



Short communication

## Predicting later problematic cannabis use from psychopathological symptoms during childhood and adolescence: Results of a 25-year longitudinal study



Katrin Zohsel<sup>a,1</sup>, Christiane Baldus<sup>b,1</sup>, Martin H. Schmidt<sup>a</sup>, Günter Esser<sup>c</sup>,  
Tobias Banaschewski<sup>a</sup>, Rainer Thomasius<sup>b,1</sup>, Manfred Laucht<sup>a,c,\*,1</sup>

<sup>a</sup> Department of Child and Adolescent Psychiatry and Psychotherapy, Central Institute of Mental Health, Medical Faculty Mannheim, Heidelberg University, Germany

<sup>b</sup> German Center for Addiction Research for Childhood and Adolescence, University Medical Center Hamburg, Germany

<sup>c</sup> Department of Psychology, University of Potsdam, Potsdam, Germany

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### ABSTRACT

**Background:** Cannabis is the most commonly used illegal substance among adolescents and young adults. Problematic cannabis use is often associated with comorbid psychopathological problems. The purpose of the current study was to elucidate the underlying developmental processes connecting externalizing and internalizing psychopathology in childhood and adolescence with problematic cannabis use in young adulthood.

**Methods:** Data were drawn from the Mannheim Study of Children at Risk, an ongoing epidemiological cohort study from birth to adulthood. For  $n = 307$  participants, symptom scores of conduct/oppositional defiant disorder, attention problems, hyperactivity/impulsivity, and internalizing disorders were available for the periods of childhood (4.5–11 years) and adolescence (15 years). At age 25 years, problematic cannabis use was assessed via clinical interview and a self-rating questionnaire.

**Results:** At age 25 years, problematic cannabis use was identified in  $n = 28$  participants (9.1%). Childhood conduct/oppositional behavior problems were predictive of problematic cannabis use during young adulthood when comorbid symptoms were controlled for. No such effect was found for childhood attention, hyperactivity/impulsivity or internalizing problems. With respect to psychopathological symptoms during adolescence, only attention problems were significantly related to later problematic cannabis use when controlling for comorbidity.

**Conclusions:** The current study highlights the role of conduct/oppositional behavior problems during childhood and attention problems during adolescence in later problematic cannabis use. It sheds more light on the developmental sequence of childhood and adolescence psychopathology and young adult cannabis use, which is a prerequisite for effective prevention approaches.

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## 1. Introduction

Cannabis use and cannabis use disorders have been repeatedly found to be associated with mental health problems, e.g., psychosis (Radhakrishnan et al., 2014; Sevy et al., 2010), major depressive episodes (Marmorstein, 2011), and anxiety disorders

(Kedzior and Laeber, 2014). In view of the high rate of comorbid mental health problems in cannabis users, the question arises whether psychopathology during childhood and adolescence acts as a predictor of later problematic cannabis use or whether mental health problems develop later on during the course of cannabis use. Several studies so far have tried to elucidate the link between externalizing and internalizing behavior problems during childhood and adolescence and later cannabis use.

Externalizing behavior problems encompass disinhibited, under-controlled and hostile behaviors such as aggression, impulsiveness and delinquency. They are observed across several childhood disorders, especially attention-deficit/hyperactivity disorder (ADHD), oppositional defiant (ODD) and conduct disorder

\* Corresponding author at: Department of Child and Adolescent Psychiatry and Psychotherapy, Central Institute of Mental Health, Medical Faculty Mannheim, Heidelberg University, J 5, 68159 Mannheim, Germany.

E-mail address: [manfred.laucht@zi-mannheim.de](mailto:manfred.laucht@zi-mannheim.de) (M. Laucht).

<sup>1</sup> The first two authors and last two authors contributed equally to this work.

**Table 1**  
Characteristics of the total sample and as a function of problematic cannabis use.

	Problematic cannabis use (N = 28)	No problematic cannabis use (N = 279)	Total (N = 307)
Sex (N Male, %)	20 (71.4)**	120 (43.0)	140 (45.6)
Psychosocial adversity	2.6 (2.7)	1.8 (2.0)	1.9 (2.1)
≥ 12 years of school attendance (N, %)	10 (37.0)*	157 (57.1)	167 (55.3)
Employment status at age 25 years (N full-time employment, %)	9 (32.1)	118 (42.3)	127 (41.4)
Externalizing behavior problems age 25 years (YASR, mean T score)	52.4 (7.7)***	42.6 (8.7)	43.5 (9.1)
Internalizing behavior problems age 25 years (YASR, mean T score)	47.8 (11.6)*	43.9 (9.7)	44.2 (10.0)
Age at first cannabis use (years)	15.3 (1.9)*	16.4 (2.2)	16.2 (2.2)
Cannabis use at age 15 years (N, %)			
none	18 (64.3)	246 (88.2)	264 (86.0)
< 1x/month	6 (21.4)	26 (9.3)	32 (10.4)
≥ 1x/month	4 (14.3)	7 (2.5)	11 (3.6)
Diagnosis of cannabis abuse/dependence at age 15 years (N, %)	0 (0) / 0 (0)	0 (0) / 0 (0)	0 (0) / 0 (0)
Diagnosis of cannabis abuse/dependence at age 19 years (N, %)	3 (10.7) ***/ 4 (14.3) ***	1 (0.4) / 2 (0.7)	4 (1.3) / 6 (2.0)

\*p < 0.05.

\*\*p < 0.01.

\*\*\*p < 0.001.

p-values refer to t- or Chi<sup>2</sup> tests as appropriate. Data are reported as mean (standard deviation) unless noted otherwise. For the variable “school attendance”, 5 cases are missing (4 in the group of participants with no problematic cannabis use). Age at first cannabis use in the group with no problematic cannabis use refers to n = 118 participants who reported to have ever tried cannabis. Diagnoses at age 15 years were obtained using the Schedule for Affective Disorders and Schizophrenia in School-Age Children K-SADS and at age 19 years using the Structured Clinical Interview for DSM IV SCID-I. Abbreviations: YASR—Young Adult Self-Report (Achenbach, 1997).

(CD). Aggressive and rule-breaking behavior problems during childhood and early adolescence have frequently been reported to predict cannabis use during adolescence and young adulthood (Fergusson et al., 2007; Goodman, 2010; Griffith-Lendering et al., 2011; Miettunen et al., 2014). Evidence is more mixed with regard to associations between externalizing problems occurring during mid- to late adolescence and later cannabis use (Barkley et al., 2004). Regarding child ADHD symptoms, there is a large body of consistent evidence – with a few exceptions (e.g., Goodman, 2010) – showing links with subsequent substance abuse (Charach et al., 2011), specifically cannabis use and cannabis use disorder (Lee et al., 2012). However, recent research emphasizes a role of comorbid symptoms of CD/ODD, which may account for at least part of this association (Pingault et al., 2013), underlining the need to simultaneously control for co-occurring symptoms (Lee et al., 2012; Pingault et al., 2013). Moreover, it may be important to consider hyperactive-impulsive behavior and attention prob-

lems separately, as the two concepts may have different predictive values for subsequent cannabis use (Elkins et al., 2007; Pingault et al., 2013). Internalizing problems during childhood and adolescence, such as anxiety, depression and somatic complaints, have repeatedly been found to be unrelated to subsequent cannabis use (Galéra et al., 2013; Griffith-Lendering et al., 2011; Hayatbakhsh et al., 2008; Miettunen et al., 2014), however, with the exception of a methodologically strong German longitudinal study (Wittchen et al., 2007).

In the present evaluation, we investigated the association of childhood and adolescent psychopathological symptoms with young adult problematic cannabis use. Specifically, we examined the predictive value of symptoms of CD/ODD, attention problems, hyperactive-impulsive behavior and internalizing symptoms for later problematic cannabis use while controlling for co-occurring psychopathology.

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