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# The relationship between subjective experiences during first use of tobacco and cannabis and effect of the substance experienced first

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## ABSTRACT

**Introduction.** In the present study, we examined the positive and negative subjective feelings associated with initial tobacco and cannabis use, as well as the role of these experiences in regular use. In addition, we investigated the effect of the first substance experienced on initial subjective experiences and later regular use.

**Methods.** Baseline data from a representative sample of young Swiss men was obtained from an ongoing Cohort Study on Substance Use Risk Factors (C-SURF), which includes 2,321 lifetime tobacco and cannabis users. We assessed the age of first tobacco and cannabis use along with the subjective experiences associated with initial use. In addition, subjective experiences related to regular use of both substances were analyzed.

**Results.** The initial subjective experiences were divided into positive and negative for each substance, and we found that the feelings associated with first use of tobacco and cannabis were similar. Moreover, the participants who used cannabis before tobacco reported less negative experiences associated with first tobacco use, whereas the participants who initially used tobacco reported more negative experiences related to first cannabis use. Also, we identified that regular use was encouraged by positive experiences, and that negative experiences were more adverse for regular use of cannabis compared to tobacco.

**Conclusions.** Taken together, these results indicate that similar subjective experiences were associated with the first use of tobacco and cannabis. Also, the use of cannabis before tobacco, which occurred in only a minority of users, had the potential to enhance the effects of initial tobacco use.

**Keywords:** Age of first use; Cannabis; Regular use; Initial subjective experiences; Tobacco.

## INTRODUCTION

Drug use and abuse is a major health concern. Therefore, it is essential to understand the factors that contribute to escalation and maintenance of drug use in order to improve prevention (Holdstock, King, & de Wit, 2000). It is known that an individual's subjective response to drug use can predict later use (Scherrer et al., 2009). In particular, initial subjective experiences strongly contribute to whether a person will continue to use drugs (Bailey, Flewelling, & Rachal, 1992; de Wit & Phillips, 2012; Friedman, Lichtenstein, & Biglan, 1985). The initial subjective experiences are composed of the feelings and impressions that an individual has when using a particular drug for the first time. These experiences not only reflect the pharmacological effect of a drug (Pomerleau, Marks, Pomerleau, & Snedecor, 2004; Schuckit, Smith, Anderson, & Brown, 2004; Zeiger et al., 2012), but are also socially influenced (Becker, 1953), varying among individuals in magnitude, quality, affect valence, and time course (de Wit & Phillips, 2012).

Cannabis is the most common illicit drug used in many countries (Degenhardt et al., 2008), with 90% of cannabis users also identifying themselves as cigarette smokers (Agrawal, Budney, & Lynskey, 2012). The positive and negative initial experiences associated with these two substances are known to influence continued use and dependence (Bewley, Bland, & Harris, 1974; DiFranza et al., 2004; Friedman et al., 1985; Hirschman, Leventhal, & Glynn, 1984; Kozlowski & Harford, 1976; O'Connor et al., 2005; Pomerleau et al., 2004; Pomerleau, Pomerleau, Namenek, & Marks, 1999; Pomerleau, Pomerleau, & Namenek, 1998; Rodriguez & Audrain-McGovern, 2004; Urbán, 2010). However, the relationship between the subjective experiences associated with initial tobacco and cannabis use has not been explored. Also, it is not known whether the experiences linked to the use of one of these two substances

before the other (i. e. used tobacco before cannabis or cannabis before tobacco) can affect the feelings associated with the first use of the other. In the present study, we have investigated these two topics in order to understand the relationship between initial subjective experiences (positive *vs.* negative) and regular tobacco and cannabis use.

**Initial subjective experiences related to tobacco and cannabis**

The initial experiences associated with tobacco smoking are often described as unpleasant (de Wit & Phillips, 2012; Eissenberg & Balster, 2000) due to feelings of dizziness or nausea (Chen et al., 2003; DiFranza et al., 2004). In contrast, initial subjective experiences related to cannabis use are more positive than negative (Grant et al., 2005; Lyons et al., 1997). Although a few individuals reported negative experiences during initial cannabis use (Davidson, Finch, & Schenk, 1993), first impressions were most commonly associated with euphoric effects (Green, Kavanagh, & Young, 2003; Hall, Solowij, & Lemon, 1994; Solowij, 1998).

**Effect of prior susbtance use on initial experiences related to another substance**

Studies investigating the impact of initial drug-related experiences on future drug use have indicated that the more a person enjoys their first drug experience, the greater the likelihood they will use other drugs (Pomerleau et al., 2004; Rhea, Gross, Haberstick, & Corley, 2006). Moreover, an individual's experiences are similar from different drugs (Haberstick et al., 2011; Zeiger et al., 2012). The same neural systems are involved and affected by different psychoactive substances, so the feelings experienced in relation to one drug may be indicative of the experiences that will be encountered with another drug (Haberstick et al., 2011). That is to say, there may be

an underlying sensitivity involved in drug use (Zeiger et al., 2012). However, initial subjective experiences have mostly been studied with a substance-specific focus (Haberstick et al., 2011).

For example, Zeiger et al. (2012) showed a significant correlation between positive experiences related to tobacco and cannabis ($r = .25$, $p < .05$), as well as negative experiences with tobacco and cannabis ($r = .22$, $p < .05$). However, an association between positive and negative initial experiences was also demonstrated ($r = .19$, $p < .05$ for positive experience of tobacco and negative experience of cannabis, $r = .20$; $p < .05$ for negative experience of tobacco and positive experience of cannabis, Zeiger et al., 2012). Thus, some users who experienced positive effects with tobacco or cannabis also experienced negative effects associated with the other drug.

The extent to which previous substance use affects initial experiences with other drugs remains largely unexplored (Agrawal et al., 2012). Cigarette smoking can modify early experiences associated with cannabis use. In fact, cigarette smokers reported more positive initial experiences with cannabis than non-smokers, but also more negative initial experiences, such as dizziness (Agrawal et al., 2012). No study has investigated the effect of prior cannabis use on early experiences of tobacco. As tobacco and cannabis share a common route of administration (mostly inhalation), and are often used in conjunction (Agrawal & Lynskey, 2009), investigation into the relationship between initial subjective experiences of these drugs may provide useful information. Indeed, concurrent tobacco and cannabis use can be explained by common genetic and environmental factors (Agrawal & Lynskey, 2009), which might also suggest shared patterns of initial subjective experiences.

The objectives of this study were: (i) to explore the relationship between initial subjective experiences related to tobacco and cannabis use, with a special focus on positive and negative initial experiences; and (ii) to explore using tobacco before cannabis and vice versa might modify the feelings associated with initial use of the opposite substance. The link between initial subjective experiences related to one substance and prolonged use of both substances was also investigated, as understanding the factors that contribute to regular use is essential for effective prevention. Regular use was chosen instead of continued use to avoid capturing recreational users.

## METHODS

### Participants

The data used in this study were obtained from the Cohort Study on Substance Use Risk Factors (C-SURF), a longitudinal study designed to assess substance use patterns and their related consequences in young Swiss men. Enrollment took place between August 23, 2010 and November 15, 2011 at three out of six army recruitment centers located in French-speaking Lausanne and German-speaking Windisch and Mels. These three centers cover 21 of 26 cantons in Switzerland, including all French-speaking cantons. In Switzerland, army recruitment is mandatory, so all young men around 20 years of age were eligible for inclusion.

Of the 13,245 conscripts informed about the study, 7,563 gave written consent to participate, and 5,990 completed the baseline questionnaire. The current study was designed to focus on the 2,433 lifetime users of both tobacco and cannabis (40.7% of the total sample). That is to say, only tobacco users and only cannabis users were not included in the sample. Missing values were deleted listwise, resulting in a total of

2,321 final participants (95.4% of the tobacco and cannabis users). There were no demographic differences observed for the excluded samples (mean age: 20.01 *vs.* 20.09 for tobacco and cannabis users; German-speaking: 55.4% *vs.* 54.3% for tobacco and cannabis users).

**Measures**

*Initial experience with tobacco*

The initial subjective experience associated with tobacco use was assessed using an adapted version of the Early Smoking Experience (ESE) questionnaire (O. F. Pomerleau et al., 1998; Rodriguez & Audrain-McGovern, 2004; Urbán, 2010). The ESE measures 10 items, which can be described as either positive (pleasant experience, relaxation) or negative (felt not well, felt dizzy and lightheaded, nausea, headache, stomach upset, heart pounding, coughed, irritations in the eyes, bad taste). Participants answered "yes" or "no" for each item.

*Initial experience with cannabis*

The initial subjective experience related to cannabis was measured using eight previously-described symptoms (Fergusson, Horwood, Lynskey, & Madden, 2003), which can be perceived as either positive (got high, felt happy, felt relaxed, did silly things, laughed a lot) or negative (felt ill or dizzy, felt frightened, passed out). Each question was assessed with a "yes" or "no" answer.

*Use of one substance before the other*

We determined the age of first tobacco and cannabis use for each participant. Two variables were then created: (i) used tobacco before cannabis (coded 1 when tobacco

was used before cannabis and coded 0 when either cannabis was used earlier than tobacco or when first use of tobacco and cannabis occurred simultaneously); and (ii) used cannabis before tobacco (coded 1 when cannabis was used before tobacco and 0 when either tobacco was used earlier than cannabis or when first use of cannabis and tobacco occurred simultaneously).

*Regular use of tobacco and cannabis*

Participants were asked if they were daily smokers and weekly cannabis users during the past 12 months. Two variables were created based on their responses: (i) the regular use of tobacco (coded 1 for regular users during the past 12 months and coded 0 for non-regular users, who did not use tobacco daily during the past 12 months); and (ii) regular use of cannabis (coded 1 for those using cannabis weekly during the past 12 months and coded 0 for non-regular users, who did not use cannabis weekly during the past 12 months).

**Statistical analyses**

Two types of analysis were conducted in order to examine the differences between the initial positive and negative experiences associated with tobacco and cannabis use. To assess the factor structure of the initial subjective experiences, two exploratory factor analyses (EFA) for ordinal data with weighted least squares means and variance adjusted (WLSMV) estimation (Muthén & Muthén, 2010) were performed separately for tobacco and cannabis. Factors with eigenvalues >1 were selected. To investigate the relationship between the initial subjective experiences related to tobacco and cannabis use, a structural equation model (SEM) using the EFA-identified factors was performed.

Two additional SEMs were separately conducted for cannabis and tobacco experiences to determine the extent to which use of tobacco before cannabis (and vice versa) predicted initial subjective experiences associated with the opposite substance. Once again, these models used the EFA-identified factors. Use of tobacco before cannabis was considered to be a predictor for factors related to early cannabis experiences, whereas use of cannabis before tobacco was used as a predictor for the factors related to early tobacco experiences. To investigate the relationship between regular use and early experiences, initial subjective experiences associated with tobacco and cannabis were used as predictors of regular use of tobacco and cannabis. The age and language (French- or German-speaking) of participants were controlled for while conducting the SEMs. The analyses were performed using Mplus 6.2 (Muthén & Muthén, 2010).

# RESULTS

### Preliminary analysis

The mean age of the participants was 20.09 ± 1.26, and their characteristics are shown in Table 1. The most common experiences associated with initial tobacco use were both positive and negative (felt irritation and bad taste: 49.7%; coughed: 49.4%; felt dizzy: 49.4%; liked the experience: 47.3%; felt relaxed: 46.8%; and felt not very well: 41.6%). Other symptoms were experienced less frequently (headache: 23.3%; heart pounding: 17.2; nausea: 12.3%; stomach upset: 6.4%). In contrast, initial experiences related to cannabis were more often pleasant than negative. In fact, the participants felt high (67.1%), relaxed (72.1%), happy (64.0%), laughed a lot (74.1%), and reported few negative experiences (passed out: 2.6%; felt frightened: 11.1%; felt ill or dizzy: 15.1%).

Most participants used tobacco first (60.5%); however, a minority started with cannabis before tobacco (13.6%). A total of 41.8% of the participants were regular tobacco users, and 22.4% regular cannabis users during the past 12 months. Mean ages of onset were 14.2 ± 2.5 for tobacco use and 15.7 ± 1.9 for cannabis use.

Insert Table 1 about here

**Positive and negative initial experiences**

Factor analyses allowed us to designate positive and negative items related to tobacco and cannabis use (Table 2). For tobacco, the first factor explained 37.86% of the variance and comprised items that could be seen as negative symptoms or feelings. For this factor, the items showing the highest values were those clearly related to negative experiences, such as “upset stomach” (0.793) and “felt nauseous” (0.775). Items related to irritations had lower values, including “coughed” (0.485) and “irritated eyes/bad taste” (0.471). Overall, this first factor was labeled as “negative experiences”. The second factor (17.27% of the variance) was made up of two positive experiences, which were “liked the experience” (0.776) and “felt relaxed” (0.820). This second factor was labeled as “positive experiences”. Although some items, such as “dizziness” or “heart pounding”, were more strongly related with negative experiences, they also showed values > 0.2 on the positive experience factor.

For cannabis, the first factor (40.64% of the variance) dealt with positive items, including “felt high” (0.789), “felt relaxed” (0.661), “laughed a lot” (0.849), “felt happy” (0.784), and “did crazy things” (0.648). In contrast, the second factor (30.93% of the variance) aggregated negative items, such as “passed out” (0.704), “felt frightened” (0.735), and “felt ill or dizzy” (0.813). These factors were labeled as

"positive experiences" and "negative experiences", respectively. In both models, positive and negative factors were negatively correlated (tobacco: $r$ = -.251; cannabis: $r$ = -.137).

Insert Table 2 about here

SEM-based correlations indicated an association between the initial subjective experiences related to tobacco and cannabis use. Overall, the "positive experiences" factor for first tobacco use correlated positively with the "positive experiences" factor for initial cannabis use ($r$ = .197, $p$ < .001, $R^2$ = 3.9%). Similarly the two "negative experience" factors correlated positively ($r$ = .437, $p$ < .001, $R^2$ = 19.1%), whereas positive experiences of one substance showed lower correlations with negative experiences of the other (positive experiences for tobacco and negative experiences for cannabis: $r$ = –.005, $p$ = .913; negative experiences for tobacco and positive experiences for cannabis: $r$ = .092, $p$ = .005, $R^2$ = 0.9%).

**Effects of use of first substance on early experiences with the other**

The effect of use of either tobacco or cannabis on early experiences associated with the other substance was tested via SEMs, using the positive and negative factors identified previously and including continued use in the models. These SEM-based results are presented in Fig. 1 for initial subjective experiences with tobacco and Fig. 2 for initial subjective experiences with cannabis.

We found that the use of cannabis before tobacco affected the initial negative experiences of tobacco (see Fig. 1). When participants used cannabis before tobacco, they reported less negative experiences upon tobacco use ($b$ = -0.268, $p$ < .001). In

contrast, use of cannabis before tobacco did not significantly increase the level of positive experiences associated with the first use of tobacco ($b$ = 0.022, $p$ = .770). We also observed that the use of tobacco before cannabis had an effect on an individual's initial experiences with cannabis (see Fig. 2). In fact, participants who had used tobacco before cannabis felt more negative experiences when using cannabis for the first time ($b$ = 0.169, $p$ = .015). However, there was no significant effect on positive experiences ($b$ = -0.033, $p$ = .524).

In addition, we found that the regular use of a substance was related to the feelings experienced at first use. The more the participants felt positive experiences when using tobacco for the first time, the more likely they were to be regular tobacco users ($b$ = 0.224, $p$ < .001; see Fig. 1). In contrast, negative experiences at first tobacco use did not predict a later regular use ($b$ = .023, $p$ = .484). Initial experiences with cannabis showed the same relationship with regular use of tobacco. The more participants felt positive experiences at first cannabis use, the more likely they were to be regular tobacco users ($b$ = 0.290, $p$ < .001; see Fig. 2). In contrast, negative experiences at first cannabis use did not predict a later regular use of tobacco ($b$ = .062, $p$ = .135). Similarly, regular cannabis use was positively associated with positive experiences at first cannabis use, but negatively associated with negative experiences at first cannabis use (positive experiences: $b$ = 0.395, $p$ < .001; negative experiences: $b$ = -0.203, $p$ < .001; see Fig. 2). Initial experiences with tobacco did not predict continued use of cannabis (positive experiences: $b$ = -0.040, $p$ = .265; negative experiences: $b$ = 0.052, $p$ = .143; see Fig. 1).

Insert Fig. 1 & 2 about here

## DISCUSSION

In the present study, we examined the relationship between positive and negative subjective experiences associated with initial tobacco and cannabis use, specifically focusing on the role playing by these experiences in regular use of both substances and the extent to which the initial use of one substance (tobacco or cannabis) modified early experiences related to the other substance.

Using factor analysis, we found different results related to tobacco and cannabis. The initial subjective experiences of cannabis were clearly divided into positive and negative factors, as previous studies have already shown (Grant et al., 2005; Lyons et al., 1997), with both factors explaining 71.57% of the variance. The first factor was related to positive initial experiences, which was in accordance with the fact that most individuals in the cohort reported positive subjective experiences associated with their first use of cannabis (Davidson et al., 1993).

The results related to initial subjective experiences with tobacco were less clear. In the case of tobacco, positive and negative factors were also identified, with the first factor related to negative experiences. This was consistent with the finding that unpleasant experiences were predominant for first time tobacco users (de Wit & Phillips, 2012) as well as having the greater number of negative items in the ESE questionnaire. However, these two factors together could only explain half of the variability of the initial subjective experiences related to tobacco use (55.13%). Indeed, values related to irritation (cough, eye irritation, and bad taste) were lower than others on the negative factor, and some items of the “negative experiences” also had values on the positive factor (e.g., heart pounding or dizziness). Therefore, even if

two factors were identified by EFA, further investigations may be needed to evaluate relationships between different initial subjective experiences of tobacco (especially those related to irritation, which did not seemed highly correlated with the negative experiences related to dizziness).

Results from our SEM-based analysis of the subjective experiences associated with initial tobacco and cannabis use were in accordance with previous studies. Positive initial subjective experiences with tobacco were positively and significantly correlated with positive initial subjective experiences with cannabis ($R^2$ = 3.9%). In contrast, negative initial subjective experiences related to tobacco were positively and significantly correlated with negative initial subjective experiences with cannabis ($R^2$ = 19.1%). That is to say, the initial subjective feelings experienced for one substance were similar to those experienced for the other (Haberstick et al., 2011; Zeiger et al., 2012), and this effect was more obvious for negative experiences compared to positive experiences. However, there was also a positive and significant correlation between positive experiences for cannabis and negative feelings related to initial tobacco use. This result is in line with the finding of a report by Zeiger et al. (Zeiger et al., 2012), which described positive correlations between negative initial subjective experiences related to one drug and positive experiences for the other. However, the effect size was very low ($R^2$ = 0.9%), and the correlation between positive experiences for tobacco and negative ones for cannabis was not significant.

Investigation into the effects of first use of one substance (cannabis or tobacco) on the early experiences of the other substance indicated that using cannabis first had a positive effect on initial experiences with tobacco, while using tobacco first had a

negative effect on first experiences with cannabis. In regard to cannabis, Becker (Becker, 1953) explained that users may have had to learn to identify and enjoy the effects of cannabis because they did not feel them at first use, and our findings suggest that this applies to subsequent tobacco use. Although Becker described these feelings as socially learned, one might wonder whether initial use of a substance enhances the effect of another. Our study indicated that this might be the case for early tobacco-related experiences when cannabis was used before. Indeed, the participants who started smoking cigarettes after using cannabis reported less negative experiences than the participants who started smoking cigarettes before using cannabis. As negative experiences are generally described for initial tobacco use (Kozlowski & Harford, 1976; Pomerleau et al., 1998; Ríos-Bedoya, Pomerleau, Neuman, & Pomerleau, 2009; Rodriguez & Audrain-McGovern, 2004; Urbán, 2010), the use of cannabis before tobacco may facilitate later tobacco use, ultimately resulting in regular use. Another explanation could be that cannabis users often mixed cannabis with tobacco, so they became accustomed to the negative effects of tobacco. The use of cannabis before tobacco had no effect on initial positive experiences with tobacco, which may be explained by the fact that the "positive effects" of cannabis outweigh those of later tobacco use at first initiation (i.e., cannabis users are already used to positive effects of one drug, namely cannabis).

On the other hand, the use of tobacco before cannabis had a negative effect on the initial experiences associated with cannabis, which was also reported in a previous study on this topic (Agrawal et al., 2012). However, this finding is not in line with the hypothesis of an underlying sensitivity to drug use (Zeiger et al., 2012). Indeed, the use of tobacco before cannabis did not enhance the experiences felt at first cannabis

use, with individuals describing more negative experiences. This might be due to the fact that these participants were accustomed to smoking and inhaled more smoke than those who started with cannabis first. This result is interesting because tobacco use often precedes experimentation with cannabis (Degenhardt et al., 2008), with many users affected by this pattern (60.5% of tobacco and cannabis users started with tobacco). The use of tobacco before cannabis had no effect on the positive experiences felt upon first use of cannabis.

Finally, we observed that regular use was related to the initial subjective experiences. Positive experiences related to first tobacco or cannabis use encouraged regular use of tobacco and cannabis, respectively. Moreover, negative initial experiences seemed to be adverse only for regular use of cannabis. Negative experiences related to the first use of cannabis had a negative effect on regular use of cannabis, whereas negative experiences during first tobacco use had a positive effect on regular use of tobacco. This result verifies the findings of previous studies (DiFranza et al., 2004; Hirschman et al., 1984; Pomerleau, Collins, Shiffman, & Pomerleau, 1993; Shiffman, 1989). Tobacco users seemed less discouraged by initial negative feelings at first use. One explanation may be found in the sensitivity model (Pomerleau, Collins, Shiffman, & Pomerleau, 1993). This model suggested that smokers with high innate sensitivity to nicotine experiment two main symptoms: dizziness and relaxation (DiFranza et al., 2004). They are more likely to progress to regular smoking (DiFranza et al., 2004; Hirschman et al., 1984; Pomerleau, Collins, Shiffman, & Pomerleau, 1993; Shiffman, 1989). So, from this perspective, negative initial experiences may be associated to later regular use. Another explanation could be that negative experiences at first tobacco use are less unpleasant than negative experiences at first cannabis use (e.g.

« coughed » or heart pounding » seem less unpleasant than « passed out » or « felt frightened »).

This study had several limitations. An important one for this study was related to the memory of first use, which may have altered with time. Even if the users were young enough to recollect their memories, continued use may have modified these memories of their first impressions. For example, current smokers remembered their first experience of tobacco more positively than former smokers (DiFranza et al., 2004; Pomerleau et al., 1999; Pomerleau et al., 1998). Nevertheless, the inclusion of age as a covariate did not affect the results. Another limitation is that the first use itself varies among individuals. For example, those experimenting with smoking may not have inhaled their first cigarette and therefore were not exposed to nicotine (Friedman et al., 1985). The same problem may occur with cannabis users who do not know how to smoke cannabis (Becker, 1953). Therefore, the dose of nicotine (DiFranza et al., 2004) or Δ9-tetrahydrocannabinol (Agrawal et al., 2012) may vary among users. A third limitation relates to the nature of our sample, which was exclusively composed of men. Thus, a study regarding the subjective experiences of women is needed in order to establish whether these findings will be consistent among men and women. Finally, a last shortcoming is related to the co-use of tobacco and cannabis. Cannabis users often mixed their cannabis with tobacco, and further research is needed to investigate and control the effect of such co-use.

To conclude, this study highlighted three main points. First, it replicated previous findings dealing with initial subjective experiences with tobacco and cannabis, showing that feelings associated with first use of these substances can be divided into

positive and negative experiences which are correlated between substances. In other words, this study confirmed the existence of shared patterns of initial subjective experiences from one substance to another. Someone who experienced negative feelings related to use of a substance is more likely to experience negative experiences while using another and vice versa (Haberstick et al., 2011; Zeiger et al., 2012).

Second, previous studies showed that initial experiences of tobacco and cannabis influenced continued use and dependence on these substances (Bewley, Bland, & Harris, 1974; DiFranza et al., 2004; Friedman et al., 1985; Hirschman, Leventhal, & Glynn, 1984; Kozlowski & Harford, 1976; O'Connor et al., 2005; Pomerleau et al., 2004; Pomerleau, Pomerleau, Namenek, & Marks, 1999; Pomerleau, Pomerleau, & Namenek, 1998; Rodriguez & Audrain-McGovern, 2004; Urbán, 2010). The current study extends these results to regular use, which can be seen as a step between continued use (capturing both recreational and regular users) and dependence (focusing on addiction to the substance). Positive experiences encouraged regular use of both substances, and negative experiences were adverse only for regular use of cannabis.

Third, this study investigated a largely unexplored topic, the extent to which previous substance use affects initial experiences with other drugs (Agrawal et al., 2012). The use of one substance modified the early experiences associated with the other. The use of cannabis before tobacco decreased the negative feelings associated with first tobacco use, and thus may enhance the effects of tobacco. Therefore, this group of users should not be forgotten when implementing measures for prevention and intervention of tobacco use, because they may be more likely to continue smoking. In contrast, the use of tobacco before cannabis increased negative feelings associated

with first cannabis use, and the use of tobacco before cannabis could prevent regular cannabis use because the initial negative subjective experiences related to cannabis have an adverse effect on regular use.

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## DECLARATION OF INTERESTS

None.

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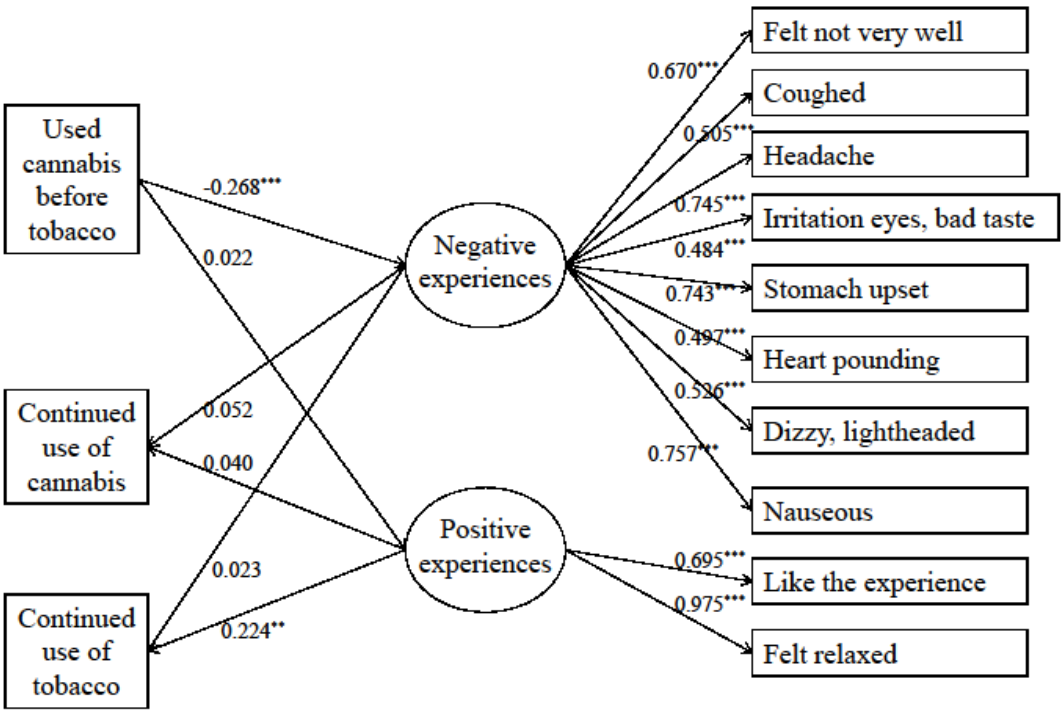


Figure 1. SEM for the initial experiences with tobacco

* p < .05; ** p < .01; *** p < .001.

Means and standard errors for regular use of tobacco: regular users: negative experiences of tobacco: 1.13 (0.98), negative experiences of cannabis: 0.03 (0.61), positive experiences of tobacco: -0.37 (0.54), positive experiences of cannabis: 1.54 (0.92); irregular users: negative experiences of tobacco: 1.05 (0.97), negative experiences of cannabis: -0.05 (0.57), positive experiences of tobacco: -0.71 (0.53), positive experiences of cannabis: 0.94 (0.94).

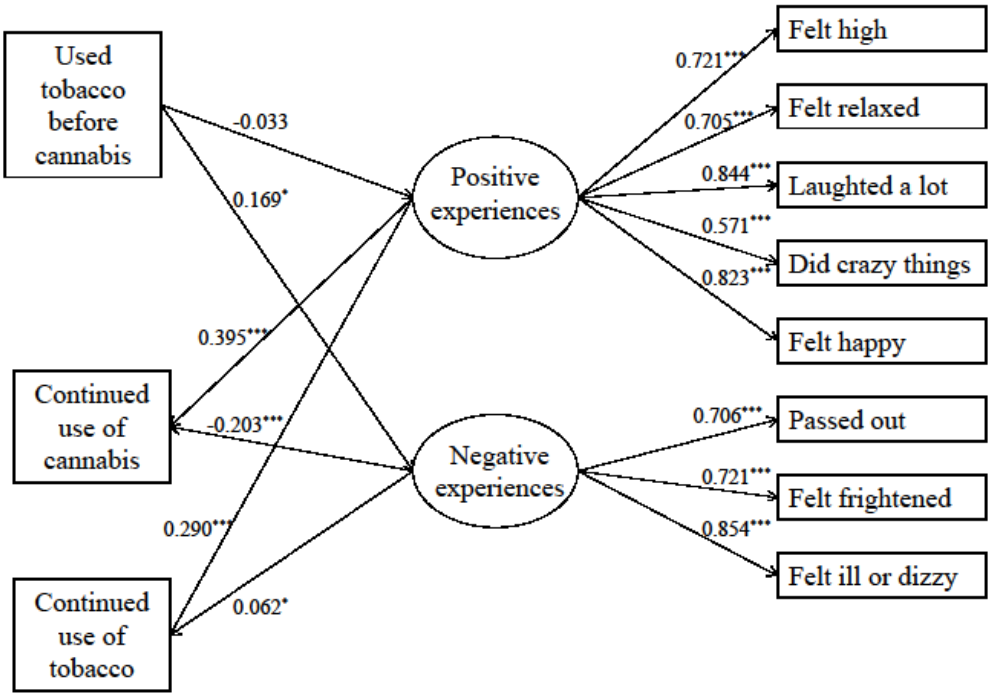


Figure 2. SEM for the initial experiences with cannabis

* p < .05; ** p < .01; *** p < .001.

Means and standard errors for regular use of cannabis: regular users: negative experiences of tobacco: 1.18 (0.97), negative experiences of cannabis: -0.22 (0.52), positive experiences of tobacco: -0.52 (0.56), positive experiences of cannabis: 1.81 (0.86); irregular users: negative experiences of tobacco: 1.05 (0.98), negative experiences of cannabis: 0.05 (0.60), positive experiences of tobacco: -0.59 (0.56), positive experiences of cannabis: 1.02 (0.94).

| Variables | % Overall (n=2,321) | % Tobacco use | | % Cannabis use | | % Age of onset[2] | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Regular (daily smoking, n=971) | Irregular (less than daily smoking, n=1,350) | Regular (weekly use, n=519) | Irregular (less than weekly use, n=1,802) | Tobacco ≤ age 14.2 (n=1,204) | Tobacco > age 14.2 (n=1,117) | Cannabis ≤ age 15.7 (n=970) | Cannabis > age 15.7 (n=1,351) |
| Initial experiences of tobacco | | | | | | | | | |
| Felt not very well | 41.6 | 42.7 | 40.7 | 42.2 | 41.4 | 43.9 | 39.0 | 43.1 | 40.5 |
| Coughed | 49.4 | 50.5 | 48.6 | 51.3 | 48.8 | 52.7 | 45.8 | 51.5 | 47.8 |
| Had a headache | 23.3 | 24.8 | 22.1 | 25.0 | 22.8 | 24.2 | 22.3 | 24.2 | 22.6 |
| Felt irritation in the eyes and bad taste | 49.7 | 45.2 | 52.9 | 48.9 | 49.9 | 50.1 | 49.2 | 51.5 | 48.3 |
| Had the stomach upset | 6.4 | 6.7 | 6.2 | 6.9 | 6.3 | 7.1 | 5.6 | 7.0 | 6.0 |
| Felt heart pounding | 17.2 | 17.5 | 16.9 | 21.2 | 16.0 | 17.5 | 16.7 | 19.3 | 15.6 |
| Felt dizzy, lightheaded | 49.4 | 53.1 | 46.7 | 53.6 | 48.2 | 52.4 | 46.1 | 54.9 | 45.4 |
| Felt nauseous | 12.3 | 12.4 | 12.1 | 12.3 | 12.2 | 14.4 | 9.9 | 13.9 | 11.0 |
| Like the experience | 47.3 | 54.5 | 42.1 | 52.2 | 45.8 | 48.2 | 46.3 | 48.8 | 46.2 |
| Felt relaxed | 46.8 | 53.2 | 42.0 | 45.9 | 46.9 | 44.7 | 48.9 | 47.4 | 46.2 |
| Initial experiences of cannabis | | | | | | | | | |
| Felt high | 67.1 | 77.8 | 59.4 | 78.0 | 63.9 | 70.5 | 63.4 | 74.9 | 61.4 |
| Passed out | 2.6 | 3.1 | 2.2 | 2.5 | 2.6 | 3.5 | 1.6 | 2.6 | 2.6 |
| Felt relaxed | 72.1 | 76.0 | 69.3 | 85.5 | 68.3 | 74.3 | 69.7 | 78.5 | 67.6 |
| Felt frightened | 11.1 | 12.1 | 10.4 | 8.7 | 11.8 | 11.2 | 11.0 | 10.9 | 11.3 |
| Laughed a lot | 74.1 | 80.9 | 69.3 | 85.0 | 71.1 | 77.2 | 71.0 | 82.2 | 68.5 |
| Felt ill or dizzy | 15.1 | 15.7 | 14.8 | 8.1 | 17.2 | 15.8 | 14.5 | 14.5 | 15.6 |
| Did crazy things | 25.6 | 70.0 | 21.5 | 32.8 | 23.6 | 29.4 | 21.6 | 32.3 | 20.9 |
| Felt happy | 64.0 | 42.7 | 59.6 | 82.9 | 58.5 | 68.0 | 59.6 | 73.1 | 57.6 |
| Prior use of a substance | | | | | | | | | |
| Used tobaco before cannabis | 60.5 | 64.9 | 57.4 | 54.9 | 62.2 | 73.8 | 46.3 | 52.2 | 66.5 |
| Used cannabis before tobacco | 13.6 | 8.7 | 17.0 | 15.2 | 13.0 | 11.5 | 15.7 | 16.3 | 11.7 |
| Both tobacco and cannabis at the same time | 25.9 | 26.4 | 25.6 | 29.9 | 24.8 | 14;7 | 38.0 | 31.5 | 21.8 |
| Regular use of tobacco and cannabis | | | | | | | | | |
| Tobacco (daily smoking) | 41.8 | 100.0 | 0.0 | 65.7 | 35.0 | 46.8 | 36.3 | 52.7 | 34.0 |
| Cannabis (weekly use) | 22.4 | 35.1 | 13.2 | 100.0 | 0.0 | 28.4 | 15.8 | 36.2 | 12.4 |

| | | | | | |
|---|---|---|---|---|---|
| Age of onset | | | | | |
| Tobacco use[1] | 14.2 (2.5) | 13.8 (2.5) | 14.5 (2.5) | 13.3 (2.6) | 14.5 (2.4) |
| Cannabis use[1] | 15.7 (1.9) | 15.3 (2.0) | 16.0 (1.8) | 14.5 (2.0) | 16.0 (1.7) |

Table 1. Descriptive statistics for initial experiences with tobacco and cannabis use, prior use of one substance, regular use, and age of onset

[1] Means and standard errors are given for age of onset.

[2] The groups for age of onset of tobacco and cannabis were created by dichotimization at the mean (mean age for onset of tobacco = 14.2, mean age for onset of cannabis = 15.7).

| | 1st factor | 2nd factor |
|---|---|---|
| EFA for initial subjective experiences of tobacco | | |
| % of explained variance | 37.86 | 17.27 |
| Felt not very well | 0.664 | -0.065 |
| Coughed | 0.485 | -0.107 |
| Had a headache | 0.713 | -0.012 |
| Felt irritation in the eyes and bad taste | 0.471 | -0.097 |
| Had the stomach upset | 0.793 | 0.214 |
| Felt heart pounding | 0.547 | 0.217 |
| Felt dizzy, lightheaded | 0.570 | 0.262 |
| Felt nauseous | 0.775 | -0.002 |
| Like the experience | -0.151 | 0.776 |
| Felt relaxed | 0.005 | 0.820 |
| EFA for initial subjective experiences of cannabis | | |
| % of explained variance | 40.64 | 30.93 |
| Felt high | 0.789 | 0.357 |
| Passed out | 0.287 | 0.704 |
| Felt relaxed | 0.661 | -0.363 |
| Felt frightened | -0.002 | 0.735 |
| Laughed a lot | 0.849 | -0.003 |
| Felt ill or dizzy | -0.143 | 0.813 |
| Did crazy things | 0.648 | 0.361 |
| Felt happy | 0.784 | -0.231 |

Table 2. Factor loadings from EFA for initial experiences with tobacco and from EFA for initial experiences with cannabis

Correlation between factors: tobacco: r = -.251; cannabis: r = -.137.