



Dissociation between implicit and explicit expectancies of cannabis use in adolescence



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ABSTRACT

Cannabis is one of the most commonly drugs used by teenagers. Expectancies about its effects play a crucial role in cannabis consumption. Various tools have been used to assess expectancies, mainly self-report questionnaires measuring explicit expectancies, but implicit measures based on experimental tasks have also been developed, measuring implicit expectancies. The aim of this study was to simultaneously assess implicit/explicit expectancies related to cannabis among adolescent users and non-users. 130 teenagers attending school (55 girls) were enrolled (Age: $M = 16.40$ years); 43.84% had never used cannabis (“non-users”) and 56.16% had used cannabis (“users”). They completed self-report questionnaires evaluating cannabis use, cannabis-related problems, effect expectancies (explicit expectancies), alcohol use, social and trait anxiety, depression, as well as three Implicit Association Tests (IAT) assessing implicit expectancies. Adolescents manifested more implicit affective associations (relaxation, excitation, negative) than neutral ones regarding cannabis. These were not related to explicit expectancies. Cannabis users reported more implicit relaxation expectancies and less negative explicit expectancies than non-users. The frequency of use and related problems were positively associated with the explicit expectancies regarding relaxation and enhancement, and were negatively associated with negative explicit expectancies and negative implicit expectancies. Findings indicate that implicit and explicit expectancies play different roles in cannabis use by adolescents. The implications for experimentation and prevention are discussed.

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1. Introduction

Cannabis is one of the most commonly drugs used by teenagers (15–17 years of age) around the world, with a mean lifetime prevalence of 30% among European students (European Monitoring Centre for Drugs and Drug Addiction, 2012) and 35% among American students (National Institute on Drug Abuse, 2014). In the long run, this substance can induce many behavioral (e.g., risk-taking behaviors or motivational impairments), physiological (e.g., respiratory or neurocognitive symptoms), psychological (e.g., anxiety or mood disorders) and social (e.g., work, school or interpersonal disabilities) effects on adolescents and young adults (Patton et al., 2002; Looby and Earleywine, 2007; Zvolensky et al., 2010; Degenhardt et al., 2012; Thames et al., 2014). Moreover,

cannabis use in adolescence may increase the risk of addictive behaviors in adulthood, particularly for vulnerable individuals (Hurd et al., 2013).

Adolescence thus constitutes a key period for investigating cannabis use and particularly to explore the early consumption stages. This developmental stage is characterized by a stressful shift from immaturity to maturity, including behavioral and cognitive changes. Teenagers often have difficulties to cope with these transitions, especially environmental and social challenges (Jessor, 1993; Collins, 2001). Compared with adults, they experience more stressors and negative life events (Larson and Asmussen, 1991; Buchanan et al., 1992), and they respond to and interact quite differently with their environment (Spear, 2000). Adolescence is thus a critical period for cannabis use and for initiating a trajectory of consumption in adulthood, and the present research proposes to specifically investigate this relevant developmental stage.

Cannabis use is influenced by a broad range of variables: genetic and environmental factors (Verweij et al., 2010), peer influence (Creemers et al., 2010; Poulin et al., 2011), comorbid substance use such as alcohol or tobacco (Coffey et al., 2000; Pedersen et al., 2001), and psychopathological symptoms such as anxiety or

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depression (Boys et al., 2001; Crippa et al., 2009). Moreover, personal expectancies about the effects of cannabis use may also play a crucial role in cannabis consumption. The most frequently reported reasons for using cannabis are to seek enjoyment, fun, experimentation, social enhancement or relaxation, or to reduce boredom, stress or anxiety (Hathaway, 2003; Bonn-Miller et al., 2007; Lee et al., 2007). This study will consider some of these related variables, with a particular focus on the evaluation of the personal expectancies among adolescents.

While no causal link has been established between expectancies and cannabis use, explicit expectancies are specifically associated with the frequency and severity of use (Galen and Henderson, 1999; Simons and Arens, 2007; Hayaki et al., 2010). For example, negative effect expectancies were found in adult non-users, whereas relaxation and craving effect expectancies were reported by adult cannabis users (Galen and Henderson, 1999). In adolescents and young adults, positive effect expectancies (e.g., euphoric effects, relaxation, stress reduction) are related to increased frequency of cannabis use (Aarons et al., 2001; Willner, 2001; Alfonso and Dunn, 2007; Kristjansson et al., 2012), while negative effect expectancies (e.g., harmful effects on health or behavioral control) are associated with reduced frequency (Simons and Arens, 2007).

Cannabis use expectancies thus constitute a central factor in understanding cannabis consumption, and previous studies have used various tools to assess these expectancies in adolescence. However, earlier results were exclusively based on self-report questionnaires (Young and Kavanagh, 1997; Willner, 2001; Ramo et al., 2013), which are associated with a wide range of biases related to self-representation, introspective limits and social desirability (Nisbett and Wilson, 1977; Schwarz, 1999; Blaison et al., 2006). Implicit measures based on experimental tasks have therefore been developed to overcome the limitations of explicit measures. These implicit measures are widely used in addiction research to assess several cognitive processes such as attentional bias, memory association and substance-related action tendencies (Stacy and Wiers, 2010; Roefs et al., 2011). Similar tools have also been used in adolescence, and it has been found that these implicit measures constitute a reliable predictor of later alcohol use (Wiers et al., 2007; Rooke et al., 2008). Specifically for cannabis, young adult users have been shown to have significant biases in implicit measures of attention (Field, 2005; Field et al., 2006; Cousijn et al., 2013), memory (Ames et al., 2002, 2005) and substance approach (Cousijn et al., 2011). Therefore, the combination of both explicit and implicit methods is essential to efficiently evaluate cannabis use expectancies, and then to predict consumption. However, we can consider the association of these methods in two ways: (1) as two different, but complementary, means (direct vs. indirect method) to evaluate the same construct (global expectancies); (2) as suggested by the dual processes theories (Strack and Deutsch, 2004), two measures (self-report questionnaire and SC-IAT) which evaluate distinct constructs (explicit and implicit attitude). The present research will give some indications on how to consider this explicit-implicit association.

Among the implicit experimental measures, the Implicit Association Test (IAT) (Greenwald et al., 1998) and its variant, the Single-Category Implicit Association Test (SC-IAT) (Karpinski and Steinman, 2006), are most frequently used to assess memory associations. They constitute good predictors of consumer behaviors (Steinman and Karpinski, 2008). Numerous studies have used these tasks to explore implicit memory associations with alcohol (for a review, see Roefs et al. (2011)), notably among adolescents (Thush and Wiers, 2007; Wiers et al., 2007; Thush et al., 2008). However, very little is known concerning implicit cannabis use effect expectancies in adolescence. Indeed, among young adults, studies have reported that cannabis users have less negative

associations for cannabis-related words (Field et al., 2004) and that heavy cannabis users have stronger implicit positive-arousal associations (Beraha et al., 2013). Another study found no correlation between cannabis use and implicit association in young adulthood (Dekker et al., 2010). Concerning adolescence in particular, Ames et al. (2007) evaluated three implicit cannabis associations and three equivalent explicit beliefs (excitation, relaxation and negative effects) among at-risk adolescents. They showed that an implicit association with excitation significantly predicted cannabis use, whereas among explicit beliefs, relaxation and negative effects predicted use. As described above, several studies have been conducted in young adults to evaluate implicit expectancies, highlighting the importance of such measures. However, although adolescence seems to be the critical period for starting cannabis use, only one study using IAT measures has assessed implicit expectancies in a sample of at-risk adolescents (Ames et al., 2007), thus limiting conclusions to this specific population. There is a clear lack of research on implicit expectancies among adolescents, especially regarding non-clinical groups with various levels of use (including abstinence). Exploring expectancies among this broader population would provide information for prevention programs, and this study will thus focus on such a population of teenagers.

In sum, expectancies could be considered in two ways: (1) explicit expectancies, namely the effects that individuals (users or not) consciously expect to feel when the substance is consumed, usually evaluated through self-report questionnaires; (2) implicit expectancies, namely the attitude that individuals (user or not) automatically manifest towards the substance-related stimuli, usually assessed through implicit measures. The above mentioned literature described different patterns of expectancies according to the level of use: (a) non-users reported more negative explicit/implicit expectancies and less positive ones; (b) at-risk users displayed more relaxation explicit expectancies, less negative ones and more excitation implicit expectancies; (c) regular users showed more positive explicit/implicit expectancies and less negative ones; (d) heavy users presented stronger relaxation/craving explicit expectancies and positive implicit association. Whereas implicit and explicit expectancies did not necessarily have the same predictive role in cannabis use (no systematic correlation between them), the nature of the association seems rather established among all levels of use: positive expectancies associated with cannabis use, negative expectancies with non-use. However, far less is known regarding both explicit and implicit measures when the use is variable or sporadic among adolescents. Such results could be put in perspective with current literature data.

As implicit expectancies constitute a crucial factor for cannabis consumption and as adolescence is the key period for developing cannabis use, the present study will present a combined exploration of implicit and explicit cannabis effect expectancies among non-clinical adolescents, who may be at an early consumption stage. Three main aims will be followed: (1) to determine the implicit expectancies related to cannabis use and to test their relationships with explicit measures (we expected to find implicit associations among all participants and correlations with explicit measures); (2) to assess the difference between cannabis users and non-users regarding these implicit/explicit expectancies (we expected to find all kinds of positive expectancies in users and negative ones in non-users); (3) among cannabis users, to evaluate the link between frequency/problems of use and explicit/implicit expectancies (we expected to find a positive correlation between frequency problems and all positive expectancies as well as a negative correlation between frequency-problems and negative expectancies).

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