University of Twente

Faculty of Behavioral Sciences

A Career-approach to Cannabis Consumption among University Students:

Identifying Differentials between Stages of Use

Bachelorthese

Stefan Solinski (s0157597)

1ste begeleider: Dr. Marcel E. Pieterse

2de begeleider: Dr. Henk Boer

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Summary

Much of previous research on cannabis use treated the drug as universally dangerous and often focused on general risk factors that contribute to become a cannabis user. The present survey study rather emanated from a dose-response relation and attempted to identify differentials between different types of consumers using a sequential "career approach" (inspired by Howard S. Becker) based on the frequency of cannabis use. The scores on a number of demographic, behavioral and social-cognitive constructs (partly taken from the Theory of Planned Behavior and the Prototype Willingness Model) of 114 university students who were divided into stages of cannabis use ("occasional user", "regular user", "heavy user" and "ex-consumer") were cross-sectionally compared with each other. The results showed a clear relation between the current level of frequency of cannabis use and the length of experience with cannabis use. No relation was found between the frequency and the intensity of cannabis use per intake. Men emerged as being more frequent cannabis users than women. Early-onset users had a higher frequency and intensity of cannabis use than late-onset users. Results concerning the social-cognitive constructs indicated that ex-consumers differed from all active user-groups in several points, including perceiving more control over cannabis use, having a less positive attitude towards its use and having fewer friends who use it. Surprisingly, ex-consumers rated themselves to be more similar to their image of a typical cannabis user than regular or heavy users. Moreover, heavy users identified more with being a cannabis user and had a higher willingness to and a lower perceived control over cannabis use in pertinent situations than occasional users. All in all, the findings in this study offer insights for an improved understanding of cannabis use among students and emphasize the importance of taking the differences between more and less frequent types of cannabis users into account. It would be a promising endeavor to expand research in the area of stage approaches to cannabis use, especially in service of an improved design of tailored harm-reduction intervention programs that might help to handle problematic cannabis use or prevent negative health outcomes as a consequence of the transition to a harmful pattern of cannabis use.

Contents

1. Introduction

Cannabis is perhaps the most controversial illicit substance worldwide and has kept scientists occupied for decades until today. In nearly all European countries cannabis is prohibited due to its reputation as a health threat, even if some countries, like Switzerland some years ago and the Netherlands still today, tolerate cannabis use to some degree. In general, however, there can be no doubt about the distaste for cannabis in most parts of the world, often because it is widely said to be a dangerous gateway-drug, thus, paving the way for young people to initiate hard drug use and elevate the risk of drug use progression (Adler & Kandel 1981; Kandel 1975; Blaze-Temple & Lo 1992; Stenbacka, Allebeck & Romelsjö 1993; Beenstock & Rahav 2002).

Despite of these concerns, findings consistently reveal that, next to alcohol and tobacco, cannabis is the most widely used drug in Western countries (Hall, Johnston & Donnelly, 1999) and cannabis use has a life-time prevalence of 21.8% among the 15-64 olds in Europe (European Monitoring Centre for Drugs and Drug Addiction [EMCDDA], 2008). Therefore, it depicts an issue of high relevance among epidemiologists and health psychologists. Special attention is often dedicated to adolescents and young adults between age 15 and 24 (average European prevalence: 30.7%) as they represent a high-risk group (EMCDDA, 2008; Swift, Copeland & Lenton, 2000). Also many students in academic programs fall into this age group and could possibly represent a distinctive subgroup of cannabis users because of their higher level of education. Due to this reasonable guess, this group will be focused in the present study, concentrating on the Netherlands. To give an illustration of the current circumstances concerning cannabis use among university students, the official statistics of the year 2008 show the following: 36% of the university students in the Netherlands (HBO and WO) tried cannabis and nearly 10% had a more regular consumption pattern (Centraal Bureau voor de Statistiek, 2009). These numbers are quite high, thus, dealing with this subject might be of interest for the public and in particular for health psychology.

The effects of cannabis can be divided into short- and long-term effects. First of all, cannabis is a psychoactive drug that can amplify the current mood and quicken the appetite (Trimbos Instituut – Netherlands Institute of Mental Health and Addiction, n.d.). Users usually value the euphoria and relaxation experienced under the influence of cannabis that go along with perceptual alterations, time distortion and the intensification of sensory experiences. Further acute effects are impaired short-term memory and attention, reduced motor skills and increased reaction time (Hall & Solowij, 1998).

However, of particular interest from the perspective of health psychology are the long-term effects, especially the problems that could occur after a longer period of cannabis consumption. Despite of a substantial amount of research the long-term effects and their

severity are not yet understood sufficiently. Nevertheless, several studies indicated that cannabis consumption is associated with a couple of negative consequences in the long term. Besides the general lung damage and cardiovascular effects through the cannabis-smoke (Hall & Solowij, 1998), Lynskey and Hall (2000), for example, found a link with lower school performance and less attainment in education and job. In cases of fierce consumption, cannabis can lead to the amotivational syndrome, a psychic disorder mainly characterized by a narrowed interest, an apathetic mood and a withdrawn, lethargic and unmotivated behavior (Lynskey & Hall 2000). Schippers and van den Brink (2008) mention possibly persistent cognitive and motor dysfunctions resulting from excessive long-term cannabis use. These authors also emphasize the fact that cannabis causes psychic dependence while there is no physical dependence. Some studies even found that heavy cannabis users more often develop schizophrenia than non-users (Schippers & van den Brink, 2008). According to Hollister (1986) there are no doubts that marijuana use may aggravate existing psychoses or other severe emotional disorders. This author further states that using cannabis, especially on a regular basis, could certainly be harmful to the emotional growth and the psychosocial maturation of young persons.

Hollister is not the only one who makes the assumption that especially more regular cannabis consumption rather than occasional use can result in serious health-damage. The view that many of the possible negative long-term consequences that are described above occur more frequently in a context of regular or heavy consumption and less frequently under low or intermittent use of cannabis, is known as dose-response relation and has received some support in previous research. For example, Moore et al. (2007) found an increasing risk for psychosis and affective symptoms for frequent users while this was not true for less frequent users. Further evidence for a dose-response relation comes from Solowij, Michie and Fox (1995) who found worse cognitive skills with regard to selective attention, memory and speed of information processing for high-frequency cannabis use as well as for long-term use. Another study even drew the conclusion that users with more frequent consumption patterns experience more negative consequences in terms of general interferences with their daily lives than less frequent users (Cunningham, Bondy & Walsh, 2000). Despite the evidence for the dose-response relation one has to keep in mind the methodological problem of the precise cut-off point: when does low cannabis use end and when does problematic consumption begin? This problem is shared by all studies that apply this approach.

The support for a dose-response relation for cannabis use advocates a so-called harm-reduction approach to construct interventions to confine abuse of the substance. This approach concentrates on the reduction of harm as a primary goal rather than the reduction of use per se (Swift, Copeland & Lenton, 2000) and is therefore more focused on preventing

regular or heavy use of cannabis. Another reason for the usefulness of this approach is the fact that cannabis is typically used experimentally or intermittently in adolescence and early adulthood and is mostly discontinued by the mid- to late 20s (Bachman, Wadsworth, O'Mally, Johnston & Schulenberg, 1997; Chen & Kandel, 1995). Nevertheless, there are enough young people who progress to regular cannabis consumption, which can evidently be harmful. Therefore - in line with a dose-response relation and the attached harm-reduction approach - it is important to differentiate between different frequencies of use rather than think about the topic in a black-and-white manner. Thus, a main presumption of this study is that the degree of cannabis use determines to a great deal if it comes to major problems or not.

This reasoning has implications for the investigation of possible background variables of cannabis use. It suggests a sophisticated vantage point in identifying the crucial determinants that might be distinguishable for different consumption levels. To my knowledge, this has rarely been done in previous research concerning cannabis use. The differences that might be found could make a useful contribution to an improved understanding of the critical factors that are involved when young people become a cannabis user with a high level of consumption. Following this line of argument, the current study is aimed at making inferences about what social-cognitive determinants distinguish a high-frequency cannabis user from users with a less dangerous consumption patterns.

2. Theoretical background and research questions

2.1 Theoretical Background

The approach to determinants of cannabis use taken in this study is inspired by the *career model* proposed by Howard S. Becker (1963). This quite old model was first developed in the context of sociology of deviance to describe illicit substance users and their "career". While it is frequently used in ethnographic studies, it is rarely applied in epidemiology or health psychology. This is probably due to a widely perceived incompatibility of the quantitative approach often used in epidemiology and the one used by Becker who always emphasized the concept of sequentiality of a "career" which he thought could not be adequately grasped with multivariate techniques (but which is not necessarily true) (Peretti-Watel, 2003).

Generally, the career model describes cannabis use as occurring in stages (from beginner, to occasional user, to regular user) embedded in a gradual learning process about the drug. (This does not mean that users necessarily proceed through all three stages.) For Becker, this learning process represents a necessary condition for a cannabis user to move on in his "cannabis career". Before he has the motivation to proceed to higher frequency of

consumption he has to get to know the effects of the drug, become familiar with them and learn to enjoy and to integrate them into other activities. In other words, while moving through successive stages of consumption, learning to use cannabis produces further motivation to do it. Consequently, if the motivation to cannabis use is subject to continuous change due to a learning-process, this might implicate that also the concepts or determinants change that reflect the learning process in the different stages. Of course, this implicates that there is no unequivocal cause-and-effect relationship but a mutual influence of determinants and the level of consumption behavior.

Becker constructed his sequential perspective in 1953 from a longitudinal study using in-depth interviews with adolescent cannabis users. His findings revealed that the relevance of several factors determining cannabis use vary with level of consumption. For example, the "presence of cannabis consumers among friends" declined with moving on in the career model. Thus, the peer-group played a greater role for the initiation of cannabis use and occasional consumption than for the regular use. Another critical point made by Becker is the attitude towards cannabis use. For him, this factor is closely linked to a kind of "moral development" of a cannabis user who constructs his opinion simultaneously with increasing consumption level. According to Becker, this development is mainly an alteration of standpoint towards the drug when cannabis is used in a more frequent manner. This change occurs in a societal climate in which frequent cannabis use is morally disapproved (which is common sense in Europe, even in the Netherlands). Therefore, Becker states, users with higher consumption levels are more likely to deny any moral dimension of their cannabis use and construct a more positive attitude towards its use opposing the negative views in society. With other words, a consumer who proceeds through the stages has to neutralize the negative stereotypes that are commonly attributed to cannabis users by choosing a different, more favorable interpretation of his consumption that is based on his own and his friend's experiences with the drug. This results in a general shift in attitude towards the drug. In explaining this shift in opinion, Becker alluded to the Cognitive Dissonance Theory (Festinger, 1957). To reduce the cognitive dissonance that is perceived by a cannabis user who increases his level of consumption, he rationalizes his behavior, downplays the risks and develops a more positive attitude in order to justify his consumption pattern. Thus, he adjusts his beliefs about cannabis consumption and develops an attitude that fits his own consumption level. As a concluding remark, one can state that higher consumption levels are associated with a more positive, stable and elaborate attitude towards the drug and an increased refusal of other perspectives that treat frequent cannabis use as morally wrong or emphasize problems involved in cannabis use.

As mentioned at the beginning of this section, Becker's model has been hardly applied in the field of health psychology. However, some recent support came from Peretti-Watel (2003)

who also took a sequential approach dividing his participants in different stages of consumption level. Unlike Becker, this author conducted a cross-sectional study with pupils using a self-report measure. He also found that cannabis users in a higher stage had more tolerant ideas about the drug and had experienced a shift in attitude. The general finding was: the higher the consumption level, the less likely respondents will disapprove cannabis users or say that this substance involves risks. Another study of this author concluded that especially the risk-denial increased with higher consumption level (Peretti-Watel, 2006). He described the risk-denial of cannabis use as a learned skill corresponding to a positive attitude towards the drug and to a higher frequency of consumption. As Becker's, Peretti-Watel's results also show that the role of peers becomes less important with the transition to more regular use.

There are not many other studies that investigate cannabis use in the context of a sequential model as Becker and Peretti-Watel suggest, but in the field of health psychology and in particular in drug research this is not an entirely new approach. With regard to smoking tobacco, a bulk of literature exists concerning the so-called stage-models. Similar to Becker's view, many researchers have conceptualized smoking behavior in adolescence as progressing though a sequence of developmental stages (e.g. Leventhal & Cleary, 1980; Flay, d'Avernas, Best, Kersell & Ryan, 1983; Stern, Prochaska, Velicer & Elder, 1987). According to Flay, Ockene and Tager (1992), multiple social, psychological and biological factors influence the progression through these stages, with different factors having different functions at different points in this development, and play different roles for individuals. Perhaps the most popular versions in the family of stage-theories is the Transtheoretical Model (TTM) by Prochaska and DiClemente (1983) which is not only applied to smoking but also to other areas of health psychology like exercise behavior and eating habits (for more information, see Sutton, 2005). In a meta-analysis, Mayhew, Flay and Mott (2000) reviewed 46 studies that have used a stage-model approach, either using a cross-sectional or longitudinal research design. The number and labeling of the different stages is not consistent but are generally made up of some of the following ones: precontemplation phase (= never thought about smoking), contemplation or preparatory phase (= begin to think about smoking), initiation phase (= trying a cigarette), experimentation (= gradual increase of smoking), regular phase (= progress beyond sporadic smoking) and established phase (= smoking daily or almost daily). Mayhew et al. concluded that in the reviewed studies only few variables were found that uniquely predicted a specific stage or stage transition. According to these authors, the reason for these relatively poor results might be the lack of precision inherent in the theoretical definitions of stages.

Nevertheless, the stage-approach is a promising one and there is no reason why it could not be transferred to the problem of cannabis use, as Becker also has suggested in 1963.

There are indeed several other studies that adopted the approach of categorizing different types or consumption patterns of cannabis users and measuring differentials between them, but none of them explicitly draws on Becker's career model or on the other well-known stage-models. Furthermore, none of them focused on differences in social-cognitive determinants or even on interdependences in psychosocial models corresponding to different levels of cannabis use.

Given this lack of research concerning social-cognitive determinants of cannabis use in the context of a sequential approach, this study seeks to investigate a new set of determinants that might vary with consumption level. Next to this, it attempts to test the tendencies Becker and Peretti-Watel found with regard to the changing attitude, attitude-variability (which refers to the stability of the attitude), the moral norm (defined as the personal rules of conduct), the risk-denial and the role of peers due to a certain stage in the "cannabis career".

For these purposes an integrated psychosocial model is arranged that consists of a combination of the Theory of Planned Behavior (TPB; Ajzen, 1991), the Prototype Willingness Model (Gibbons & Gerrard, 1995, 1997) and a couple of additional variables. The model and its components are described below.

The TPB states that behavior is predicted by the intention to perform that behavior which in turn is influenced by the attitude towards that behavior, the subjective norm (related to the individual's perceived social pressure (not) to perform that behavior) and the perceived behavioral control (concerned with the individual's perception of ease or difficulty to perform that behavior and facilitators or inhibitors to that behavior). The subjective norm is defined as the product of the normative beliefs – that is, what a person thinks about what salient referent groups think whether he or she should or should not perform the behavior – and the motivation to comply with those beliefs. The perceived behavioral control is defined as the relative power of facilitators and inhibitors of behavior and their frequency of occurrence. The TPB has been applied to predict cannabis use in several studies (e.g. Armitage, Conner, Loach, & Willets, 1999; Conner & McMillan, 1999) but not in the context that is intended here. A general finding across these studies was that intention was the strongest predictor of behavior and attitude was the strongest predictor of intention. Subjective norm also predicted intention across different studies, although to different degrees (Leitner, Shapland & Wiles, 1993). Also the perceived behavioral control was identified as playing a role in forming an intention towards cannabis use (McMillan & Conner, 2003). Based on the reviewed literature it seems reasonable to use the TPB-components in the present study as they might be subject to variation across different frequencies of consumption. The attitude-variability, the moral norm and the risk-denial, which were explored by previous research, are here treated

as deliberate cognitions and are therefore included as supplemental variables to the TPB working on the intention.

Next, the present model is augmented with several constructs from the Prototype Willingness Model (Gibbons & Gerrard, 1995, 1997; Gerrard, Gibbons & Gano, 2003). This model adds a so-called social reaction pathway to the explanation of health-risk behavior while the TPB explains such behavior via a more reasoned pathway. The PWM emphasizes that especially drug taking behavior might be better explained as a reaction to a social situation (e.g. when a joint is offered) where, next to other normative influences, an association with positive or negative prototype images of the typical consumer work on the willingness to perform the behavior. According to theory, these images consist of an individual's prototype favourability (i.e. the extent to which the image is positively evaluated) and his prototype similarity (i.e. the perceived similarity between the image and one's self) (Norman & Conner, 2005b). The social-reaction pathway does not predict behavior via an elaborated intention (as in the TPB) but rather via a situational willingness that is aimed to reflect the social nature of using cannabis and is therefore much more affective. Thus, to cover the less reasoned cannabis consumption, the model is extended with the determinants prototype favourability, prototype similarity, and behavioral willingness as proximal determinant.

Another additional construct is the descriptive norm. It is included to better account for the finding of Becker and Peretti-Watel that peer-influence varies across different consumption levels. While the TPB concentrates on the injunctive social norm, that is the concern about the social approval of others which motivates intention to action through social reward or punishment (Norman & Conner, 2005a), the descriptive norm is concerned with an individual's perception of what significant others do. Because of the social nature of this construct it is assumed that it does not only work on the intention but also on the behavioral willingness in social situations.

Finally, role-identity is taken as the last predictor of intention in the present model. This is done because this construct also seems to share the developmental dimension in cannabis consumption, that is central the career-approach, by its very nature. For example, Fletcher, Bonell, Sorhaindo and Rhodes (2009) highlight the importance of drug use in young people's identity construction and group bonding. Role identity as a concept that predicts cannabis use is derived from sociology, in particular from identity theory, which "suggests that a person's self-concept is organized into a hierarchy of role identities that correspond to one's position in the social structure" (Fekadu & Kraft, 2001). In health psychology, the concept is defined as self-identity, "the salient part of a person's self concept which relates to behavior" (Conner & Armitage, 1998). The developmental dimension of role-identity, on which this study concentrates, relates to the extent to which a role is internalized as part of the self.

Fekadu and Kraft state that the longer people have occupied a specific role, the more likely it is that the intention to engage in this behavior is based on the salience of role-identity. Support for this thesis comes from Biddle, Banks and Slavings (1987) who found out that identity labels based on previous behaviors have strong effects on intentions and subsequent behaviors. Therefore, it can be assumed that role-identity becomes a stronger predictor when consumption level rises. However, Conner and McMillan (1999) showed a reversed relationship. In their study about determinants of cannabis use role-identity was only predictive at moderate level of consumption, but became less important with an increasing consumption level. According to the authors, this decrease of role identity's predicting value is due to an increased habit strength, which shows that intentions become less under control of cognitive factors and more automatic in nature with increasing the frequency of cannabis consumption. Including role-identity in the current model and looking for eventual differences across the stages in the career-model can perhaps resolve those contradictory views.

So far, only the social-cognitive determinants were described that are assumed to be subject to variation due to different stages of consumption. To reflect the stage itself in which the particular user is, the model in this study employs the construct frequency of use, as it was also applied in the previous studies using this research paradigm. Nevertheless, one should keep in mind here that frequency of use might not be the one and only construct that is decisive for the particular stage and that there could be other constructs as well depending on what theoretical assumptions are made. (To avoid misunderstandings, note that in the following paragraphs, stage and level of frequency are used synonymously).

A further obviously important consideration concerns the dose or intensity of cannabis use per intake. This construct, however, is no integral component of Becker's theory. Nevertheless, it seems to be of additional value to explore in this study how this issue might be related to particular stages in the cannabis-career, especially in the light of the just mentioned problem concerning the application of frequency as the only decisive construct for stage-membership. Consequently, this construct, as it might also be reflective of a certain stage in the career-model, was incorporated into the model.

Another theoretical aspect of Becker's sequential approach is the learning process through which the cannabis user proceeds when moving on in the stage-model. Central to this process is the degree of experience with cannabis use. For this reason, the length of experience is included in the model as a construct that should be different across the distinctive stages.

Furthermore the age of first contact with cannabis is included in the model to look for its eventual effects on the consumption level. This construct was also part of a study conducted by Fergusson, Horwood and Beautrais (2003) with the general finding that an early contact with cannabis (before 17) can be of predictive value for developing a cannabis dependency,

which often goes along with increased consumption. This relation could eventually exist for both, the frequency of use and the intensity of use.

Ultimately, age and gender are used as demographics. This enables to test if the presence of men or women is different across the distinctive stages or if they have a different intensity of cannabis use per intake. Peretti-Watel (2003) for example reported that male preeminence increases as level use-frequency increases. To explore this gender-consumption relation, gender is included in the model. The whole model is shown in figure 1.
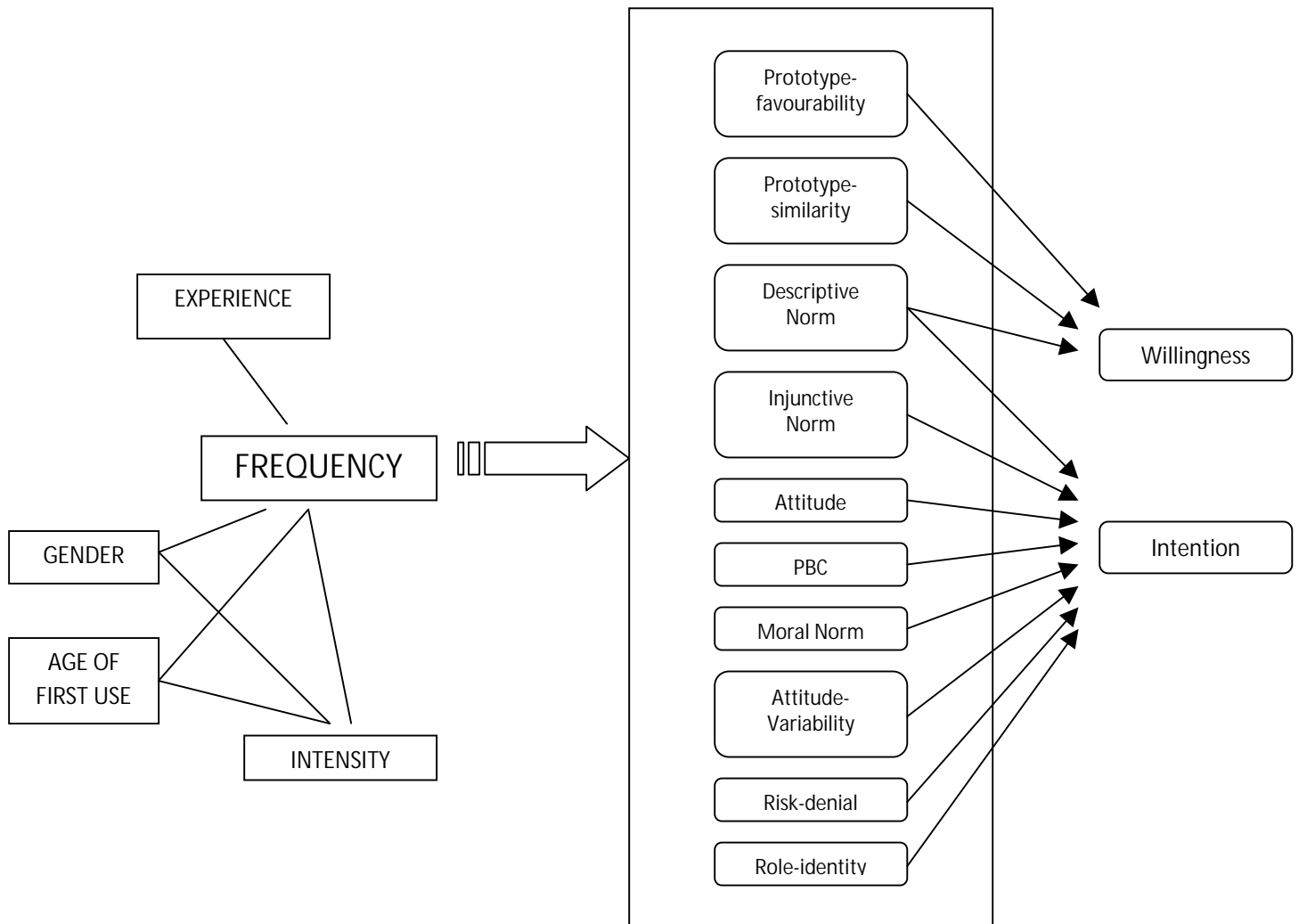

Figure 1. Theoretical model: Influence of social-cognitive determinants (in the box) on willingness and intention (right side), varying for different levels of frequency, and relations of gender, age of first use, intensity and experience with frequency (left side).

2.2 Research questions

From the theoretical background given in this section and the proposed model the following research questions were derived:

1. In what way are gender and age of first cannabis use related with levels of frequency and

dose of cannabis use?

2. In what way are frequency of cannabis use and intensity of cannabis use related?

3. Do cannabis users with relatively higher levels of frequency have a longer experience with cannabis?

4. Do the social-cognitive constructs in the proposed model vary across different levels of frequency of cannabis use?

5. Which of the determinants in the model predict the intention to stop cannabis use and the willingness to use it for the different levels of frequency of use?

3. Method

A survey research was carried out to examine the issues described above. In the forthcoming paragraphs a short description of the used sample and the followed procedure, the measures of the different model-components and the applied data analysis techniques are provided.

3.1 Sample and procedure

The survey was conducted in form of an online questionnaire and with a questionnaire in written form (see *appendix*). It was addressed to male and female university students (who at least smoked cannabis for some time in the past) in different fields of study and with different nationalities studying in Enschede (The Netherlands). Surveymonkey.com was used for the online data collection. With this online application the questionnaire was written whereupon participants could answer the questions following a particular link. Other respondents were approached personally by the researcher with the written form. The respondents received no reward for their participation, which took approximately 10 minutes.

3.2 Measures

The questionnaire was made up of a short introduction page where the participants were informed about the topic of the questionnaire and a list of items to measure the constructs described in paragraph 2.

First, the respondent's age, gender and age when the first contact with cannabis was made were assessed. Based on the latter measure participants were assigned to having

used cannabis "early" (< age 17) and "late" (≥ age 17) for the first time. This classification alludes to research by Fergusson et al. (2003) and Lynskey et al. (2003).

The length of experience with cannabis use was measured with a question about how many years (and/or months) participants have consumed cannabis. There were no pre-formulated answers, thus, an absolute number was required.

The measurement of the actual frequency of cannabis use and its classification into distinctive levels corresponding to the stages seems a bit arbitrary because of the cut-off point problem already mentioned in the introduction. Even Becker himself did not make any concrete suggestions or proposes exact numerical values in his stage-model. In fact, the literature offers various possibilities for these purposes. While for example Solowij et al. (1995) differentiated between light- (< 3 times) and heavy (≥ 3 times) users, Hammersley and Leon (2005) classified respondents into ex-users, casual users, regular users and daily/near daily users by letting them choose between different verbal attributes. Others like Peretti-Watel (2006) and Kuipers and de Zwart (1999) distinguished occasional users (< 10 times/month) from regular users (≥ 10 times/month), and still others divided their respondents into less than weekly- (occasional-), weekly- and daily users (Swift, Coffey, Carlin, Degenhardt & Patton, 2008). Apparently, there is no (strictly scientific) one way to measure and label the frequency of use and the distributions are rather made in a way that is practicable and makes sense for the particular case. Thus, in this study the participants were instructed to indicate how many smoking sessions they had during the past 30 days. A smoking session was considered to be one occasion where cannabis is used alone or with friends. Again, an absolute number was required. Based on this measure, the respondents were assigned to one of the following actual frequency-levels of consumption: "ex-consumer", "occasional user" (1-5 smoking sessions), "regular user" (6-15 smoking-sessions), and "heavy user" (> 15 smoking sessions).
It is important to keep in mind the relative subjectivity of the definition of the stages and their particular cut-off points.

The intensity of use was assessed by two constructs. On the one hand the respondents had to indicate the number of joints, water pipes or other units of cannabis intake per smoking session. (To simplify matters we will talk about joints below). On the other hand, participants had to estimate the approximate amount of hash or weed that they use per smoking session. One more time absolute numbers required. However, it should be noted that the latter measure has to be treated with special caution because at least for some people it might be hard to say how many gram they usually consume.

The scales used to measure social-cognitive determinants are listed below.

Four items are used to measure the intention for cannabis consumption. These were formulated negatively as they asked for the intention to stop cannabis consumption in the

forthcoming month (e.g. "I intend to stop using cannabis in the forthcoming month"). The items were adopted from (Boer, Goosensen & Pieterse, n.d.) and a similarly structured item was added for the intention to reduce cannabis use. The intention could be rated on a 7-point scale from 1 (very likely) to 7 (very unlikely).

Willingness to use cannabis is assessed with three items adopted from Gibbons and Gerrard (1995, 1997). They measure with a 7-point scale how likely or unlikely the respondents would react in a particular way in a situation when cannabis is offered to them. Three reactions proposed: "I would take it", "I would say no "thank you and refuse it", and "I would leave the situation".

To measure the prototype favourability the item-structure of Gibbons, Gerrard and Boney-McCoy (1995) is employed. The respondents were asked to imagine a typical cannabis user at their age and to rate from 1 to 7 how unlikely or likely they would attribute 12 different prototype-adjectives to this person (e.g. "cool" or "immature"). To connect the construct prototype similarity to the previous items, participants are asked afterwards in how far they resemble the imagined prototype of a cannabis user (rated on a 5-point Likert-scale from "not at all" to "greatly").

The item-structure for the TPB-variables is taken from Ajzen (2002).

Attitude towards cannabis use was measured by pairs of semantic differentials. These were rated on 7-point scale form −3 (e.g. "harmful") to +3 ("beneficial") in response to the statement "For me, using cannabis is…".

Injunctive norm was assessed with four items in relation to parents, siblings, friends and fellow students or colleagues. The participants were asked to rate from 1 (strongly agree) to 7 (strongly disagree) whether these significant others think that it is okay for them to consume cannabis.

Perceived behavioral control was measured with five items, which asked for the participant's degree of control over their cannabis use in general, especially when facing different facilitators (e.g. "It is hard for me not to consume cannabis when I see my friends using it"). The participants had to rate in how far they agree with the given statements from 1 (strongly agree) to 7 (strongly disagree).

Descriptive norm was measured with one item adopted from (Boer et al., n.d.) which asked the respondents to indicate on a scale from 1 (none) to 5 (all of them) how many of their friends (they see regularly) consume cannabis.

Measures of moral norm were adopted from McMillan and Conner (2003) and Manstead (2000). The respondents were asked to rate on a scale from 1 to 7 in how far they agree or disagree with three statements (e.g. "Consuming cannabis goes against my moral principles"). Low values indicated the moral norm not to use cannabis.

Attitude variability was assessed with one item also taken from McMillan and Conner (2003). The respondents had to rate the following statement on a 7-point scale: "My attitude towards using cannabis varies from time to time".

Six items for the assessment of risk-denial were adopted from Apostolidis, Fieulaine, Simonin and Rolland (2004). Participant should rate on a scale from 1 to 7 whether they agree or disagree with a number of risk statements concerning cannabis consumption (e.g. "Cannabis consumption diminishes mental abilities" or "cannabis destroys friendly relationships").

Finally, four items were taken from Fekadu and Kraft (2001) and Charng, Piliavin and Callero (1988) to provide a measure for role-identity. The respondents had to rate statements like "Cannabis is an important part of who I am" on a 7-point scale indicating their agreement with them.

3.3 Data analysis

For the analysis of the data SPSS v16 was used.

To control for internal consistency of the used measurement scales a reliability analysis was carried out with Chronbach's alpha as indicator of reliability.

Furthermore, to examine the relations between categorical variables (like gender and age of first cannabis consumption, and the different frequency-levels), chi-square tests were used to indicate the general distribution and when it seemed reasonable a t-test was used to further examine if there is linear relationship.

For statistical comparisons between the different group-means on the different social-cognitive constructs, t-tests and several univariate analyses of variance with subsequent *Bonferroni* post-hoc test were applied. As a pre-condition to the faultless interpretation of the results of the univariate ANOVA the multivariate criterion Wilk's λ was used to avoid alpha-inflation due to multiple testing (a higher chance to make a type 1 error than the chosen alpha-level would predict). In the case of significance of Wilk's λ an interpretation of the univariate F-values is possible without the danger of making this error.

To test for correlations between the constructs Pearson's correlation coefficient r was used. The variables that correlated significantly with intention and willingness were chosen as predictors for subsequent regression analysis with intention and willingness as dependent variables.

4. Results

4.1 Sample

In total 114 (ex-) cannabis-consuming students participated in the study (for a summary of all sample characteristics, see *table 1*). The whole sample consisted of 82 men and 32 women aged between 18 and 30 years. On average these young people started their "cannabis career", to speak in Becker's terms, with 16.19 years in a range from 11 to 23 years and it endured or still endures on average 5.75 years in a range from 2 months to 14 years. On closing of the data collection the participants had an average frequency of 10,39 smoking sessions in the last thirty days wherein they smoked between 0,2 and 13 joints per smoking session (average: 2,8 joints) or, differently spoken, smoked between 0,1 and 5 gram cannabis (average: 1,17 gram). The information about the amount of cannabis in gram, however, provided by the participants contained, as already suspected above, 24 missing values. Therefore, this measure was excluded from further analysis.

The frequencies within the stage-classification for frequency of cannabis use satisfied the set minimum-limit of at least 20 subjects per group and therefore the grouping could be retained for further analyses.

Table 1

Sample Characteristics (N=114)

Variable	Minimum	Maximum	Mean	*N*	*%*
Gender					
Male				82	71.9
Female				32	28.9
Age	18	30	23.41		
First contact with cannabis (Age)	11	23	16.19		
Early (< 17)				73	64.0
Late (> 17)				41	36.0
Experience (years)	0.17	14.0	5.75		
Actual frequency (smoking-sessions)	0	40	10.39		
Ex-consumer				23	20.2
Occasional user (1-5)				33	28.9
Regular user (6-15)				25	21.9
Heavy user (>15)				33	28.9
Dose (joints)	0.3	13.0	2.8		
Dose (gram)	0.1	5.0	1.17		

4.2 Reliability analysis

First of all a reliability analysis for internal consistency was carried out for all those variables in the model that were measured with more than one item (the results are summarized in *table 2*). Cronbach's Alpha was assessed to indicate how well the different sets of items measured their underlying latent constructs. A scale was considered to have an acceptable reliability when Cronbach's Alpha was at least 0,60. Only the scale for willingness was modified by excluding the third item ("I would leave the situation") to increase the alpha from 0,630 to 0,789. All other scales were sufficiently reliable and were retained for further analysis.

Table 2

Reliability-Analysis

Variable	Number items	Chronbach's α
Intention	4	.93
Willingness	2	.79
Prototype-favourability	12	.84
Prototype-similarity	1	
Descriptive norm	1	
Injunctive norm	4	.62
Attitude	8	.77
PBC	5	.79
Moral norm	3	.84
Attitude-variability	1	
Risk-denial	6	.66
Role-identity	4	.75

4.3 Relation of gender and age of first consumption with stage-level and with intensity of cannabis use

The first aspect of research question 1 dealt with the relation between gender and the levels of the frequency of use and the intensity of cannabis use among the participants (for a summary, see *table 3.1*).

A chi-square test, using an alpha level of 0.05, showed a significant relation between gender and actual frequency of use, χ^2 (3, N = 114) = 16.009, p = .001. While among men, most participants were heavy users (39%), the greatest part of the women were occasional users (37.5%). A similar proportion of both, the male and female subgroup, showed a regular use. A further noticeable issue is that there were nearly 20% more ex-consumers within the

female than within male subgroup. The distribution across the different levels of frequency justifies a test of linear relationship. The t-test revealed that men (M = 2.84, SD = 1.11) had on average in a higher frequency-levels than women (M = 1.97, SD = 0.86), t (112) = 4.013, p = .000 which confirms the linear relationship between gender and level of frequency.

Table 3.1

Relation of gender and frequency (N=114)

Gender	Frequency							
	Ex-consum.		Occasional		Regular		Heavy	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*
male	12	14.6	21	25,6	17	20,7	32	39,0
female	11	34,4	12	37,5	8	25,0	1	3,1

χ² = 16,009, df = 3, p = .001

A t-test was performed to examine the relation between gender and intensity of cannabis use. Ex-consumers are not included in this test because they do not have an intensity, as they do not use cannabis anymore. Results indicate that the intensity of cannabis use was on average not significantly higher for men (M = 2.97, SD = 1.87) than for women (M = 2.21, SD = 2.56), t (88) = 1.48, p = .143.

The second aspect of the first research question was concerned with the relation of age of first cannabis use with the levels of frequency of cannabis use and the intensity of cannabis use (results are summarized in *table 3.2*).

Another chi-square test revealed a significant relation between age of first cannabis consumption and actual frequency of use, χ² (3, N=114) = 9.749, p = .021. The greatest part of the early beginners was heavy consumers (37%) whereas the most late beginners engaged in occasional use (43.9%). Regular users were represented to a similar degree in both subgroups. Approximately the same proportion of both, early and late beginners, have stopped cannabis use (19.2 and 22%). Again, a t-test was performed to examine a possible linear relationship. The t-test confirmed the linear relationship between age of first use and level of frequency, showing that early beginners (M = 2.79, SD = 1.15) used cannabis on average on a significantly higher frequency-level than late beginners (M = 2.27, SD = 0.98), t (112) = 2.414, p = .017.

Table 3.2

Relation between age of first use and frequency (N=114)

First age of use	Frequency							
	Ex-consum.		Occasional		Regular		Heavy	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*
early	14	19,2	15	20,5	17	23,3	27	37,0
late	9	22,0	18	43,9	8	19,5	6	14,6

$\chi^2 = 9,749$, df = 3, p = .021

A further t-test was carried out to examine the relation between age of first cannabis use and intensity of use. Again, because of their abstinence ex-consumers were not included in this test. Results indicate that early beginners (M = 3.17, SD =2.24) on average use cannabis with a higher intensity than late beginners (M = 2.11, SD = 1.00), t (86.11) = 2.90, p = .005.

4.4 Relation between stage-level and intensity

Concerning the second research question, a one-way ANOVA was used to examine whether the intensity of cannabis use is related to the level of frequency. Again, because of their abstinence ex-consumers were left out in this test. Results yielded no significant effect of frequency, F (2, 89) = 1.281, p = .283. Means (and standard deviations) from occasional to heavy users were 2.42 (1.60), 2.74 (2.45) and 3.24 (2.12), respectively. A closer look at the standard deviations reveals that the intensity of cannabis use could vary within the different levels of frequency. Thus, it can be concluded that intensity of cannabis use is more individual and not clearly reflective for the sequential approach taken in this study and is therefore not treated as an additional decisive component for stage-membership in the following analyses.

4.5 Relation between stage-level and experience

To test if users with a higher level of frequency of use are also more experienced cannabis users (research question 3) a one-way ANOVA was performed. Results showed that the effect of frequency was significant (F (3, 114) = 5.908, p = .001). Pairwise comparisons using the Bonferroni post hoc criterion (alpha level = .05) indicated that heavy users (M = 7.76, SD = 3.50) have significantly longer experience with cannabis than ex-consumers (M = 4.07, SD = 2.99) or occasional users (M = 4.90, SD = 4.15). Regular users' experience (M = 5.95, SD = 3.15) lies between that of occasional users and heavy user but does not significantly differ from both of them. Noteworthy were the relatively high standard deviations, indicating that the experience could vary substantially for all frequency-groups.

4.6 Relation between stage-level and social-cognitive determinants

To answer the fourth research question, in how far the scores on the different social-cognitive constructs vary due to different levels of frequency of cannabis use, a one-way MANOVA was performed using Wilk's λ as multivariate criterion. Applying an alpha level of .05 this analysis yielded that the effect of actual frequency was significant on at least one of the dependent variables, $F_{(36, 114)} = 3.097$, $p = .000$. This result allowed interpreting the F-values of the univariate analysis without running the risk of alpha-inflation. With the same alpha level the univariate analyses of variance reached significance for seven dependent variables including intention ($F_{(3, 114)} = 4.720$, $p = .004$), willingness ($F_{(3, 114)} = 16.008$, $p = .000$), prototype-similarity ($F_{(3, 114)} = 5.952$, $p = .001$, descriptive norm ($F_{(3, 114)} = 8.719$, $p = .000$, attitude ($F_{(3, 114)} = 4.629$, .004, perceived behavioral control ($F_{(3, 114)} = 12.207$, $p = .000$) and role-identity ($F_{(3, 114)} = 18.394$, $p = .000$). All other constructs including injunctive norm, prototype-favourability, moral norm, risk-denial and attitude-variability do not significantly differ in their means due to a certain frequency-level (for a summary, see *table 4.1 – 4.3*).

Subsequently, pairwise comparisons were used to specify these results, again using the Bonferroni post hoc criterion (alpha level = .05).

First, the results concerning the TPB-variables are presented in *table 4.1*.

For intention, the analysis showed that only the ex-consumers differed significantly from the heavy consumers. However, because this construct was about the intention to stop cannabis use, this information is completely redundant. More important is the insight that the three consumer-groups did not differ significantly in their intention to stop cannabis use. Means (and standard deviations) from occasional to heavy users were 3.80 (2.12), 3.20 (2.38) and 2.77, (1.41), respectively. All in all, it should be mentioned here that neither group showed a substantially high intention to stop or reduce their cannabis consumption.

With regard to the descriptive norm, results indicated that the circle of friends of ex-consumers (M = 2.35, SD = 0.78) contained significantly less friends that consume cannabis than it was the case for the three consumer-groups which themselves do not significantly differ from each other. Means (and standard deviations) from occasional to heavy users were 2.97 (0.85), 3.12 (0.88) and 3.48 (0.80), respectively. (Following the presented model in section 2, the descriptive norm is also part of the PWM and therefore the present results also hold for this other part of the model.)

For attitude, again, the ex-consumers (M = 3.87, SD = 0.68) had on average a significantly less positive attitude towards cannabis consumption than had the three consumer-groups. The attitude becomes not significantly more positive with a rising

frequency of use. In order, means for occasional, regular and heavy users were 4.31, 4.43 and 4.61 (SDs = 0.79, 0.78, 0.71).

Furthermore, results indicated that the perceived behavioral control was on average significantly lower among regular users (M = 4.06, SD = 1.46) and heavy users (M = 3.99, SD = 1.08) than among ex-consumers (M = 5.65, SD = 1.28) and occasional users (M = 5.32, SD = 1.33). There was no significant difference between regular and heavy users, and between ex-consumers and occasional users. It is noteworthy here that the means in the regular and heavy group showed that their members held no substantially low, but a relatively medium control-beliefs.

Table 4.1

MANOVA-results, means and standard deviations for TPB-constructs across frequency-levels (N=114)

	Frequency										
	Ex-consum.		Occasional		Regular		Heavy				
Construct	M	SD	M	SD	M	SD	M	SD	F (3, 114)	p	Post-hoc
Intention	4.77	2.34	3.80	2.12	3.20	2.38	2.77	1.41	4.720*	.004	E<O, E<R, E<H
Descriptive norm	2.35	0.78	2.97	0.85	3.12	0.88	3.48	0.80	8.719*	.000	E<O, E<R, E<H
Injunctive norm	4.33	1.35	4.19	1.03	4.01	1.00	3.87	1.20	0.853	.468	
Attitude	3.87	0.68	4.31	0.79	4.43	0.78	4.61	0.71	4.629*	.004	E<O, E<R, E<H
PBC	5.65	1.28	5.32	1.33	4.06	1.46	3.99	1.08	12.207*	.000	E>R, E>H, O>R, O>H

Note. E = Ex-consumers, O = Occasional users, R = Regular users, H = Heavy users

$p < 0.05$

Next, the results with regard to the constructs that the present study has added to the TPB (see figure 1) are presented in *table 4.2*. Pairwise comparisons for the only – but overall most strikingly - significant construct role-identity revealed that ex-consumers (M = 2.18, SD = 1.14), as might have been expected, identified on average significantly less with the role as a cannabis user than the three consumer-groups. Furthermore, occasional users (M = 3.38, SD = 1.42) and heavy users (M = 4.66, SD = 1.08) differ significantly in their scores on role-identity, with regular users lying in between (M = 3.88, SD = 1.33), not being significantly different from their surrounding levels of frequency of cannabis use.

It might be noteworthy here that the moral norm had a relatively high means across all levels of frequency. This indicated that cannabis consumption was not taken as a morally problematic issue, regardless of how frequently cannabis was used.

Table 4.2

MANOVA-results, means and standard deviations for additional constructs to the TPB across frequency-levels

	Frequency										
	ex-consum.		occasional		regular		heavy				
Construct	M	SD	M	SD	M	SD	M	SD	F (3,114)	p	Post-hoc
Moral norm	5.65	1.47	5.24	1.58	5.41	1.58	5.90	1.42	1.142	.335	
Attitude-variability	3.22	1.76	3.91	1.86	4.00	2.22	3.90	1.97	0.834	.478	
Risk-denial	3.26	1.20	3.55	1.15	3.41	1.03	3.73	0.85	1.007	.393	
Role-identity	2.18	1.14	3.38	1.42	3.88	1.33	4.66	1.08	18.394*	.000	E<O, E<R, E<H, O<H

Note. E = Ex-consumers, O = Occasional users, R = Regular users, H = Heavy users

*p < 0.05

Finally, results concerning the PWM-constructs are presented in *table 4.3*. For willingness, pairwise comparisons revealed on average a significant difference between ex-consumers (M = 3.30, SD = 1.92) and all other frequency-levels, which might also be not surprising (although also ex-consumers do not seem to be entirely sure about their constant abstinence). Furthermore, heavy users (M = 5.94, SD = 1.27) had a significantly higher willingness than occasional users (M = 4.77, SD = 1.56) to take a joint in an appropriate situation, with regular users lying in between (M = 5.48, SD = 0.99) but not differing significantly from them.

For prototype-similarity, results yielded surprisingly that ex-consumers (M = 3.91, SD = 0.85) on average rated themselves to resemble more strongly their own picture of the typical cannabis consumer than both regular users (M = 2.96, SD = 1.02) and heavy users (M = 3.03, SD = 0.92). Occasional users (M = 3.39, SD = 0.79) rate their prototype-similarity not significantly higher than regular and heavy users. Note the strange result, that contrary to as one could possibly have expected, prototype-similarity and role-identity, which both might be assumed to have a common theoretical core, differed in their direction of relation to the level of frequency. While the role-identity rather seemed to increase with rising frequency of use, prototype-similarity did not and is even highest for the ex-consumer group.

Table 4.3

MANOVA-results, means and standard deviations for PWM-constructs across frequency-levels

	Frequency										
	ex-consum.		occasional		regular		heavy				
Construct	M	SD	M	SD	M	SD	M	SD	F (3,114)	p	Post-hoc
Willingness	3.30	1.92	4.77	1.56	5.48	0.99	5.94	1.27	16.008*	.000	E<O, E<R, E<H, O<H
Prototype-favourability	3.79	0.96	4.10	0.85	4.31	1.12	4.23	0.77	1.497	.219	
Prototype-similarity	3.91	0.85	3.39	0.79	2.96	1.02	3.03	0.92	5.952*	.001	E>R, E>H
Descriptive norm	2.35	0.78	2.97	0.85	3.12	0.88	3.48	0.80	8.719*	.000	

Note. E = Ex-consumers, O = Occasional users, R = Regular users, H = Heavy users

*$p < 0.05$

4.7 Relation between stage-level and the prediction of intention and willingness

To answer the last research question, three correlation analyses were conducted separately for occasional, regular and heavy users to explore whether the proposed predictors are connected with intention and willingness in the first place. (Correlations between predictors themselves were not further analyzed.) Those predictors that correlate significantly with their target variables are retained for subsequent regression analyses. Below, the results are presented apart for each level of frequency under the respective subheadings.

Occasional users. The correlation analysis revealed that none of the constructs is significantly related with either intention or willingness (see *table 5.1*). This result superseded a regression analysis to explore prediction.

Table 5.1

Correlations between social-cognitive constructs for occasional users (N = 33)

Construct	INT	WIL	FAV	SIM	DES	INJ	ATT	PBC	MOR	VAR	RIS	ROL
Intension	1											
Willingness	-.28	1										
Prototype-favourability	.01	.06	1									
Prototype-similarity	-.06	-.07	-.43*	1								
Descriptive norm	.30	-.18	.29	-.03	1							
Injunctive norm	.12	.14	-.26	.09	-.38*	1						
Attitude	-.17	.17	.55**	-.50**	.18	-.53**	1					
PBC	-.18	-.11	.06	.15	-.07	-.04	-.01	1				
Moral norm	-.12	.19	.22	.13	.18	-.35*	.12	.26	1			
Attitude-variability	-.18	.24	-.04	.20	.08	-.13	-.05	-.32	-.17	1		
Risk-denial	-.24	.25	.30	-.46**	-.17	-.26	.63**	-.08	.05	-.07	1	
Role-identity	-.07	.19	.19	-.14	-.04	-.22	.34	-.64**	.02	.05	.26	1

*p < 0.05, **p < 0.01

Regular users. In contrast to the group of occasional users, among regular users several relevant constructs correlated significantly with reach other (see *table 5.2*). Results indicated that a higher attitude and higher perceived behavioral control both significantly correlated to a lower intention to stop or reduce cannabis use (for both r = -.43). Furthermore, the outcomes also showed a highly significant negative correlation between the constructs moral norm and risk-denial and the intention to stop or reduce cannabis use (r = -.69 and -.59, respectively). Finally, a higher attitude-variability correlated highly significant with a higher intention to stop or reduce the cannabis consumption (r = .55). Only between prototype-favourability and willingness a positive significant correlation was found (r = .47).

The constructs mentioned above were taken as predictors for regression analysis for the regular group, either with intention or willingness as dependent variable, and an alpha-level of .10 was used.

For intention as dependent variable, only moral norm emerged as a significant predictor (β = -.43, p = .052). Altogether, the tested predictors explain 58% of the variance in the dependent variable (R² = .580).

For willingness as dependent variable, prototype-favourability was significant as a predictor (β = .470, p = .018) and explained 22.1% in its variance (R² = .221).

Table 5.2

Correlations between social-cognitive constructs for regular users (N = 25)

Construct	INT	WIL	FAV	SIM	DES	INJ	ATT	PBC	MOR	VAR	RIS	ROL
Intension	1											
Willingness	-.06	1										
Prototype-valuability	-.26	.47*	1									
Prototype-similarity	.05	-.33	-.69**	1								
Descriptive norm	.13	.34	.33	-.55**	1							
Injunctive norm	.11	-.09	-.15	.46*	-.24	1						
Attitude	-.43*	.49*	.57**	-.41*	.33	-.29	1					
PBC	-.43*	-.25	.05	.20	-.42*	-.20	-.04	1				
Moral norm	-.68**	.24	.36	-.24	-.01	-.44*	.54**	.40	1			
Attitude-variability	.55**	.06	.10	-.13	.34	.19	-.40*	-.39	-.51**	1		
Risk-denial	-.59**	.28	.42*	-.19	-.03	-.06	.60**	.23	.51**	-.59**	1	
Role-identity	-.05	.39	.11	-.31	.32	-.01	.45*	-.57**	-.03	-.07	.24	1

*p < 0.05, **p < 0.01

Heavy users. For heavy users, only attitude significantly correlated with intention and no construct correlated with willingness (see *table 5.3*). Results indicated that a more positive attitude was linked with a lower intention to stop or reduce cannabis use (r = -.41). Regression analysis with this construct revealed that attitude was a significant predictor of this intention (β = -.413, p = .017). Overall, it explained 17.1% of the variance in intention (R² = .171).

Table 5.3

Correlations between social-cognitive constructs for heavy users (N = 33)

Construct	INT	WIL	FAV	SIM	DES	INJ	ATT	PBC	MOR	VAR	RIS	ROL
Intention	1											
Willingness	.14	1										
Prototype-valuability	-.15	-.09	1									
Prototype-similarity	-.21	.23	-.32	1								
Descriptive norm	.02	-.06	.22	-.41*	1							
Injunctive norm	-.11	.22	.07	.01	-.06	1						
Attitude	-.41*	.21	.31	.16	.24	-.11	1					
PBC	-.36	-.32	.23	.17	.01	.01	.15	1				
Moral norm	-.21	.01	.24	.19	.01	-.15	.59**	.34	1			
Attitude-variability	.17	.23	-.04	.09	.01	.09	-.25	-.15	-.20	1		
Risk-denial	-.07	.02	.31	-.26	.30	-.06	.32	-.02	.10	-.49**	1	
Role-identity	-.04	.41*	.26	.01	.23	.02	.48**	-.14	.27	.04	.22	1

*p < 0.05, **p < 0.01

5. Discussion

The main point of this study was to make inferences about what background variables and social-cognitive determinants might be distinguishable for a higher frequency of cannabis use in comparison with less frequent consumption, presuming a dose-response relation of cannabis use. A stage-model, inspired by Howard Becker, was used to approach this issue, using the frequency of cannabis use as indicative for stage-membership (ex-consumer, occasional-, regular- and heavy user). The outcomes are discussed in the order of the research questions proposed in paragraph 2.

Concerning the first research question, a clear, even linear relation between gender and stage-level was found. Preeminence of men increased with higher consumption-levels while women used cannabis less frequently and on a more occasional basis. This is in line with previous research (Peretti-Watel, 2003). Furthermore, much more women than men in this sample had already stopped their cannabis career that might allow the assumption that

women loose their interest in cannabis use earlier than men do. Of course, also other factors are imaginable. To explore this issue a comparative study focusing on gender would be interesting and could shed some light on the matter. Overall, this result confirms once more the established fact that men are more at risk for heavy use than women (e.g. Butters, 2002). However, a similar relation between gender and the intensity of cannabis use per smoking session could not be found. This shows that the particular dose of cannabis use might not depend on gender but is perhaps more personally motivated.

The age of first cannabis consumption also had a significant relation with the stage of cannabis use. Again, the relation was linear, even though not that strong as between gender and frequency. People that began their cannabis career before age 17 were more likely to be in a higher stage of cannabis use than those who began later. The same kind of relationship exists for first age of consumption and the intensity of use. Early beginners consumed higher doses per smoking session than late beginners. Again these results are in line previous research (Fergussen et al., 2003) and this permits the conclusion that beginning cannabis use early in life exposes to a greater risk to develop a high frequency and a higher intensity of consumption.

With regard to the second research question, the findings do not suggest a relationship between frequency and intensity of use, even if one could have expected that the intensity increases similar or even in parallel to the frequency of use. This is clearly not the case, suggesting that the intensity of use is not that kind of developmental issue as frequency of use is. However, one has to keep in mind that the frequency of use is here subjectively chosen as indicator for the stage in which the particular user is, and that the present interpretation of the results works from this perspective. Thus, if one had taken intensity of use as the decisive variable for stage-membership, then frequency would not have fitted into the picture. Because of the general lack of research about these apparently conflicting criteria it remains for now a question of preference which criterion to use for the stage classification (even though the present study provides some support for the useful application of frequency, see discussion concerning research question 3). Nevertheless, what at least can be concluded is that in this sample, frequency and intensity of use are not bound to each other and are not compatible within this career-approach. Prospective research in the context of a stage-approach should try to explore and integrate variables other than frequency, which could discriminate between distinctive stages to create a more multi-faceted model.

In respect of research question 3, the findings suggest that the level of frequency is clearly connected with the length of experience with cannabis use. Heavy users have on average almost 3 years more experience with cannabis use than occasional users. Thus, the presumption of the stage-approach that becoming a frequent user is a developmental issue

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that is shaped over time could be confirmed and demonstrated the general usefulness of a stage-approach conceptualized on frequency of use. However, the high standard deviations show that there could be substantial variations in use-experience within the distinctive stages. This phenomenon echoes Becker's statement that one can stay in one stage for a long time and does not necessarily proceed through all stages, while on the contrary some individuals may reach the highest stage in a relatively short time. Exploration of the factors that are decisive for the speed of transition through the stages could be an important issue for longitudinal future research.

A remarkable outcome concerning the third research question was that ex-consumers had significantly less experience than heavy users but did not differ significantly in length of experience from occasional and regular users. This could possibly suggest that most ex-consumers had stopped their career in the stage of occasional or regular use and not in the stage of heavy use. However, making those kind of statements is only a vague speculation. Given the different stage-levels as they were segmented in this study, one cannot make sure inferences about in which stage these people stopped using cannabis. That is because only one general ex-consumer group was defined but it was left unclear how it relates to the other stages. Future research should try to divide ex-consumers more specifically corresponding to their stage of use before quitting cannabis use. An orientation to solve this problem is offered by Kremers, Mudde and de Vries (2001) who made a similar consideration for a stage-theory in relation to smoking. These researchers developed a six-phase model of smoking initiation in adolescence wherein they differentiated not only "never smoker", "trier", "experimenter" and "regular smoker", but also two ex-smoker phases called "non-smoking decider" which could be reached forwards from the trier-stage and backwards from the experimenter-stage, and "quitter" which referred to people that have already been regular smokers. This sophisticated approach could be transferred to cannabis use and applied in prospective research, especially with the possibility in mind to identify the characteristics of ex-users in comparison with those who still use cannabis on the particular level on which the ex-users did before quitting. If carried out longitudinally this would enable useful insights into the quitting-process.

The fourth research question of the present study concerned the social-cognitive characteristics that were assumed to differ across the distinctive stages. In contrast to the expectations based on previous research on the career model, several characteristics were the about the same for all stages. The outcomes of Becker's and Patetti-Watel's studies that were cited in the second paragraph could not be replicated. The attitude towards cannabis use was not found to be more positive for higher frequencies of use than for lower frequencies of use (only the ex-consumers' attitude was less positive than for the still active users) and also the stability of attitude did not differ across the levels of frequency.

Furthermore, neither risk-denial was found to rise with the frequency of cannabis nor were there differences concerning the moral norm across the stages. The latter concept was rather found to be quite disconnected from the frequency of use because in for none of the groups cannabis seemed to be a very moral issue for them. Also the role of peers or other important social contacts (represented by the injunctive and descriptive norm) did not emerge as being more important for occasional users than for regular or heavy users. The role of peers might therefore be seen as a constantly important factor for cannabis consumption regardless of the frequency of use. However, one interesting aspect was found with regard to the descriptive norm: ex-consumers seem to have less cannabis users as friends than the still active cannabis users. This might suggest that ex-consumers do not move anymore in the same circles as those who still consume cannabis. The outcomes allow the interpretation that possibly complete circles of friends stop using cannabis at about the same time. Qualitative research could further explore this connection, in particular how quitting the cannabis career relates to major changes in life-style according to external circumstances (e.g. end of study, beginning a job, or marriage).

The new set of investigated constructs in the present study included on the one hand the TPB-variables intention to stop using cannabis, perceived behavioral control and role-identity as an additional variable, and on the other hand the PWM variables prototype-favourability, prototype-similarity and willingness.

Overall, the intention to stop using cannabis was neither very low nor very high and was not different for the three stages of active consumption.

Outcomes concerning the perceived behavioral control showed a more differentiated pattern. One remarkable finding was that occasional users showed similarly high control beliefs as ex-consumers. This might permit the assumption that the latter group does not feel in complete control about their cannabis use and that there might be a possibility to make an exception to abstinence when an appropriate facilitator is present. Furthermore, regular and heavy users perceived to have less control over their cannabis consumption than ex-consumers and occasional users. This finding indicates that cannabis use in a higher stage increases the probability for the users to accommodate to possible facilitators. In other words, this outcome points to the addictive potential of cannabis. Nevertheless, it should be noted that regular and heavy still believe to have a medium degree of control and one should be cautious not to interpret this outcome in the way that users in the two highest stages would comply with any given facilitator. However, the findings make clear that heavy cannabis users, who want to quit or reduce their cannabis consumption, could profit from an intervention that strengthens their control beliefs, especially in the face of facilitating situations.

Findings concerning the role-identity showed that heavy users identify most with being a cannabis user and differ significantly from occasional users. The finding suggests that heavy users have integrated cannabis use into their self-concept to a higher degree than those who only use the drug on some occasions. This confirms the theory of Fekadu and Kraft (2001) mentioned in section 2. Therefore, it seems to be a possibility for interventions designed to help heavy cannabis users to push back this internalized part of the self and to emphasize or activate other parts that have the potential for compensation. This would of course require a highly individual approach.

The willingness to use cannabis in a characteristic situation was, as expected, higher for all stages of active consumption than for the ex-consumers although the willingness of latter group had no extremely low scores. Again, similar to the outcomes concerning PBC, this shows an uncertainty of the ex-consumers with regard to complete abstinence. Moreover, heavy users had a stronger willingness to use cannabis in a characteristic situation than occasional users, which also corresponds to findings with regard to control beliefs. This suggests that interventions that are made to help avoiding cannabis use should therefore work on the basis of concrete prospective scenarios and establish strategies to resist situational cues.

Finally, the observed differences in respect of prototype-similarity are quite surprising: ex-consumers rate themselves more similar to the typical cannabis user than regular and heavy users do. This seems to be especially discrepant with the findings that were made concerning role-identity because one might expect somebody who identifies with the role as a cannabis user should also rate himself being similar to the typical cannabis user than somebody who has stopped using cannabis. However, this seems not to be the case. In consideration of the fact that both groups rated the typical cannabis user nearly equally positive or rather negative (see prototype-favourability) the reason for this strange outcome cannot lie in their different evaluations of their prototype image. Further research, maybe rather of qualitative nature, is needed to provide more clarity about this issue.

Research question 5 attempted to identify predictors of intention to stop using cannabis and the willingness to use cannabis for the particular stages, only focusing on the active users. None of the proposed determinants predicted intention or willingness for the occasional users, while for the regular users moral norm emerged as a negative predictor of the intention to stop cannabis use and prototype-favourability as a predictor of willingness. At least for the regular users, these connections correspond to the directions as they were expected according the PWM and the TPB, which can be seen as a partly support of the interrelations that are proposed in both the social-reaction pathway and the reasoned pathway. An intervention program for regular consumers could use these insights to promote the intention to stop cannabis use and to reduce the situational willingness to use cannabis.

However, one should be careful to emphasize the moral component of cannabis too much because, as we have seen in relation to the fourth research question, cannabis use is generally not perceived as a moral issue. This approach could therefore be counterproductive. The same caution is advised when an intervention that is set out to devalue the typical cannabis user. With regard to the high-frequency users it was found that a more positive attitude towards cannabis use predicts a lower intention to stop using it. For an intervention to promote this intention this could mean that intensive persuasive communication techniques should be used to alter this attitude. In the context of a career-approach as it was used in the present study, the findings concerning this last research (and also the fourth) question suggest that interventions that try to help cannabis consumers to reduce or to stop their use should take into account how frequently they use the substance.

Overall, the findings that were reported above should be viewed in the light of four general methodological shortcomings. First, a sample size of 114 participants was quite small and limits the explanatory power of the present study. This problem was still intensified by forming subgroups. Thus, especially for a stage-approach, a greater sample is a necessity for prospective studies. Second, the study was cross-sectional in nature, which means that only static differences between the different stages could be examined. However, this tells only little about the development of cannabis use prospectively because it cannot separate out the antecedents from the consequences of behavior. Only studies over time can examine transitions across stages directly, which would allow concrete inferences about the decisive factors that bring about these transitions. Thus, longitudinal research is a second necessity for future research. Third, the definitions and the cut-off points of the stages were more or less subjectively chosen and therefore the findings are not generalizable without difficulty. However, it reveals some interesting tendencies can be taken as an orientation for similar prospective studies using a stage-approach. Fourth, the study does not control extensively for confounding factors like individual differences or different demographic backgrounds, which could also be a limit to validity. This problem should also be addressed in forthcoming research.

Despite of its shortcomings, the present study provides some evidence for the usefulness of a career-approach to cannabis use. Stage-models are used for a long time in connection with the progression of smoking behavior and are quite far developed. This study shows that it would be a promising endeavor to work out approaches for cannabis use in a comparable manner, at least for the target group of university students and perhaps even more for adolescents. Many of the existing stage-models concerning smoking behavior (as for example the TTM), are in particular directed to smoking-cessation which, when applied on a similar basis, could possibly offer still another avenue to influence cannabis use. Research in this area is thus highly recommended. Altogether, in terms of a harm-reduction approach to

intervention, a well-validated stage-model could help to design tailored programs for cannabis users that are at risk to develop a harmful level of consumption or for those, who want to stop with using cannabis on a potentially harmful level. In the long run, such steps could prevent a variety of health problems.

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7. Appendix

Questionnaire on cannabis consumption

1.

In the course of my bachelor thesis, I am doing research on the topic "cannabis consumption among students".

The questionnaire below is concerned with all kinds of common use of cannabis-products such as weed or hash (in Dutch: "wiet" or "hasj") by smoking it in a joint, a water pipe, bong or chillum, a vaporizer, or by taking it orally, for example as a spacecake or a marihuanatea.

Please answer all questions honestly. Your answers will be treated anonymously.

The questionnaire demands about 10 minutes of your time.
Thanks in advance for your collaboration!

2.

* 1. Sex:

◯ male

◯ female

* 2. Age:

[   ]

3.

* 1. At what age did you consume cannabis for the first time?

[   ]

* 2. How long have you been using cannabis?

years [   ]

months [   ]

* 3. During the past 30 days, how often did you consume cannabis (how often = how many "smoking-sessions") ?

[   ]

* 4. When you consume cannabis, how much cannabis do you use on a typical "smoking-session"?

joints/water pipes/etc.: [   ]

gram (approximately) [   ]

4.

Questionnaire on cannabis consumption

* 1. Please rate the following statements.

	very unlikely						very likely
I intend to stop using cannabis in the forthcoming month	○	○	○	○	○	○	○
I want to stop using cannabis in the forthcoming month	○	○	○	○	○	○	○
I expect to stop using cannabis in the forthcoming month	○	○	○	○	○	○	○
I intend to reduce my cannabis use in the forthcoming month	○	○	○	○	○	○	○

5.

* 1. Imagine: You are at a party with some friends and one of them offers you cannabis. What would you do in this situation?

	very unlikely						very likely
I would take it	○	○	○	○	○	○	○
I would say:" no, thanks" and refuse it	○	○	○	○	○	○	○
I would leave the situation (e.g. go to other friends who do not consume cannabis or to the toilet)	○	○	○	○	○	○	○

6.

Questionnaire on cannabis consumption

＊1. Imagine a typical person at your age who uses cannabis. How would you describe this person using the following characteristics?

	very unlikely						very likely
cool	○	○	○	○	○	○	○
sexy	○	○	○	○	○	○	○
popular	○	○	○	○	○	○	○
smart	○	○	○	○	○	○	○
self-conscious	○	○	○	○	○	○	○
independent	○	○	○	○	○	○	○
sympathic	○	○	○	○	○	○	○
unattractive	○	○	○	○	○	○	○
immature	○	○	○	○	○	○	○
confused	○	○	○	○	○	○	○
self-centered	○	○	○	○	○	○	○
dull	○	○	○	○	○	○	○

＊2. Do you resemble this person?

○ greatly

○ yes

○ a bit

○ no

○ not at all

7.

Questionnaire on cannabis consumption

* 1. Rate the following opposite adjective-pairs from -3 to +3 (with 0 as neutral midpoint).

For me, using cannabis is...

	-3	-2	-1	0	+1	+2	+3
unenjoyable - enjoyable	◯	◯	◯	◯	◯	◯	◯
wrong - right	◯	◯	◯	◯	◯	◯	◯
foolish - wise	◯	◯	◯	◯	◯	◯	◯
uncool - cool	◯	◯	◯	◯	◯	◯	◯
abnormal - normal	◯	◯	◯	◯	◯	◯	◯
harmful - beneficial	◯	◯	◯	◯	◯	◯	◯
bad - good	◯	◯	◯	◯	◯	◯	◯
boring - exciting	◯	◯	◯	◯	◯	◯	◯

* 2. My attitude towards using cannabis varies from time to time

◯ 1 strongly agree   ◯ 2   ◯ 3   ◯ 4   ◯ 5   ◯ 6   ◯ 7 strongly disagree

8.

* 1. How many of your friends (that you see regularly) consume cannabis?

◯ all of them

◯ most of them

◯ half my friends

◯ less then half

◯ none

Questionnaire on cannabis consumption

* 2. Please rate the following statements.

	strongly agree						strongly disagree
My brothers/sisters think it's okay for me to consume cannabis	○	○	○	○	○	○	○
My friends think it's okay for me to consume cannabis	○	○	○	○	○	○	○
My parents think it's okay for me to consume cannabis	○	○	○	○	○	○	○
My fellow students/colleagues think it's okay for me to consume cannabis	○	○	○	○	○	○	○

* 3. Please rate the following statements.

	strongly agree						strongly disagree
It is morally wrong for me to consume cannabis	○	○	○	○	○	○	○
I feel guilty when I consume cannabis	○	○	○	○	○	○	○
Consuming cannabis goes against my moral principles	○	○	○	○	○	○	○

9.

* 1. Please rate the following statements.

	strongly agree						strongly disagree
I feel in complete control whether I consume cannabis or not	○	○	○	○	○	○	○
It is hard for me not to consume cannabis when I see my friends using it	○	○	○	○	○	○	○
It is hard for me not to consume cannabis when someone offers me a joint	○	○	○	○	○	○	○
It is hard for me not to consume cannabis when I feel bad	○	○	○	○	○	○	○
It is hard for me not to consume cannabis when I'm at a party	○	○	○	○	○	○	○

10.

Questionnaire on cannabis consumption

* 1. Please rate the following statements.

	strongly agree						strongly disagree
Cannabis consumption does not involve health risks	○	○	○	○	○	○	○
Cannabis use diminishes mental abilities	○	○	○	○	○	○	○
Cannabis consumption makes one lose self-control	○	○	○	○	○	○	○
Cannabis does not disturb the mental equilibrium of the consumer	○	○	○	○	○	○	○
Consuming cannabis destroys friendly relationships	○	○	○	○	○	○	○
Cannabis causes addiction	○	○	○	○	○	○	○

11.

* 1. Please rate the following statements.

	strongly agree						strongly disagree
Using cannabis is an important part of who I am	○	○	○	○	○	○	○
I am not the type of person who uses cannabis	○	○	○	○	○	○	○
I would feel a loss if I were forced to give up my cannabis use	○	○	○	○	○	○	○
For me, being a cannabis user means more than just consuming cannabis	○	○	○	○	○	○	○