use, the IAT and Attitude.

6. Women score significant higher on cannabis use, the IAT and Attitude.

2. Research Methods

2.1 Participants

In this study 26 participants were involved. The participants were assembled via ´convenience sampling' and 'snowball sampling'. To create a trusted and safe setting in which the participants feel free to perform cannabis use, which may be seen by others as controversial, the researcher is known by the participants and the other way around. Due to the fact that the participants need to consume a risk-taking drug, in this case through smoking cannabis, the participants need to be at least 18 years old, so that he or she can be fully aware of their risky behavior. Furthermore they also need to be used to regular cannabis consumption and the possible side effects of cannabis so that they know which risks they are taking. That means that all the participants of this research are using at least once a month cannabis through smoking and this for at least a six month period of time. Further points, that characterize the participants, are that they have no problem in staying absent of alcohol, cannabis and other drugs, apart from nicotine and caffeine, for at least 12 hours before the research, and that they are willing to smoke cannabis in form of a 'joint' in front of the researcher. Most of the participants are German or have at least extreme good German-language skills. The participants are informed in the way of testing and the different conditions it holds, by the researcher itself. They can ask questions about the procedure of the research at all times.

2.2 Procedure

The whole procedure is ethical approved by the ethical commission of the University of Twente. Before starting with the experiment the participants get to know about the possible risks and the purpose of the study by a brochure. It is made sure that everyone reads the brochure and that they also behave in a correct way after consuming the drug. That includes not doing any risky behavior like driving, operating etc.

There are three steps during the experiment. At first the participant has to fill in a questionnaire. Then he has to perform in the IAT in a state of soberness, which includes no earlier use of cannabis, alcohol or other drugs. Exceptions are nicotine or caffeine. After the first IAT the participant has to make use of cannabis through smoking. Thereby he has to bring his own materials. After that he has to perform the IAT again.

2.3 Materials & Equipment

The research is experimental. The whole experiment includes a questionnaire, an experimental test, and the treatment with cannabis. According to the fact that most of the participant's mother-language is German, the whole questionnaire and the IATs are in German.

2.3.1 Questionnaire

2.3.1.1 CUDIT-R

During the questionnaire the participants have to answer questions according their habits in relation to cannabis consume, this happens with help of the CUDIT-R (Adamson et al., 2010). One example of a question in the CUDIT-R is; '*how often do you use cannabis*?' Those questions are closed ones where you can decide between 5 different answers that are stated. For example in this question the possible answers are; Never/ Monthly or less/2-4 times a month/ 2-3 times a week/ 4 or more times a week. With the results a clinical picture of the use of cannabis during the last 6 months can be made. The CUDIT-R is an accepted instrument for giving a sufficient clinical picture about the cannabis use of people. Due to the fact that different categories of cannabis use are asked it is not possible to gain a high reliability on the CUDIT-R. However, according to Adamson et al (2010) the CUDIT-R has a high sensibility and specificity.

2.3.1.2 Nicotine Use

The second part of the questionnaires asks for the nicotine use of the participant. In this research it is important to know whether the participants also have an addiction according to nicotine, due to the fact that you smoke tobacco too, when consuming cannabis through smoking. All the questions are closed ones, whereas the first question, '*do you smoke cigarettes?*' can only be answered with yes or no and the second question has five different possible answers. The nicotine use questions are based on CUDIT-R and are developed especially for this research.

2.3.1.3 Attitude

The last part of the questionnaire asks about the attitude of the participants towards cannabis use. This construct contains two parts.

Direct Attitude

The first part asks for the direct attitude. It makes two 'cannabis is…' statement where you can choose on a 7-point-scale between two bipolar adjectives. Those are good/bad and comfortable/uncomfortable. With α=.717 the internal consistency of the 2 Items constructs is high.

Indirect Attitude

The second part of the construct holds seven statements with a 5-point-likert scale where the participants have to choose between '*total agreement'* to '*totally no agreement'*. One example of a statement is; '*When I smoke cannabis I feel very relaxed'*. The internal consistency of the construct which questions are adopted from another study by Solinski (2009) is really low (α=.080), which points at a low reliability (Table 1). That's why the focus is more on the single items of the indirect attitude construct.

2.3.2 IAT

After the questionnaire, the participant does an IAT. For measuring this, the participant needs to do different task on the computer, categorizing words in target and attribute words.

The first two target categories are *'cannabis'*, and '*workplace'*. In this task the participant sees a word that is either cannabis- or workplace-related. Workplace words are; '*Büro, Löschblatt, Kaffee, Meeting, Hefter, Stift, Locher, notieren'*; while the cannabis words are the following; '*Blunt, Longpaper, Coffee Shop, Weed, Hanf, Joint, High, kiffen'*. Those words were created by the researcher herself and aren't based on recent tests. The focus on the cannabis words lays on finding words that are only associated with cannabis use and not with other substances like tobacco, as for example '*joint'* would be. The characteristics of the workplace words are that they are neutral and not associating with other substances that may cause testing errors.

The attribute categories are '*positive*' and '*negative*'. Those categories appear during the second task. The positive words are; '*Gut, Freude, Liebe, Frieden, Wunderbar, Vergnügen, Lachen, Glücklich',* while the negative words are; 'Schlecht, Trauer, Furchtbar, Schrecklich, Ekelhaft, Böse, Gehässig'. All of this words are found in the FreeIAT-program of Meade (2009).

The third task mixes the target words, 'cannabis' and 'workplace' with the attribute words 'positive' and 'negative'. The participant gets either a *positive/negative* word or a

cannabis/workplace word. The participant has to push the words with the right and left arrow keys to *cannabis/positive* or to *workplace/negative.*

The fourth task also mixes the already mentioned categories, but this time it is a reversed categorization. Now the participant has to push the words with the arrow keys to the right or the left. The words are in the category *cannabis/negative* or in the category *workplace/positive*.

The IAT-score that is the most relevant for this study is the Greenwald, Nosek, and Banaji (2003) overall IAT score, called the GNB-score. A high GNB-score denotes a Pro-Cannabis bias whereas a low score means the opposite. The GNB-score 'returns a score of "TooFast" for participants who have less than 300ms reaction time for more than 10% of their trials; computes the mean reaction time for items in Block 3 in which the initial response was correct,; computes the mean reaction time for items in Block 5 in which the initial response was correct; computes the (…) pooled standard deviation; computes the mean reaction time for items in Block 5 in which the initial response was correct; (and) replaces the reaction time for items initially answered as incorrect with the Block Mean of Correct items' (Meade, 2009).

The scores of the IAT will be visible for neither the researcher nor the participant during the procedure. Only afterwards participants can have access to their individual scores on request.

2.3.3 Treatment

After the questionnaire and between the first and second measurement of the IAT the participant needs to smoke one dose of cannabis. This dose depends on the dose the participant regular smokes, so it varies from person to person. The participant smokes in a well-known area to create a trustful environment. Even though cannabis works right after inhaling, there is a 10 minute long break before the second IAT is made. With this it is made sure that THC of the Cannabis really affects the participant. There are two test-measurements of the IAT. The first one is in a sober state (IAT0) and the second one is in an intoxicated state (IAT1).

2.4 Statistical Analysis

To test the different hypotheses a correlation analysis, a Mann-Whitney U test, a T-Test and a regression analysis are made between the different variables. There is a low pool of samples which could not guarantee a normal distribution, which causes that mainly non-parametrical

testes are used. However the use of parametrical test is sometimes also necessary, just for the reason that no non-parametrical tests are available or to compare the results of both tests.

The most important variables in the correlation and the regression analysis are *attitude*, as present in *direct attitude* and *indirect attitude, cannabis use,* as present in the *CUDIT-R* score and *'implicit processes'* present in *IAT0* and *IAT1*. The used *IAT* score is the GNB-score, the *direct* and *indirect attitude* score is the mean score of all the questions in the categories, and the used *CUDIT-R*-score is the sum of all the Item-scores.

Using the statistical program SPSS it is tested whether there is a correlation between '*cannabis use*' and the three mentioned variables. It is looked after Pearson's and Spearman's correlation coefficient. The correlation coefficient is no proof for a causal relation, but it counts as a reliable instrument to predict the causality between two variables. To get to know whether there are any outliners affecting the results there is also looked after the Spearman correlations of the variables.

The T-test is used to see whether there is a significant difference between the scores of the first IAT and the IAT after the intoxication.

With the Mann-Whitney U test, it is looked after the different scores between two categories. In this research the attention lays on the differences in gender and smoking behavior.

According to the fact that no reliable construct can be formed of the *indirect attitude* (table 1) the 7 items of its construct are used for the following analyses.

Table 1. *Cronbach's Alpha (Cronbach's α), Mean Item score and standard deviation (SD) of the constructs Direct Attitude and Indirect Attitude*

	No. of items	Cronbach's α	Mean Item Score	SD
Direct Attitude	2	.717	5.58	.997
Indirect Attitude	7	.080	2.87	.35
positive	3	.313	3.58	0.82
negative	4	.031	2.33	.93

3. Results

Most of the participants were students within a lifespan of 20 to 25 years. The average age was 23 with a 40 percentage of women. The average score on the CUDIT-R lies within 14.08 and 13 participants state themselves as heavy-smoking.

In relation to the descriptive statistics as shown in table 2, it is noticeable that women (TotalCUDIT-R= 9.90) seem to use less cannabis than man (TotalCUDIT-R= 16.69) which is also noticeable in the other categories as the Direct-attitude score, the Indirect Attitude score and both of the IAT scores.

Furthermore participants with high nicotine consume, at least 4 times a week, have on average a higher CUDIT-R score, a higher score in the direct attitude towards cannabis and a lower score in the IAT0, than participants who consume less nicotine.

Table 2. *Total score in the CUDIT-R, and Mean score (M) and standard deviation (SD)*

	No	*M Age*	*Total CUDIT-R(SD)*	*M ADirect (SD)*	*M ATT (SD)*	*M IAT0 (SD)*	*M IAT1 (SD)*
Participants	26	22.76	14.08 (7.18)	5,58(.99)	2,86(.35)	.27(.46)	.31(.38)
Gender:							
male	16		16.69(7.4)	6.06(.70)	2.94(.32)	.28(.50)	.38(.35)
female	10		9.90 (4.6)	4.80(.92)	2.75(.38)	.26(.41)	.21(.43)
Smoking habits:							
Non-smoking	6		8.17 (3.0)	4.83(.75)	2.95(.27)	.34(.58)	.24(.33)
Casual-smoking	7		10.14(5.6)	5.93(.79)	3.10(.31)	.26(.43)	.43(.18)
Heavy-smoking	13		18.92(6.0)	7.73(1.1)	2.71(.36)	.25(.45)	.29(.48)

To give information about the indirect attitude of the participants towards the use of cannabis, the individual Items of the construct *Indirect Attitude* count as single predictors.

No one disagreed (89%) that they feel relaxed when smoking cannabis. Also, halve of the people (50%) totally agreed to this statement while about 10 percent had a neutral opinion. This shows a high tendency to a positive attitude towards the use of cannabis. While asking

whether it is expensive to smoke cannabis most of the participants agreed (58%) and nearly 8 percent disagreed to this statement.

Although it is noticeable that even if nearly all of the participants have a positive attitude towards cannabis in relation to having fun while smoking cannabis (89%) and feeling relaxed while consuming it (89%), there is a high tendency in agreeing to the statements that cannabis can be dangerous (58%) that cannabis is something you easily get addicted to (54%) and that its consume is expensive (58%). This means that more than halve of the regular cannabis consumers are constantly aware of the negative consequences of cannabis. This could declare the fact that nearly 90 percent of the participants thought about lowering or even stopping the cannabis consume, and more than 60 percent thought about it during the past 6 months.

Table 3. *Mean Item score (M), standard deviation (SD), and tendency of indirect attitude as single predictors, high: score > 3, low: score < 3*

Low. Label of single Items of Indirect Attitude	M	SD	Tendency	Amount (%)
1. After smoking cannabis I feel relaxed.	4.38	.697	*High*	89
			Neutral	11
			Low	0
2. Cannabis does cost a lot of money.	3.77	.951	*High*	58
			Neutral	34
			Low	8
3. If I smoke cannabis I am part of the group.	2.08	1.093	*High*	12
			Neutral	26
			Low	62
4. When I smoke cannabis I get dull.	3.81	.801	*High*	73
			Neutral	19
			Low	8
5. Smoking cannabis is fun.	4,27	.667	*High*	89
			Neutral	11
			Low	0
6. Smoking cannabis can be dangerous.	3.58	1.065	*High*	58
			Neutral	27
			Low	15
7. You get addicted to cannabis very easy.	3.54	.905	*High*	54
			Neutral	38
			Low	8

3.1 Change in implicit attitude due to cannabis intoxication

Even though there is a difference noticeable between the mean score of the IAT0 and IAT1, the results of the paired-samples t-test show that the mean score of the IAT before the treatment (M= .257, SD= .457) does not differ at a .05 level of significance to the mean score of the IAT after the treatment (M= .315, SD .318) (Table 4). This means there is no proof for H1: *There is a higher score of the IAT noticeable made in a sober state than made after the use of cannabis.*

Table 4. *Results of paired sample t-test and Descriptive Statistics for IAT before and after intoxication*

	IAT0		IAT1			95% CI for Mean Difference			
Outcome	M	SD	M	SD	n		t	p	df
	.257	.457	.315	.318	26	-.275, .189	-.380	.707	25

* $p < .05$.

3.2 Finding associations between the different test categories

The results of the Pearson-correlation as stated in table 7 show no correlation on a .05 level of significance between CUDIT-R, and the IAT0 (r= .254) and IAT1(r= . 174). Also there is no significant correlation found between IAT0 and IAT1, and Direct Attitude, a significant correlation at the .05 level is found between Indirect Attitude and Direct Attitude (r= .407). The strongest Pearson correlation coefficient was found between Direct Attitude and CUDIT-R (r= .595). This coefficient is significant at the .01 level.

Table 5. *Pearson Correlations (r) between the different variables and correlation significance (p).*

	1 (p)	2 (p)	3 (p)	4 (p)	5 (p)
1.CUDIT-R	1.00				
2.Direct Attitude	.56** (.001)	1.00			
3.Indirect Attitude	.23 (.261)	.41* (.039)	1.00		
4.IAT0 score	.26 (.210)	.10 (.634)	.32 (.106)	1.00	
5.IAT1 score	.17 (.396)	.30 (.141)	.30 (.141)	.07 (.743)	1.00

**. Correlation is significant at the 0.05 level (2-tailed).*

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

In comparison to the Pearson Correlations, the Spearman Correlation Coefficients as stated in table 6, do not show any significant higher or lower scores. It is noticeable that a non-parametrical test does not show any significant correlation between Indirect and Direct Attitude (r= .246). There is no significant correlation noticeable between CUDIT-R and IAT1 and IAT2 and between IAT0, IAT1 and Attitude noticeable, even though with a correlation coefficient of r= .33 and a p-value of .105 there is a positive trend to a high correlation between IAT0 and indirect Attitude noticeable. However, the results show no proof for H2 (*A positive correlation can be noticed between cannabis use and the score of an IAT0.*) and H3 (*A positive correlation between attitude and the score of an IAT0 can be noticed.*). Furthermore it is noticeable that even though there is no significant proof for the correlation, the IAT0 always has a higher correlation with the cannabis use than the IAT1. Those scores are noticeable in the parametrical-scores as well as in the non-parametrical-scores.

Table 6. *Spearman Correlations between the different variables.*

	1 (p)	2 (p)	3 (p)	4 (p)	5 (p)
1.CUDIT-R	1.00				
2.Direct Attitude	.58** (.002)	1.00			
3.Indirect Attitude	.16 (.435)	.25 (.227)	1.00		
4.IAT0 score	.27 (.184)	.04 (.862)	.33 (.105)	1.00	
5.IAT1 score	.19 (.350)	.27 (.182)	.21 (.299)	.13 (.533)	1.00

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

According to the fact that there is a low reliability in the construct of the indirect attitude the construct was separated in 7 items. In table 7 two significant correlations are noticeable. The first and the fifths item have a high correlation with direct attitude. The question whether you feel relaxed (r= .41, p=.039) or have fun after smoking cannabis (r= .55, p=.004) seem to be a sign for a high direct attitude score.

Even though there are no significant results a positive correlation for thinking cannabis can be dangerous and cannabis use (r= .38, p=.057) was found.

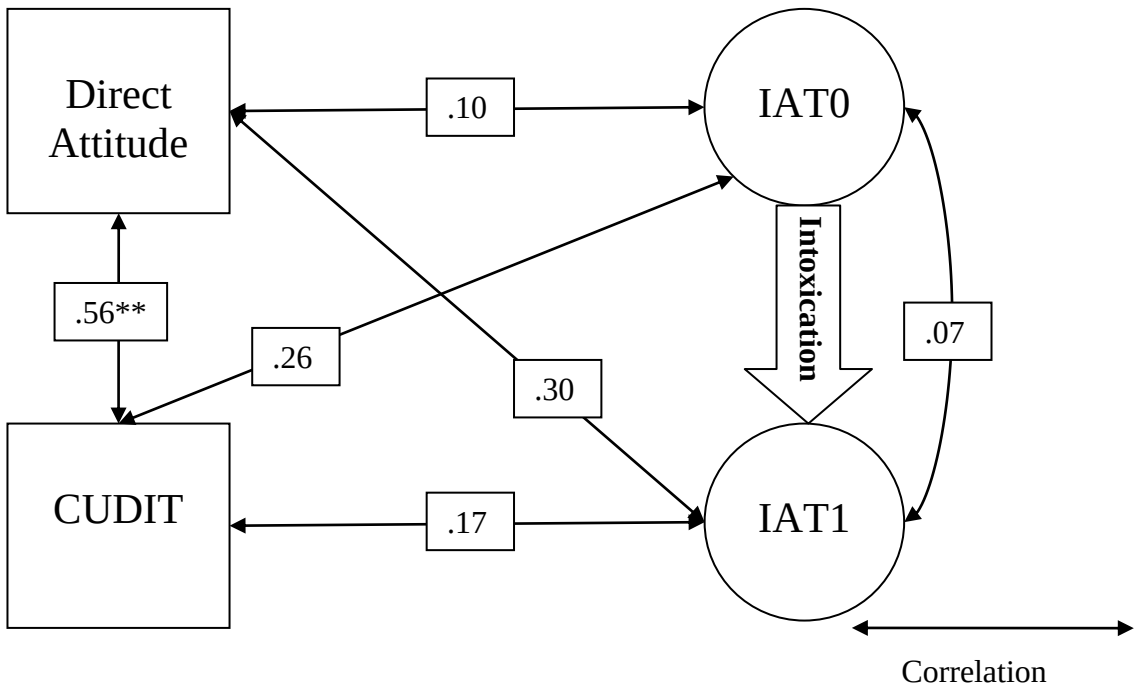
Table 7. *Spearman correlations and level of significance Indirect attitude Items with CUDIT-R, Direct Attitude*

Indirect Attitude Items	CUDIT-R		Direct Attitude	
	r	p	r	p
1. Feeling relaxed	.09	.659	.41*	.039
2. Cost money	-.32	.112	-.10	.638
3. Part of the group	-.011	.957	-.27	.180
4. I am getting dull	.27	.187	.30	.134
5. Having fun	.32	.107	.55**	.004
6. Cannabis is dangerous	.38	.057	.31	.123
7. Get easily addicted	.01	.979	.04	.850

**. Correlation is significant at the 0.05 level (2-tailed).*
***. Correlation is significant at the 0.01 level (2-tailed).*

Figure 2 shows the correlations of the most significant variables as the direct attitude, the IAT0 and IAT1 and the CUDIT-R.

Figure 2. Associations and correlations between the different variables



Although there is a high correlation between CUDIT-R and direct attitude, both models are no good predictors for CUDIT-R. IAT0 (p=.238) as well as IAT1 (p=.988) have low significance as predictors for the CUDIT-R. The R square of Model 1 (r^2= .392) and the R square of Model 2 (r^2=.353) have high scores but due to the low n of 26 they do not count as a significant Model to predict the score of the CUDIT-R. However, Attitude with a level of significance lower than .05 in Model1 as well as in Model2 can count as a predictor for the CUDIT-R score. In reference to the hypothesis, H4 (*The score of the IAT in a sober state is a stronger predictor for cannabis use than Attitude*.) cannot be proven.

Table 8. *Predictor variables, dependent variables and Statistics of the different Models*

Labels	*β*	*Unstandardized Coefficients*		*Signification level*	*Model Statistics*
		B	*SE*		
Model 1:					
Direct Attitude	.575	4.14	1.18	.002	$r^{2=}$,392 F= 7.422
Score IAT0	.198	3.11	2.56	.238	p= .003
Model 2:					
Direct Attitude	.595	4.286	1.264	.003	$r^{2=}$ .353 F= 6.287
Score IAT1	-.003	-.051	3.304	.988	p=.007

Model 1: *Dependent Variable*: CUDIT-R, *Predictors*: (Constant), Direct attitude, IAT0
Model 2: *Dependent Variable*: CUDIT-R, *Predictors:* (Constant), Direct attitude, IAT1

3.3 Differences in gender and smoking behavior

To answer whether the participants gender or smoking behavior make a difference in the mean score of the IATs, the CUDIT-R and in its attitude a non-parametrical rank-sum test is made.

As stated in table 9 there is proof that heavy smoker score higher on the CUDIT-R than the other participant (p=.008) Furthermore there is proof o a 0.01 level of significance, that casual/non-smoking participants do more often think that smoking cannabis do cost a lot of money (p=.005) than the heavy smoking participants. This means that H5 (*Heavy-smoking participants score significant higher on cannabis use, the IAT and Attitude*.) can only partly

be proven. There is significant proof that they score higher on cannabis use, but not on the IAT or Attitude.

Table 9. *Smoking behavior as dependent variable in the Mann-Whitney U-test (U)*

Variable	Casual & non-smoker		Heavy-smoker		U	p
	Mean	SD	Mean	SD		
CUDIT-R	10.14	2.13	18.92	1.66	12	.008
Direct Attitude	5.93	.30	5.73	.30	43	.840
Indirect Attitude:						
1. *Feeling relaxed*	4.71	.49	4.23	.83	31	.200
2. *Cost money*	2.86	.690	1.62	.768	12	.005
3. *Part of the group*	2.00	1.16	1.92	1.03	44	.900
4. *I am getting dull*	2.43	1.13	2.23	.73	39	.578
5. *Having fun*	4.43	.79	4.23	.73	38	.518
6. *Cannabis is dangerous*	2.57	1.27	2.54	1.13	44	.902
7. *Get easily addicted*	2.43	.54	2.23	.93	39	.580
IAT0	.26	.16	.25	.12	39	.606
IAT1	.43	.07	.29	.13	39	.606

In table 10 the differences between the genders in the different test categories are stated. It is noticeable, that manly participants, on a 0.05 level of significance, do have higher scores on the CUDIT-R and think more often that smoking cannabis is fun. They also do have a higher direct attitude towards cannabis than the female participants on a 0.01 level of significance. This means that the H6 (*Women score significant higher on cannabis use, the IAT and Attitude*.) can also only partly be proven. There is significant proof that they score higher on cannabis use, but not on the IAT or Attitude.

Table 10. *Gender variable in the Mann-Whitney U-test (U)*

Variable	male		female		U	p
	Mean	SD	Mean	SD		
CUDIT-R	16.69	-	9.90	-	39	.030
Direct Attitude	6.06	.70	4.80	.92	20	.001
Indirect Attitude						
1. Feeling relaxed	4.50	.63	4.20	.79	63	.322
2. Cost money	2.13	.89	2.40	1.08	66	.439
3. Part of the group	1.94	.93	2.30	1.34	68	.504
4. I am getting dull	2.38	.89	1.90	.57	56	.157
5. Having fun	4.50	.63	3.90	.57	40.5	.021
6. Cannabis is dangerous	2.26	1.15	2.20	.92	65.5	.425
7. Get easily addicted	2.56	1.03	2.30	.68	70	.571
IAT0	.28	.50	.26	.41	80	1.000
IAT1	.38	.35	.21	.43	66	.461

Discussion

In the research questions it was asked if the IAT could count as a predictor for cannabis use and whether saturation decreases the predictive strength of implicit processes. Regarding to former research, cannabis use can be explained by dual-process theories, that include explicit and implicit processes. In this research it was looked whether there is any support for this theory and if the explicit and the implicit processes play a major role in predicting cannabis use (Richardson, & Hardesty, 2012).

This research is trying to answer two questions. The first one is about the effect of intoxications on implicit processes regarding cannabis consumption. With regard to the automatic, implicit processes, as measured with the IAT, there is not enough evidence to state that saturation of cannabis can decrease the predictive strength of the IAT. However a higher correlation with cannabis use before smoking cannabis than after the intoxication was noticeable regarding the fact that there is no significant proof for those correlations.

The second research question asks whether attitude and the performance of the IAT can count as a predictor for cannabis use, as measured with the CUDIT-R. It was looked after the different smoking behaviors and the gender of the participants and if this causes any differences in the score of the CUDIT-R. During the study it was found out that attitude in general, could count as an explanatory value. Furthermore both the IAT0 (before intoxication) as well as the IAT1 do not seem to have significant explanatory value regarding cannabis use. When splitting the scores into different categories, as male/female and non-smoking/heavy-smoking a tendency to higher cannabis use dependent on the gender and smoking behavior can be found.

3.4 Implicit memory bias as predictor of cannabis use

According to Cousijn et al. (2013) the cannabis related behavior is mainly influenced by implicit processes, including memory bias. In reference to the results this statement and also the second Hypothesis, *A positive correlation can be noticed between cannabis use and the score of an IAT0,* cannot be proven. Even though a positive correlation can be noticed, there is not statistical proof to say that the higher the implicit biases, as measured with the IAT, the higher is the cannabis use. Those results could possibly be declared by the fact that there is a low pool of samples in this research which lead to less significant results.

The measuring of the IAT happened during two test moments. During the first test moment participants were sober. The score during the second test moment is taken after the intoxication with cannabis. It was stated in the introduction that the IAT0 is a stronger predictor for cannabis use than the IAT1. In research of Schoenmaker and Wiers (2010) it was found out, that participants, who are addicted to alcohol, show less biases after they drank, than before. Schoenmaker and Wiers stated that reason for this behavior is the so-called craving for the substance, that is, after consuming, satisfied. According to the results this cannot be proven. However, it is noticeable that the mean of the IAT1 seems to be higher than the mean of the IAT0. This could have different explanations. One explanation could be the intoxication which causes a slower reaction on the IAT. In combination with a change in the biases due to the intoxication higher score on the IAT is possible. With such an error it seems that there is a higher bias after the intoxication even though the real cause of the higher score is the affect of the cannabis. This could change the results in finding the memory bias of cannabis. The other explanation could be that there are higher biases in the second test moment. A declaration for this phenomenon could be that the implicit processes got stronger under conditions of lower executive control which could cause lower skill on the IAT. However, according to the results of the t-test, there is no significant difference in the IAT before and after the treatment. This means that the first hypotheses, "*There is a higher score of the IAT noticeable made in a sober state than made after the use of cannabis"* cannot be proven with the results. However, it is noticeable that there is a higher correlation with the CUDIT-R before the intoxication than after the intoxication, which could lead to the consideration that intoxication still has an effect on the implicit bias. Regarding to the already mentioned fat that this research only has a limited pool of samples it may be possible to have more significant findings when doing research with a bigger pool of samples which represent a higher amount of people and not only students.

While looking at the results of the correlations as stated in figure 2 it is noticeable that there is no significant association between the IATs and the attitude and also between the IATs themselves. The fact that there does not seem to be a high internal correlation in the IAT was also found in other research by Rooke ,Hine and Thorsteinsson (2008) who stated that the IAT may not be a good instrument to measure implicit processes in substance use. It was criticized that the IAT only has a bipolar categorizing system which only permits positive /negative approaches toward cannabis-related words (Rooke, Hine, & Thorsteinsson, 2008). Those limitations of the IAT could lead to a worse repetition of the real implicit processes of the participants and could lead to wrong results. However, the results of the IAT before and

after the intoxication cannot support the third hypothesis, *a positive correlation between attitude and the score of an IAT0 can be noticed.* There seems to be a relative high positive correlation between IAT1 and Attitude, but there is not enough proof to manifest this thesis.

Another important factor that could play a role in the results of the IAT is the amount of errors during the test approval. It was noticed that a lot of participants were confused about the word 'furchtbar'(horrible) in mistaking it for the term 'fruchtbar'(fertile) which is more a positive word than a negative. Also the neutral term 'Kaffee' stood out because a lot of participant mistook it for a cannabis-related word instead of a work-place related. The participants declared it with the fact that they often drink coffee when they smoke or have a higher craving for caffeine after smoking cannabis. In further study, the trials with these data should be left out. However, while only making use of the GNB-score, which is already corrected of such errors (Meade, 2009) those factor should not make a meaningful difference regarding the test result.

In addition to the already mentioned arguments another important one is the number of participants. Even big differences cannot count as significant because there is only a low pool of participants (n= 26). There is a high chance that a higher pool could lead to more significant results.

3.5 Social-cognitive constructs as predictor of cannabis use

As already stated in the introduction by Armitage et al. (1999), the attitude is a good explanatory value for the participants cannabis use. This could also be proven with the results of the research where attitude seems to be a significant predictor for the results of the CUDIT-R and also has a high correlation with it (figure 1). With those results there is enough statistical proof for the alternative hypothesis of the fourth hypothesis, *the score of the IAT in a sober state is a stronger predictor for cannabis use than Attitude.*

Furthermore it is noticeable that only the construct of the direct attitude seems to be a good predictor of the CUDIT-R whereby the indirect attitude with a low reliability showed interesting opinions between the participants. It was noticeable that the participants who have a high pro-cannabis attitude also have the opinion that smoking cannabis can be dangerous this could lead to the conclusion that most of the participants who know about the positive factors of smoking cannabis are also aware of the negative ones. A declaration of this result could be that most of the participants were students and all of them are between 20-25 years old. Students may do more often want to try out things that are not healthy but of which they

think it would be more fun. The sensation seeking and the impulsivity which play a major part in substance use (Petraitis et al., 1995) could be higher in younger people than older ones. In research with participants of different life spans the results could show that older people or people who are already working answer different to those questions.

Another interesting fact is that the reliability of the indirect attitude is low even if the items are separated in positive and negative attitude. This could have different declarations. At first it could be that the single items of the construct are no good choices that do not show the attitude of the participant towards cannabis. According to Fishbein and Ajzen (2010) a questionnaire needs to pass different steps before developing the questions. At first it is important to clearly define the single terms of the questionnaire and to make interviews with the target persons. This did not happen in developing the questionnaire for the attitude construct.

However, in looking more closely at the single items it is noticeable that most of the participants do have different opinions to each of the statements, which means that there is no single construct for the attitude. Not all of them think that cannabis do cost a lot of money but mostly all of them think that smoking cannabis can be dangerous, and the same participants think again that smoking cannabis is a lot of fun. This leads to the result that the researcher has to be aware of the incongruities of thinking between the different participants. The fact that there is still a low internal consistency leads to the consideration, that not all of the participants do have this ambiguous attitude towards cannabis. If it is only asked for the pleasure of smoking cannabis and whether the applicant likes it or not as stated in the direct attitude construct you get a high reliability. This means that in further research it is important to define the attitude towards cannabis in multiple different terms. Those terms can be: economical factors (money, time), effect factors (feeling relaxed, dull) and possible negative consequences (addiction, dangerous effects).

3.6 Differences in smoking habits

According to Pesta et al. (2013), smoking behavior can influence the cognitive skills. The influence on the cognitive skills could lead to differences in the rest results of the IAT. Furthermore, Petraitis et al. (1995) stated that substance use which includes smoking cigarettes are partly dependent on the impulses and the sensation seeking of the participants which could lead to higher memory bias in the IAT. To see whether there are any differences in the results considering the smoking habits the following outcomes are found. As already seen above also the behavior has high effect on the cannabis use. It was proven that heavy-

smoking participants have higher scores on the CUDIT-R than casual- or non-smoking participants. As already mentioned, cannabis-related behavior as well as other substance use can be declared by a low impulse control (Petraitis et al., 1995). If the participants are smoking, there is a high chance that they have a low impulse control and this could again declare the cannabis-smoking behavior.

Another interesting fact found out is that there is a difference in the statement whether smoking cannabis does cost a lot of money. It seems that casual- or on-smoking participants agree more often to this statement than the other group. A declaration for this finding could be that the heavy-smoking participants already pay a lot for the smoking materials and only have to buy the cannabis. Casual- or non-smoking participants do have to pay extra for the tobacco they have to use in the joint, and this may lead to the different kind of thinking. With regard to this outcomes there is nearly enough proof for the fifth hypothesis, *Heavy-smoking participants score significant higher on cannabis use, the IAT and Attitude.* The fact that the memory bias by heavy smoking participants is higher could not be proven.

A declaration for the findings could also be that smoking cannabis could be some sort of 'life style'. There is a limitation of the pool of participants due to the fact that all of them are between 20 and 25 years old, and nearly all of them are students. There could be a high chance that the person sees his own behavior as something he identifies himself and others with and that he is more influences by others.

3.7 Differences in gender

In comparing the results between male and female participants there is much support for the last thesis: *women score significant higher on cannabis use, the IAT and Attitude*. Not only that male participants seem to make higher use of cannabis than female it is also noticeable that they have a higher positive attitude towards cannabis including having fun while smoking cannabis. Those results are significant even though there is only a small pool of participants. Those findings support the research of Johnson et al. who declares that boys have a higher risk for substance use than girls (Johnston et al., 1992). Petraitis et al. (1995) try to explain it in a higher impulsivity and risk-taking behavior of boys in contrast to girls, which could also slightly be seen in the results, where girls score slightly less on the IAT than boys.

It looks as if men think more positive of cannabis than woman which may also declare the fact that they make more use of cannabis and have slightly higher scores on the IAT. According to the individual dose of cannabis for each participant another possible declaration

could be that women have consumed a smaller amount of cannabis which could cause less bias on the performance of the IAT. In further research it should be noted how much the participant smokes and also how high the influence of the cannabis could be on the explicit processes.

3.8 Conclusion

To come back to the research questions, '*Does the difference between the IATs decreases when in an intoxicated state?',* and *'Is an implicit memory bias towards cannabis (measured with IAT) a stronger determinant of cannabis use than the attitude toward cannabis?'* no real conclusive outcome can be noticed. It was found that attitude plays an important part in the cannabis use but there was just not enough proof for this fact. In addition there is not enough proof for stating that the IAT before and after the intoxication is a sufficient predictor for cannabis use. A possible solution for those findings could be another task testing the implicit memory bias. As already mentioned above there is a high possibility that the reaction of the participants slowed down which caused the non-significant results.

Apart from the implicit memory bias and the attitude also the smoking behavior and the gender of the participants can be an important fact regarding cannabis use. Although they may not directly count as a predictor they could count as a moderator. Female participants could be more concerned with the negative consequences and that could lead to less use of cannabis. Furthermore it could be that smoking participants do have other coping strategies. It could be possible that they think smoking cannabis would not harm them more than smoking cigarettes. However, regarding those conclusions further research is necessary.

Even though some relevant results were found, the research has a lot of limitations. It was a small pool of applicants which were not chosen with purpose sampling but with snowball sampling. This means that the results are not representative for normal society. All of the participants had a similar age and were students. Furthermore the study was made cross-sectual, which means that the results may be dependent on the day's form of the participants. In further research a longitudinal research may show more significant results.

Until today, using cannabis is still a relevant topic in society. There are a lot of questions whether it should be legalized and how it should be handled. This again means that there is a lot of demand in research for cannabis related issues. Even though this research could not hold sufficient answers to the research questions it still gave some important signs that give effort for further research. It is obtrusive that most of the participants are aware of the

negative consequences of cannabis, even though they smoke it and have a pro-cannabis attitude. Those results may give the hint to more research, finding out the reasons of the different ways of thinking and attitude regarding regular use of cannabis.

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Appendix

Questionnaire

Fragebogen

Liebe/r Teilnehmer/in,

Vielen Dank für Ihre Teilnahme an meiner Untersuchung.

Im Anhang der Einleitung finden Sie einen Fragebogen mit Verschiedenen Fragen. Bei der Beantwortung der Fragen bitte ich Sie, diese so gut und ehrlich wie möglich auszufüllen, es gibt keine richtigen oder falschen Antworten. Bei eventuellen Fragen stehe ich Ihnen gerne zur Verfügung.

Bitte notieren sie hier Ihre Teilnehmernummer: _____

Teil 1.

Geben Sie bitte im folgenden Abschnitt ihre demografischen Gegebenheiten an.

Alter:		
Geschlecht:	o männlich	o weiblich
Geben Sie hier Ihre Tätigkeit an:		
o Student	o Auszubildener	o Berufstätig
o Weiteres, nämlich:		

Teil 2.

Dieser Teil des Fragebogens beschäftigt sich mit der Nachfrage Ihres allgemeinen Cannabisgebrauchs. Wenn Sie die erste Frage mit „Ja“ beantworten können, so füllen Sie bitte auch die restlichen Fragen aus.

1. Haben Sie innerhalb der letzten 6 Monate Gebrauch von Cannabis gemacht?
o Ja (weiter mit Frage 2) o Nein

2. Wie häufig machen Sie Gebrauch von Cannabis?				
○ Nie	○ Monatlich oder weniger	○ 2-4 Mal im Monat	○ 2-3 Mal die Woche	○ 4 Mal oder öfter die Woche
3. Wie viele Stundenam Tag sind Sie normalerweise „stoned“ wenn Sie Cannabis gebrauchen?				
○ Weniger als 1 Stunde	○ 1 oder 2 Stunden	○ 3 oder 4 Stunden	○ 5 oder 6 Stunden	○ 7 Stunden oder mehr
4. Wie oft haben Sie in den letzten 6 Monaten bemerkt, dass Sie nicht mit dem Cannabis Konsum aufhören können, nachdem Sie einmal angefangen haben?				
○ Nie	○ Weniger als monatlich	○ Monatlich	○ Wöchentlich	○ Täglich oder beinahe täglich
5. Wie häufig, in den letzten 6 Monaten, haben Sie, aufgrund Ihres Cannabiskonsums, Dinge die von Ihnen erwartet wurden nicht ausführen können?				
○ Nie	○ Weniger als monatlich	○ Monatlich	○ Wöchentlich	○ Täglich oder beinahe täglich
6. Wie häufig, in den letzten 6 Monaten, haben Sie einen großen Teil Ihrer Zeit damit verbracht Cannabis zu besorgen, es zu gebrauchen oder sich davon zu erholen?				
○ Nie	○ Weniger als monatlich	○ Monatlich	○ Wöchentlich	○ Täglich oder beinahe täglich
7. Wie häufig, in den letzten 6 Monaten, hatten sie nach Gebrauch von Cannabis Probleme mit Ihrer Konzentration oder Erinnerung?				
○ Nie	○ Weniger als monatlich	○ Monatlich	○ Wöchentlich	○ Täglich oder beinahe täglich
8. Wie häufig machen Sie Gebrauch von Cannabis in Situationen die Physisch gefährlich sein könnten, wie z.B. beim Autofahren, bedienen von Maschinen und der Betreuung von Kindern?				

○ Nie	○ Weniger als monatlich	○ Monatlich	○ Wöchentlich	○ Täglich oder beinahe täglich
9. Haben Sie jemals daran gedacht Ihren Cannabiskonsum schrittweise zu senken oder zu stoppen?				
○ Niemals		○ Schon, aber nicht in den letzten 6 Monaten		○ Ja, innerhalb der letzten 6 Monaten

Teil 3.

Der letzte Part des Fragebogens behandelt allgemeine Information bezüglich Ihrer Person und Einstellung.

10. Konsumieren Sie regelmäßig Nikotinhaltigen Tabak, abgesehen von der Menge die im Joint vorhanden ist?				
○ Ja			○ Nein	
11. Wie oft in den letzten 6 Monaten haben Sie Nikotin konsumiert?				
○ Nie	○ Monatlich oder weniger	○ 2-4 Mal im Monat	○ 2-3 Mal die Woche	○ 4 Mal oder öfter die Woche

Bitte kreuzen in den folgenden 2 Fragen den Punkt an, der mit Ihrer Meinung am meisten Übereinstimmt. Der mittlere Punkt bedeutet, dass Sie neutraler Meinung sind.

Cannabisgebrauch ist:

12.	**Gut**	0	0	0	0	0	0	0	**Schlecht**
13.	**Angenehm**	0	0	0	0	0	0	0	**Unangenehm**

Inwiefern stimmen Sie den folgenden Aussagen zu?

	Stimme voll und ganz zu	Stimme zu	Neutrale Meinung	Stimme nicht zu	Stimme ganz und gar nicht zu
13. Nachdem ich Cannabis konsumiert habe fühle ich mich schön entspannt.	O	O	O	O	O
14. Cannabis kaufen kostet ganz schön viel Geld.	O	O	O	O	O
15. Wenn ich Cannabis rauche gehöre ich dazu.	O	O	O	O	O
16. Wenn ich Weed konsumiere werde ich träge.	O	O	O	O	O
17. Joints rauchen macht Spaß.	O	O	O	O	O
18. Der Konsum von Cannabis kann gefährlich sein.	O	O	O	O	O
19. Von Cannabiskonsum wird man abhängig.	O	O	O	O	O

Informationsbroschüre hinsichtlich der Bacheloruntersuchung:

Kontakte

- Verantwortliche:
  (bei Fragen bezüglich der Untersuchung)

Hannah Maria Holländer
Reutumbrink 22
7544 XM Enschede
+31610667859

- Bei Beschwerden richten Sie sich
  bitte an die folgende Kontaktperson:

Jeanine Lodeweges-de Vries
Universiteit Twente
Drienerlolaan 5
7522 NB Enschede

Prozedur der Untersuchung:

Die Untersuchung findet unter folgenden Umständen statt. (Anschließende männliche Bezeichnungen beinhalten zu gleicher Maßen auch weibliche Teilnehmerinnen.)

1. Der Teilnehmer steht mindestens 12 Stunden vor der Untersuchung nicht unter dem Einfluss von Drogen, mit Ausnahme von Kaffee und/oder Nikotin.
2. Der Teilnehmer füllt so ehrlich wir nur möglich den gegebenen Fragebogen aus.
3. Anschließend absolviert der Teilnehmer einen IAT (implicit association task).
4. Der Teilnehmer raucht einen Joint in der für den Teilnehmer üblichen Dosis. Die benötigten Materialien hierzu werden von dem Teilnehmer selbst gestellt.
5. Der Teilnehmer absolviert erneut einen IAT

Die Gesamte Untersuchung wird im Durchschnitt ca. 2 Stunden andauern.

Die zu Untersuchende Person wird in einem ihr vertrauten Umfeld untersucht.

Falls die Untersuchung nicht bei dem Teilnehmer Zuhause erfolgt wird dem Teilnehmer die Möglichkeit zuteil, von der Untersuchenden nach Hause gefahren zu werden, oder die entsprechenden Gebühren für öffentliche Verkehrsmittel erstattet zu bekommen.

Die Teilnehmer verpflichten sich bei Teilnahme der Untersuchung dazu, bis zu 20 Stunden nach eben genannter Untersuchung keinerlei Aktivitäten auszuüben, die unter Cannabiseinfluss verboten sind, bzw. zu einem hohem Risiko führen (Auto fahren, Operieren, Fahrrad fahren, etc.).

Risiken:

Bei Teilnahme der Untersuchung setzt sich die zu untersuchenden Person *unter Umständen* den folgenden Risiken und Nebenwirkungen aus:

- Beeinträchtigung der Fahrtauglichkeit
- Entwicklung einer psychischen Abhängigkeit
- Erhöhtes Risiko, eine chronische Bronchitis auszubilden
- Eventuelle Erhöhung des Risikos der Ausbildung einer Schizophrenie
- Erhöhtes Risiko einer Krebserkrankung
- Benommenheit
- Halluzination
- Desorientierung
- Übelkeit
- Schwindel

Sollten oben genannte Nebenwirkungen oder ähnliches während der Untersuchung auftreten, so verpflichtet sich die untersuchende Verantwortliche dazu, sofern notwendig, ärztliche Hilfe zu besorgen und der teilnehmenden Person bis zum Eintreten eben genannter beizustehen.

Voraussetzungen, Rechte und Anonymität der Teilnehmer:

Der Teilnehmer ist mindestens 18 Jahre alt und macht seid mindestens 6 Monaten im Durchschnitt einmal im Monat regelmäßigen Gebrauch von Cannabis.

Teilnehmende Personen sind jederzeit dazu berechtigt die Untersuchung abzubrechen. Des Weiteren haben Sie das Recht dazu, bis zu 24 Stunden nach der Untersuchung ihre Teilnahme zurück zu ziehen, in folgedessen ihre Daten vollständig gelöscht werden.

Die Kandidaten nehmen freiwillig an der Untersuchung teil und sind zu keiner Zeit dazu verpflichtet etwas gegen ihren Willen zu tun.

Den Kandidaten steht es frei zu Fragen über die Untersuchung zu stellen.

Jegliche persönliche Daten der Teilnehmer, sowie die Teilnehmer selbst, werden vertraut behandelt, bleiben anonym und werden nicht an Dritte weitergegeben.

Belohnungen:

Bei eventuellem Interesse an „Proefpersonenpunten“ erhalten die Teilnehmer bei Anfrage 2 Punkte. Diese werden über Sona Systems geregelt.

Ziel der Untersuchung:

Ziel der Untersuchung ist es heraus zu finden ob unbewusste Denkfehler Cannabis Gebrauch erklären können. In dieser Studie wird bei regelmäßigen Cannabiskonsumenten auf die unbewusste Bevorzugung von Cannabisrelatierten Stoffen geachtet. Diese werden mithilfe des IATs gemessen. Durch die Analyse der Daten soll anschließend festgestellt werden, welche Faktoren Indikatoren für regelmäßigen Cannabiskonsum sein können.

Wenn es noch weitere Fragen vor, während oder nach der Untersuchung geben sollte, so können die Teilnehmer sich via Email an die Verantwortliche Person, wie oben vermerkt wenden.

Schriftliche Einwilligung des Teilnehmers zur Teilnahme der Bacheloruntersuchung:

Implicit & explicit Determinants of cannabis use

Teilnahmeerklärung:

Hiermit versichere ich, dass ich freiwillig an der folgenden Untersuchung teilnehme. Ich habe die mir gegebene Informationsbroschüre aufmerksam gelesen und bin vor der Untersuchung ausreichend informiert worden über Prozedur und eventueller Konsequenzen einer Teilnahme und bin mir dieser bewusst. Desweiteren bestätige ich, dass ich mindestens 12 Stunden vor Beginn des Testes keine anderen bewusstseinsverändernden Stoffe (z.B. Alkohol, LSD) zu mir genommen habe mit Ausnahme von Nikotin und/oder Koffein. Ich versichere, dass ich bis

zu 20 Stunden nach der Untersuchung keinerlei Aktivitäten ausübe(wie z.B. Auto fahren), die unter Einfluss zu hohem Risiko führen können.

Mit der hiesigen Unterschrift Stimme ich den oben erwähnten Aussagen und einer Teilnahme an der Untersuchung zu:

Name (Teilnehmer) : _____

Unterschrift (Teilnehmer) :_____

Name (Untersucher) : Hannah Holländer

Unterschrift und Datum(Untersucher) :_____