



## Parenting styles and metacognitions as predictors of cannabis use

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### ABSTRACT

Metacognitions, the beliefs held about internal mental processes and the strategies aimed at controlling such processes, are known to play a significant role in the development and maintenance of addictive behaviours. Specifically, lack of cognitive confidence and beliefs about the need to control thoughts have been implicated across addictive behaviours. No research to date, though, has explored the role of metacognitions in cannabis use. Research has also shown that an authoritarian parenting style (where a parent uncompromisingly enforces their own ideas regardless of the will of the child) may be correlated with addictive behaviours. However very limited research has investigated the role of parenting styles in cannabis use. In the current study we aimed to investigate the relative contribution of parenting styles and metacognitions to cannabis use. A sample of 85 participants completed a series of online questionnaires, measuring negative affect, parenting styles, metacognitions and cannabis use. Spearman correlations indicated that cannabis use was positively correlated with each of the metacognitions and both permissive and authoritarian parenting styles. Regression analyses demonstrated that a combination of the physically coercive aspects of the authoritarian parental style and lack of cognitive confidence predicted cannabis use when controlling for negative affect. The implications of the current findings are discussed.

## 1. Introduction

### 1.1. Cannabis use

Cannabis is the most widely used drug in the UK, according to the Crime Survey for England and Wales (Home Office, 2019), with a lifetime prevalence rate of 30.2% for respondents aged 16 to 59. The National Survey on Drug Use and Health (Substance Abuse and Mental Health Services Administration, 2019) reports that in the United States of America 34.8% of 18 to 25 year-olds and 13.3% of those aged 26 and above have used cannabis in the last year, compared to between 41% and 45% of 16 to 25 year-olds and 18% of those aged 26 and above in Canada (Health Canada, 2017).

According to the Substance Abuse and Mental Health Services Administration (2019), approximately 4.4 million people in the US qualified for a diagnosis of Marijuana Use Disorder in 2018, which was the most common of all the illicit drug use disorders. Cannabis use has been linked to physical health conditions, such as cardiovascular disease (Mittleman, Lewis, Maclure, Sherwood, & Muller, 2001; Mukamal, Maclure, Muller, & Mittleman, 2008) and bronchitis (Tetrault et al., 2007), as well as the increased risk of physical injury (Gerberich et al., 2003). Long-term use of cannabis has also been correlated with

impairments in learning, memory and attention (Crane, Schuster, Fusar-Poli, & Gonzalez, 2013; Grant, Gonzalez, Carey, Natarajan, & Wolfson, 2003; Solowij et al., 2002) and may contribute to the development and maintenance of psychosis (Minozzi et al., 2010; Moore et al., 2007; Gage, Hickman & Zammit, 2016). There is also evidence linking cannabis use with the development of depression and anxiety, including a recent longitudinal study linking adolescent cannabis use to depression in later life (Schoeler et al., 2018), but results in this respect have been less consistent (Moore et al., 2007; Patton et al., 2002).

### 1.2. Parenting styles and cannabis use

Parenting is an extremely complex and challenging activity that incorporates many specific behaviors by an adult to influence a child throughout various ages (Darling & Steinberg, 1993). It requires the caregiver to consistently demonstrate a constellation of robust attitudes, including being extremely motivated, helpful, responsive, insightful and strategic in their presentation. Whilst parenting may be more of an art form than a science, it has been widely observed that it plays a pivotal role in shaping substance-use behaviors in offspring (Johnson, Shontz, & Locke, 1984; Glynn & Haenlein, 1988; Hawkins, Lishner, Catalano, & Howard, 1986).

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In an attempt to classify differences in parenting style that could potentially have varying impact on one's offspring, Baldwin (1948) identified three patterns of parenting: authoritative, indulgent and accepting. Schaefer (1959) followed this early research by introducing the term 'parental styles' and proposed a model made of two extended aspects of parenting: disciplinary control and affective warmth. Baumrind (1966), synthesizing and extending the research undertaken in the field, proposed three parenting styles: authoritative, authoritarian and permissive.

The authoritative parenting style is one which is depicted by warmth and strictness. It is frequently exhibited by those who are high on acceptance and behavioral control yet low on psychological domination and who seek to raise happier and emotionally healthier children which are equipped to face real world challenges. Baumrind (1967) states that such parents are rational, warm, encouraging, supportive and controlling in a way that promotes child autonomy. Likewise, Maccoby and Martin (1983) define authoritative parents as those who set limits, enforce clear boundaries and use reasoning to implement them, which in turn not only promotes but encourages open and honest communication. The authoritative parenting style is regarded by many child development experts as the optimal parenting style (Baumrind, 1966; Baumrind, 2013; Maccoby & Martin, 1983) and has been related to positive child attributes such as self-reliance (Baumrind, 1968; 1971), social responsibility (Baumrind, 1971) and adjustment (Baumrind, Larzelere, & Owens, 2010).

Authoritarian parents, on the other hand, are deemed neglectful, rejecting and psychologically controlling. Here, the parental tendency is to uncompromisingly enforce their own ideas and display irritation should the child's views differ. Ultimately, this intrudes into the psychological and emotional development of the child and restricts their desire to be curious, creative and expressive (Baumrind, 2013; Baumrind et al., 2010). In addition, authoritarian parents are highly demanding and often punitive and forceful so that their offspring adhere to an absolute standard of behavior (Baumrind, 1966). The overarching theme is that authoritarian parental control is imperious with this mode of parenting been found to be related to less optimal child outcomes such as lower self-efficacy (Baumrind et al., 2010), greater externalizing of problems (Maccoby & Martin, 1983) and increasing episodes of rebellion (Baumrind, 1968), which could lead to subsequent engagement in addictive behaviours.

Permissive parents are characterized, as outlined by Maccoby and Martin (1983), by indulgence. Children are allowed to make their own rules and decisions. Parents included in this type place few behavioral demands on the child and avoid coercive or confrontive practices as much as possible (Baumrind, 1966; 1989). This could paradoxically lead to poorer outcomes for them, such as a lower sense of achievement (Baumrind, 1971), lack of impulse control (Maccoby & Martin, 1983) and lower autonomy (Baumrind et al., 2010). Such parents essentially set rules but rarely uphold them. They are not known for promoting psychological autonomy, are accepting of what their child may/may not do and exhibit negligent behavioral control (Baumrind, 2013; Baumrind et al., 2010). As a result, consequences are rarely imposed, as these parents believe that their child will learn best with minimal intervention on their part and only intervene when there is a significant concern. Whilst permissive parents are lenient in approach, they frequently fail to discourage poor choices or bad behavior and furthermore, children of such parents often report having low self-esteem, a lack of appreciation of authority and rules and are more likely to struggle academically (Baumrind, 2013).

Reviews of the literature (e.g. Becona et al., 2011) indicate that the authoritative parenting style is the most protective against substance use, whilst the neglectful aspects of the permissive style may increase the risk of drug use. Research on the authoritarian and permissive styles remains inconclusive. Kassel, Wardle, and Roberts (2007) argue that offspring may possibly seek an attachment with a substance as a means of survival in managing domestic distress. In practical terms, this would

mean that those who fail to experience intimate social and domestic bonds as a result of, for example, authoritative parenting, may tend to be less happy and far more likely to develop substance misuse issues themselves.

### 1.3. Metacognitions in addictive behaviours

Metacognitions have been defined as "the information individuals hold about their own cognition and internal states, and about coping strategies that impact both" (Wells, 2000). Cartwright-Hatton and Wells (1997; Wells & Cartwright-Hatton, 2004) were the first researchers to assess metacognitions through the Metacognitions Questionnaire (MCQ; Cartwright-Hatton & Wells, 1997) and the Metacognitions Questionnaire 30 (MCQ-30; Wells & Cartwright-Hatton, 2004), which consist of five factors: (i) positive beliefs about worry ('If I worry I will be solve the problem'); (ii) negative beliefs about thoughts concerning danger and uncontrollability ('My thoughts are out of control and may harm me'); (iii) cognitive confidence ('I don't trust my judgement'); (iv) beliefs about the need to control thoughts ('I need to control my thoughts at all times'); and (v) cognitive self-consciousness ('I play close attention to how my mind works'). According to the metacognitive theoretical tenet (Wells, 2000), metacognitions play an important role in leading individuals to develop maladaptive coping strategies (e.g. worry, rumination, desire thinking, avoidance, thought suppression) which end up perpetuating psychological distress. Evidence suggests that metacognitions are implicated in all psychological problems (for a review, see Wells, 2013).

A recent systematic review by Hamonniere and Varescon (2018) identified that metacognitions are predictive of addictive behaviour. Research, for example, has found that all five dimensions of the MCQ/MCQ-30 are positively correlated with the severity of alcohol use, nicotine use, gambling and problematic Internet use (Akbari, 2017; Jauregui, Urbiola, & Estevez, 2016; Lindberg, Fernie, & Spada, 2011; Mansueto et al., 2016; Marino et al., 2016; Moneta, 2011; Nikčević & Spada, 2008; Spada, Langston, Nikčević, & Moneta, 2008; Spada & Marino, 2017; Spada, Nikčević, Moneta, & Wells, 2007; Spada & Roarty, 2015; Spada & Wells, 2005; Spada, Zandvoort, & Wells, 2007). These studies also indicated that among the five metacognitions factors, cognitive confidence and beliefs about the need to control thoughts emerged as the strongest predictors of severity of addictive behaviour and category membership as suffering from an addictive behaviour over and above negative affect.

Spada and colleagues (Spada, Caselli, Nikčević, & Wells, 2015; Spada, Caselli, & Wells, 2009) have postulated that lack of cognitive confidence may be an important predictor of addictive behaviour because it represents or reflects diminished confidence in coping. Lack of cognitive confidence should therefore contribute to addictive behavior because such behavior can provide information to reduce, in the short term, 'metacognitive discomfort' (e.g. alcohol gives a sense of confidence in one's opinions through disinhibition, nicotine use provides a sense of increased attentional capability) increasing the felt sense that one is coping.

Spada and colleagues (2015) reported that beliefs about the need to control thoughts are a marker for the tendency to monitor and control intrusive thoughts. In turn, the strategies that are employed to control intrusive thoughts, if maladaptive (e.g. perseverative thinking and thought suppression), will lead to an increase in the accessibility of negative information about the self and a greater likelihood of engaging in addictive behaviors to regulate one's emotional state.

It is, therefore, plausible to assume that metacognitions, especially cognitive confidence and beliefs about the need to control thoughts, may play a similar role in cannabis use as they broadly do in other addictive behaviors. We also think that metacognitions should be independent predictors (from parenting styles) of cannabis use, as research has indicated that though metacognitions may be related to parenting styles, they also predict pathology independently of these. In

support of this view, Spada and colleagues (2012) noted an association between parental overprotection and both anxiety and metacognitions. Furthermore, it has been purported that problematic parenting styles may give rise to maladaptive metacognitions in children, which in turn may give rise to psychopathology. Research by Chow and Lo (2017) has also suggested that metacognitions between parents and adolescents may be correlated with one another and that parenting styles may be associated with adolescents' positive and negative metacognitions.

#### 1.4. Aims and objectives of the current study

This study aimed to explore the relationship between parenting styles, metacognitions and cannabis use. We hypothesized that: (1) permissive and authoritarian parenting styles would be positively correlated with cannabis use; (2) authoritative parenting style would be negatively correlated with cannabis use; (3) metacognitions (cognitive confidence and beliefs about the need to control thoughts, in particular) would be positively correlated with cannabis use; and (4) metacognitions (cognitive confidence and beliefs about the need to control thoughts, in particular) would independently predict cannabis use when controlling for negative affect and parenting styles.

## 2. Method

### 2.1. Participants

A sample of 85 participants (29 females; mean age = 37.85 years [SD = 9.00; range 20 to 76 years]) completed a battery of online questionnaires. Participants were required: (1) to be at least 18 years of age; (2) be current cannabis users; and (3) not possess any learning difficulties. The ethnic background of this sample included 68.2% Caucasian, followed by 12.9% Mixed Race, 10.6% Asian, 7.1% Black British, and 1.2% Other Background.

### 2.2. Materials

#### 2.2.1. Negative affect

The short form of the Depression Anxiety Stress Scale (DASS-21; Antony, Bieling, Cox, Enns, & Swinson, 1998) is a 21-item measure using a 4-point Likert scale ("Did not apply to me at all" to "Applied to me very much") that assesses general symptoms of psychopathology. The DASS-21 distinguishes between depression ("I couldn't seem to experience any positive feeling at all"), physiological arousal ("I was aware of dryness of my mouth") and psychological agitation ("I found it hard to wind down"). It contains three orthogonal factors (depression, anxiety and stress) as well as an overall factor of negative affect (Henry & Crawford, 2005). For the purposes of this study, the total score was used. The DASS-21 has been found to have excellent reliability and has been validated using clinical and non-clinical populations. In this study, Cronbach's Alpha was 0.94 (95% C.I. = 0.92 - 0.96).

#### 2.2.2. Parenting styles

The Short-Form of the Parenting Styles and Dimensions Questionnaire (PSDQ; Robinson et al., 1995; 2001) is a 32-item questionnaire that uses a 5-point Likert Scale ("Never" to "Always"). It is comprised of seven subscales (Permissive; Physical Coercion; Non-Reasoning/Punitive; Verbal Hostility; Warmth & Support; Autonomy Granting; Regulation) comprising three parenting styles: Permissive ("Finds it difficult to discipline child"); Authoritative ("Allows child to give input into family rules"); and Authoritarian ("Punishes by taking privileges away from child with little if any explanations"). This tool provides continuous variable-centered scores rather than categorizing parenting style typologies and is anchored by never (1) and always (5). Reliability of this measure is good (Cronbach's Alpha = 0.85; 95% CI = 0.81 - 0.90).

### 2.2.3. Metacognitions

The Metacognitions Questionnaire 30 (MCQ-30; Wells & Cartwright-Hatton, 2004) is a 30-item measure that assesses generic metacognitions in psychopathology using a 4-point Likert scale ("Do not agree" to "Agree very much"). Five factors are assessed, which include: (i) positive beliefs about worry ("Worrying helps me to get things sorted out in my mind"); (ii) negative beliefs about thoughts concerning danger and uncontrollability ("My worrying could make me go mad"); (iii) cognitive confidence ("I have little confidence in my memory for words and names"); (iv) beliefs about the need to control thoughts ("I should be in control of my thoughts all of the time"); and (v) cognitive self-consciousness ("I am constantly aware of my thinking"). The MCQ-30 has demonstrated good internal consistency and convergent validity and has acceptable test-retest reliability (Spada, Mohiyeddini, & Wells, 2008; Wells & Cartwright-Hatton, 2004). In this study, Cronbach's Alpha was 0.91 (95% C.I. = 0.88 - 0.94).

### 2.2.4. Cannabis use

The Cannabis Use Disorder Identification Test-Revised (CUDIT-R; Adamson & Sellman, 2003; Adamson et al., 2010) is a brief ten-item screening measure that was developed by modifying the Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, De la Fuente, & Grant, 1993) to assess cannabis use over the previous six months. It contains yes/no questions about usage concerns ("Have you or someone else been injured as a result of your use of cannabis over the past 6 months?"), a 5-point Likert scale ("Never" to "Daily or almost daily") to gauge usage and an approximation of the number of hours per day that one is "stoned". It is readily applicable to identify problematic cannabis use and provides an excellent basis for brief interventions as well as possessing good psychometric properties when used in clinical populations. In this study, Cronbach's Alpha was 0.84 (95% C.I. = 0.77 - 0.88).

### 2.3. Procedure

Ethical approval for this study was received by the London South Bank University Research Ethics Committee. Data was gathered from a range of individuals within the community using an online platform and participants were not remunerated for their involvement in the study. Once the consent form was completed and permission was granted, participants completed, in order, the DASS-21, the MCQ30, the PDSQ and the CUDIT-R. Each question had to be answered before moving onto the next. At the end of the survey, participants were debriefed in writing.

### 2.4. Analyses

Correlation analyses were conducted in order to test the associations between the variables of interest, followed by regression analyses to test the strength of the relationships that variables of interest have with cannabis use. All analyses were calculated using SPSS, version 21 (IBM Corp, 2012). Due to the sample size, initial forward regression analyses were conducted to determine which of the metacognitions and which of the parenting styles predicted cannabis use. Any significant predictors were then added to a third hierarchical regression, which controlled for negative affect.

## 3. Results

### 3.1. Normality and bivariate correlations

Table 1 shows the means, standard deviations and ranges of the variables included in the study. Table 2 shows the bivariate correlations between the variables. A series of Shapiro-Wilk normality tests indicated that all of the variables were non-normally distributed, with the exception of cognitive self-consciousness; thus, Spearman's Rho was

**Table 1**  
Means, standard deviations and range of variables.

	Mean	S.D.	Range
1. MCQ-30 (POS)	10.02	4.00	6 to 21
2. MCQ-30 (NEG)	12.93	4.50	7 to 23
3. MCQ-30 (CC)	10.66	3.78	6 to 19
4. MCQ-30 (NC)	11.26	4.21	6 to 22
5. MCQ-30 (CSC)	15.25	4.78	6 to 24
6. DASS-T	15.64	13.04	0 to 57
7. PDSQ-P	2.11	0.67	1 to 4.2
8. PDSQ-PC	2.11	1.02	1 to 5
9. PDSQ-NR	2.11	0.92	1 to 4
10. PDSQ-VH	2.50	1.07	1 to 5
11. PDSQ-WS	3.26	1.14	1 to 5
12. PDSQ-AG	2.55	1.02	1 to 4.8
13. PDSQ-R	3.03	1.17	1 to 5
14. CUDIT-R	10.91	7.43	0 to 32

used to calculate correlations. Cannabis use, as measured by the CUDIT-R demonstrated a weak positive correlation with three of the MCQ-30 subscales: Positive beliefs ( $r_s = 0.22, p < .05$ ); negative beliefs ( $r_s = 0.25, p < .05$ ); and cognitive self-consciousness ( $r_s = 0.27, p < .01$ ). There was a moderate positive correlation between the CUDIT-R and cognitive confidence ( $r_s = 0.48, p < .01$ ) and between the CUDIT-R and beliefs about the need for control thoughts ( $r_s = 0.39, p < .01$ ). There was also a moderate positive correlation between the CUDIT-R and negative affect ( $r_s = 0.42, p < .01$ ). Lastly, of the seven parenting styles, there was a weak positive correlation between the CUDIT-R and four of them, including permissive ( $r_s = 0.25, p < .01$ ) and the three authoritarian styles: Physical coercion ( $r_s = 0.29, p < .01$ ); non-reasoning/punitive ( $r_s = 0.27, p < .01$ ); and verbal hostility ( $r_s = 0.26, p < .01$ ). There was no significant correlation between the CUDIT-R and the authoritative styles: Warmth and support ( $r_s = -0.07, n.s.$ ); regulation ( $r_s = -0.12, n.s.$ ); and autonomy granting ( $r_s = 0.02, n.s.$ ).

3.2. Regression analyses

As all five metacognitions were significantly correlated with

**Table 2**  
Bivariate correlations.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Gender															
2. Age	-0.19														
3. MCQ-30 (POS)	0.06	-0.27*													
4. MCQ-30 (NEG)	0.29**	-0.38**	0.37**												
5. MCQ-30 (CC)	0.13	-0.24*	0.20*	0.43**											
6. MCQ-30 (NC)	-0.02	-0.36**	0.28**	0.50**	0.43**										
7. MCQ-30 (CSC)	0.11	-0.09	0.18	0.53**	0.29**	0.36**									
8. DASS-T	0.23*	-0.32**	0.27**	0.67**	0.71**	0.61**	0.53**								
9. PDSQ-P	0.06	-0.10	0.06	0.21*	0.08	0.14	0.06	0.14							
10. PDSQ-PC	0.05	-0.01	0.13	0.12	0.04	0.27**	0.11	0.26**	0.24*						
11. PDSQ-NR	0.07	-0.01	0.10	0.19*	0.07	0.23*	0.18	0.23*	0.31**	0.79**					
12. PDSQ-VH	0.21	0.01	0.08	0.20*	0.12	0.11	0.33**	0.27**	0.25*	0.71**	0.73**				
13. PDSQ-WS	0.08	-0.13	-0.01	-0.07	0.02	-0.10	-0.14	-0.05	0.04	-0.25*	-0.32**	-0.37**			
14. PDSQ-AG	-0.01	-0.32**	0.07	0.03	0.07	-0.02	-0.13	0.01	0.18	-0.33**	-0.38**	-0.40**	0.75**		
15. PDSQ-R	0.15	-0.23*	-0.01	-0.09	0.01	-0.06	-0.13	-0.03	0.11	-0.13	-0.26**	-0.22*	0.77**	0.76**	
16. CUDIT-R	0.11	-0.01	0.22*	0.25*	0.48**	0.39**	0.27**	0.42**	0.25**	0.29**	0.27**	0.26**	-0.07	-0.12	0.02

Note: Gender: Gender of participant; Age: Age in years; MCQ-30 (POS) = Metacognitions Questionnaire-30 (Positive); MCQ-30 (NEG) = Metacognitions Questionnaire-30 (Negative); MCQ-30 (CC) = Metacognitions Questionnaire-30 (Cognitive Confidence); MCQ-30 (NC) = Metacognitive Questionnaire-30 (Need to Control); MCQ-30 (CSC) = Metacognitions Questionnaire-30 (Cognitive Self-Consciousness); DASS-T = Depression, Anxiety Stress Scale-21 (Total); PDSQ-P = Parenting Styles and Dimensions Questionnaire (Permissive); PDSQ-PC = Parenting Styles and Dimensions Questionnaire (Physical Coercion); PDSQ-NR = Parenting Styles and Dimensions Questionnaire (Non-Reasoning/Punitive); PDSQ-VH = Parenting Styles and Dimensions Questionnaire (Verbal Hostility); PDSQ-WS = Parenting Styles and Dimensions Questionnaire (Warmth & Support); PDSQ-AG = Parenting Styles and Dimensions Questionnaire (Autonomy Granting); PDSQ-R = Parenting Styles and Dimensions Questionnaire (Regulation); CUDIT-R = Cannabis Use Disorder Identification Test-Revised;  $n = 85$ .

\*  $p < .05$ ;  
\*\*  $p < .01$ .

cannabis use, they were entered into a forward stepwise regression model, with cannabis use as the criterion variable (see Table 3). Cognitive confidence and beliefs about the need to control thoughts emerged as the only metacognitions that contributed to a significant increase in the variance of cannabis use ( $B = 0.779, p < .001$  [LL = 0.374, UL = 1.184] and  $B = 0.401, p < .05$  [LL = 0.038, UL = 0.765], respectively).

A forward stepwise regression model was run for the four parenting styles that significantly correlated with cannabis use (permissiveness, physical coercion, non-reasoning/punitive and verbal hostility) with cannabis as the criterion variable (see Table 4). Only physical coercion was found to be a significant predictor of cannabis use ( $B = 2.313, p < .01$  [LL = 0.803, UL = 3.823]). Therefore, the subscale, along cognitive confidence and beliefs about the need to control thoughts were carried forward to the next regression analysis.

A hierarchical regression analysis was then conducted; again, with the cannabis use as the criterion variable (see Table 5). Negative affect was placed on the first step, physical coercion parenting style was placed on the second step, followed by cognitive confidence and beliefs about the need to control thoughts on the third step. Negative affect was found to account for a significant amount of the variance in cannabis use when initially entered ( $R^2 = 0.199, p < .001$ ). The physical coercion parenting style added a significant contribution to the variance ( $R^2$  change = 0.039,  $p < .05$ ). The addition of the cognitive confidence and beliefs about the need to control thoughts also contributed significantly to the variance ( $R^2$  change = 0.103,  $p < .01$ ). However, in the final equation of this model only cognitive confidence and the physical coercion parenting style were significant predictors of cannabis use ( $B = 0.807, p < .01$  [LL = 0.315, UL = 1.300] and  $B = 1.754, p < .05$  [LL = 0.350, UL = 3.158]) with both negative affect and beliefs about the need to control thoughts losing significant effects.

4. Discussion

The goal of the present study was to examine the contribution of parenting styles and metacognitions to cannabis use controlling for negative affect. Results indicated that negative affect, permissive,

**Table 3**  
Forward stepwise regression analysis with CUDIT as the outcome variable and MCQ-30 subscales as predictor variables.

Model	R <sup>2</sup>	Coefficients <sup>a</sup>		Unstandardized Coefficients			t	Sig.	95.0% Confidence Interval for B	
				B	Std. Error	β			Lower Bound	Upper Bound
1 (Constant)	0.247	0.247**	0.512	2.114		0.242	0.809	-3.694	4.717	
MCQ-CC			0.975	0.187	0.497	5.213	0.000	0.603	1.347	
2 (Constant)	0.288	0.042*	-1.918	2.345		-0.818	0.416	-6.582	2.746	
MCQ-CC			0.779	0.204	0.397	3.829	0.000	0.374	1.184	
MCQ-NC			0.401	0.183	0.228	2.197	0.031	0.038	0.765	

Note: MCQ-30 (CC) = Metacognitive Questionnaire-30 (Cognitive Confidence); MCQ-30 (NC) = Metacognitive Questionnaire-30 (Need for Control); CUDIT-R = Cannabis Use Disorder Identification Test-Revised; n = 85

\* p < .05;

\*\* p < .01.

<sup>a</sup> . Dependent Variable: CUDIT-R

**Table 4**  
Forward stepwise regression analysis with CUDIT as the outcome variable and parenting styles as predictor variables.

Model	R <sup>2</sup>	Coefficients <sup>a</sup>		Unstandardized Coefficients			t	Sig.	95.0% Confidence Interval for B	
				B	Std. Error	β			Lower Bound	Upper Bound
1 (Constant)	0.101	0.101**	6.035	1.774		3.402	0.001	2.506	9.563	
PDSQ-PC			2.313	0.759	0.317	3.046	0.003	0.803	3.823	

\*p < .05; \*\*p < .01.

Note: PDSQ-PC = Parenting Styles and Dimensions Questionnaire (Physical Coercion); CUDIT-R = Cannabis Use Disorder Identification Test-Revised; n = 85

<sup>a</sup> . Dependent Variable: CUDIT-R

**Table 5**  
Three-step hierarchical regression analysis with CUDIT as the outcome variable and physical coercion, cognitive confidence and beliefs about the need to control thoughts as predictor variables.

Model	R <sup>2</sup>	Coefficients <sup>a</sup>		Unstandardized Coefficients			t	Sig.	95.0% Confidence Interval for B	
				B	Std. Error	β			Lower Bound	Upper Bound
1 (Constant)	0.199	0.199**	6.936	1.136		6.103	0.000	4.676	9.196	
DASS-T			0.254	0.056	0.446	4.537	0.000	0.143	0.365	
2 (Constant)	0.238	0.039*	4.290	1.705		2.517	0.014	0.899	7.680	
DASS-T			0.220	0.057	0.387	3.844	0.000	0.106	0.334	
PDSQ_Authoritarian_PC			1.506	0.734	0.207	2.053	0.043	0.047	2.966	
3 (Constant)	0.341	0.103**	-4.483	3.011		-1.489	0.140	-10.476	1.509	
DASS-T			-0.003	0.085	-0.006	-0.040	0.969	-0.173	0.166	
PDSQ_Authoritarian_PC			1.754	0.706	0.240	2.485	0.015	0.350	3.158	
MCQ-CC			0.807	0.247	0.411	3.262	0.002	0.315	1.300	
MCQ-NC			0.279	0.210	0.159	1.328	0.188	-0.139	0.698	

Note: DASS-T = Depression, Anxiety Stress Scale-21 (Total); PDSQ-PC = Parenting Styles and Dimensions Questionnaire (Physical Coercion); MCQ-30 (CC) = Metacognitive Questionnaire-30 (Cognitive Confidence); MCQ-30 (NC) = Metacognitive Questionnaire-30 (Need for Control); CUDIT-R = Cannabis Use Disorder Identification Test-Revised; n = 85.

\* p < .05;

\*\* p < .01.

<sup>a</sup> Dependent Variable: CUDIT.

physical coercion, non-reasoning/punitive, and verbal hostility parenting styles, and all five metacognitions, were significantly correlated with cannabis use.

A series of regression analyses showed that the physical coercion parenting style and cognitive confidence were the only significant predictors of cannabis use controlling for negative affect. These results are broadly consistent with our hypotheses. The finding that the physical coercion parenting style was a predictor of cannabis use is in keeping with Baumrind (2013) central idea that coercive power assertion does not promote the internalization of parental values (permitting

parents to relax control during adolescence) but rather is more likely to elicit resistance from the child, which may require the parent to maintain high external control into adolescence. This may, in turn, result in ‘rebellious’ actions by the adolescent to gain control in the form of engagement in addictive behaviours (Baumrind, 1968). In support of this view, recent research has indicated that an authoritarian parenting style may be a clear risk for the development of addictive behaviours when controlling for other factors (Calafat, García, Juan, Becoña, & Fernández-Hermida, 2014).

With respect to findings regarding metacognitions, low cognitive

confidence may lead to cannabis use in order to reduce, albeit temporarily, metacognitive discomfort (Spada et al., 2008). In other words, engaging in cannabis use, at least in the short term, could remove attention from upsetting thoughts about the self (e.g. possibly resulting from an authoritarian parenting style) and contemporaneously increase confidence in one's opinions/actions through disinhibition and an increased sense of attentional capability (in other words facilitate rebelliousness and assertion). It is also important to note, however, that cannabis use may affect cognitive confidence through an objective detrimental impact on cognitive functioning (e.g. Crane et al., 2013; Grant et al., 2003; Solowij et al., 2002) highlighting the possible bidirectionality of this relationship.

The present results are preliminary, and some limitations must be highlighted. First, the sample was not randomly selected and the use of data from a self-report questionnaires may have been influenced by recall bias and answer accuracy. Second, a cross-sectional design does not allow definitive statements about causality. Future studies should employ longitudinal designs and monitor how and when metacognitions change over time and how these changes may or may not be correlated with cannabis use. Third, the sample size was small, which could have affected the significance of the effects of the study. Future research could explore the connections between these variables with a larger and more representative sample.

Despite these limitations, results of this study indicate that targeting the effects of a physically coercive parenting style, possibly through interventions aimed at 're-parenting' and/or building assertiveness skills such as schema focused therapy (Taylor, Bee, & Haddock, 2017) or cognitive behavior therapy (Speed, Goldstein, & Goldfried, 2017) may prove of value. The modification of metacognitions (in particular relating to cognitive confidence) may also be potentially of therapeutic benefit. There is a large literature demonstrating the effectiveness of metacognitive therapy in treating psychological distress (see Wells, 2013) and growing evidence of its application to addictive behaviors (see Spada et al., 2015; Caselli, Martino, Spada, & Wells, 2018). These interventions may include the direct restructuring of cognitive confidence (e.g. showing that cannabis use worsens rather than improves cognitive confidence) as well as techniques aimed at potentiating attentional flexibility (attention training technique) and interrupting rumination and worry (detached mindfulness and postponement) which may free up valuable resources for problem-solving.

In conclusion, the results from the current study provide an important addition to the literature on the role of metacognitions and parenting styles in addictive behaviors, as well as the first findings linking metacognitions to cannabis use.

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## Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.abrep.2020.100259>.

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