

Abstract

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

Purpose- Factors influencing cannabis use have been previously identified mainly using multivariate approaches. However, there is a dearth of information collected from the perspective of the adolescent cannabis user, in particular for voluntary abstinences. This was the present study's aim.

Methodology- 38 cannabis users were identified from a sample of 261 adolescents recruited from schools. They completed open ended questions identifying reasons for voluntary abstinences. Thematic analysis was used to assess their responses.

Findings- Voluntary abstinences by cannabis users were influenced by both internal and external factors. These were; the user's state of mind, an attempt to quit, negative effects of cannabis, prior to important events, prior to family interactions and peers.

Research limitations/implications –The results show that adolescent cannabis users are flexible in their approach to using cannabis, being able to briefly stop when the situation warrants it. However, the study is limited by a lack of in-depth and rich data, limiting the scope of the analysis.

Originality value-This is the first study to identify reasons for voluntary abstinences from the user's perspective in adolescent cannabis users.

Keywords: substance use, marijuana, risk factors, adolescents, abstention, cannabis

Article Type: Research paper

1 Self-reported reasons for voluntary abstinences by adolescent cannabis users

2
3 Cannabis is the most widely used illicit drug and it comes third in popularity
4 to alcohol and tobacco (EMCDDA, 2012). It has been identified as one of the first
5 illicit drugs to be used by young people, with onset of use typically from 11 to 13
6 years (Fuller, 2006; Perkonigg et al., 2008). Owing to the maladaptive mental health
7 and psychosocial outcomes associated with early onset cannabis use (e.g. Arseneault et
8 al., 2002; Macleod et al., 2004), there is a need to fully understand the reasons for
9 cannabis use and changes in use patterns in adolescents.

10 According to triadic influence theory (Flay & Petraitis, 1994) cannabis use is
11 influenced by factors falling within the intrapersonal, cultural/attitudinal and
12 social/interpersonal dimensions (Petraitis, Flay & Miller, 1995). Each dimension also
13 consists of factors falling broadly within three levels of influence; proximal, distal,
14 and ultimate. These streams of influence have broadly been identified in the literature
15 identifying various factors influencing cannabis use in young people.

16 Use of other substances, in particular tobacco and alcohol, has been shown to
17 increase the risk of cannabis initiation. This includes both an adolescent's own use
18 (Von Sydow et al., 2002), and that by peers (e.g. Coffey, Lynskey, Wolfe & Patton,
19 2000; D'Amico & McCarthy, 2006). Males appear to be at higher risk of developing
20 cannabis abuse and dependence than females (Swift et al., 2008), and they also
21 experience a more protracted period of developing these problematic use patterns
22 (Farmer et al., 2015).

23 Adolescent cannabis use trajectories reveal that approximately, only 4% of
24 those initiating early progress to increased levels of use (Coffey et al., 2000).
25 Additionally, it's been found that half of adolescents reporting past year cannabis use
26 also feel they should either reduce or stop use (Terry-McElrath, O'Malley &

1 Johnston, 2008). It has also been shown that factors influencing decreases and
2 cessation differ from those influencing initiation (Pollard et al., 2014), thus it is
3 imperative to assess reasons for decreases and cessation of cannabis use. However the
4 majority of this literature has focused on adult samples.

5 Age is a commonly identified predictor of change in cannabis use, with older
6 samples more likely to decrease and stop using cannabis than younger samples
7 (VonSydow et al., 2001; Chen & Kandel, 1998). However, these effects have not been
8 attributed to age per se, rather to transitioning into adult roles (Hammer, & Vaglum,
9 1990). Evidence for this comes from findings of continued cannabis use in adulthood
10 being related to factors such as unemployment (e.g. Lee et al., 2015). Additionally,
11 cessation has been linked to transitions such as establishing a family, stable
12 employment, stable relationship etc. (Hammer & Vaglum, 1990; Chen & Kandel,
13 1998; Veysey et al., 2013). These findings can be explained by role incompatibility
14 theory, which states that the use of cannabis is incompatible with acquisition of
15 typical and normative adult roles (Thorton et al., 1975).

16 In comparison to adult data, the scant adolescent literature on cessation has
17 alluded to a varied range of influences. For example, cessation has been linked to
18 motives for cannabis use, with high enhancement motives linked to past attempts to
19 quit (Dash & Anderson, 2015). Other factors linked to cessation in adolescents
20 include having few pro-drug use myths, ethnicity, negative psychological and
21 physical effects (Little et al., 2013; Pollard et al., 2014; Terry-McElrath, O'Malley &
22 Johnston, 2008). Nevertheless, both adult and adolescent literature indicates that
23 cessation is not always permanent, with some identifying factors influencing both
24 successful and successful and unsuccessful cessation attempts (e.g. Lieberegts et al.,
25 2015; Chauchard et al., 2013; Pollard et al., 2014).

1 Whilst the literature differentiates between successful and unsuccessful
2 cessation attempts, sometimes users briefly or periodically abstain from cannabis for
3 reasons other than quitting. Only one study has previously looked at reasons for these
4 brief voluntary abstinences, and it was found that a short term change in
5 circumstances, and physical/mental health concerns were mainly influential (Terry et
6 al., 2007). However, the respondents in this qualitative study had been cannabis users
7 for an average of 14 years (Terry et al., 2007), limiting comparability with
8 adolescents. The factors influencing cannabis use in adolescence may differ from
9 those of adulthood, as these are developmentally distinct stages (Casey et al., 2008).

10 There remains a need to qualitatively identify reasons for voluntary
11 abstinences in adolescent cannabis users in order to aid understanding of change
12 processes. Additionally, a qualitative approach may help to elucidate causal
13 mechanisms, currently missing from the predominantly multivariate approach utilised
14 in the literature (Terry et al., 2007). Therefore, the aim of the present study was to
15 assess reasons for voluntary abstinences in a sample of adolescent cannabis users.
16 This information was gathered utilising open-ended responses to questions relating to
17 voluntary abstinences. These were analysed using thematic analyses, and themes
18 identified were mapped onto triadic influence theory (Flay & Petraitis, 1994).

19
20
21
22

Method

Participants

23 A convenience sample of 261 participants was recruited from four schools
24 across the West Midlands, UK between July-December 2012. They were aged
25 between 11 and 18 years (mean=16.21 years, SD= 1.45), and 59.8% were female. The
26 sample was predominantly UK White (82.4%).

1 **Measures**

2 The study utilized the Cannabis and Young People Questionnaire (CYPQ).
3 This is a 46-item measure that assesses patterns of cannabis use and factors that
4 influence use. The scale contains three separate sections for those who have never
5 used cannabis, previous users, and current users. Cannabis users are identified by their
6 response to the question of whether they have ever used cannabis. The present study
7 utilized the two questions within the measure for assessing voluntary abstinences. The
8 first question is, “Have you had times when you chose not to smoke cannabis? If Yes,
9 please provide details.” There is a blank space for their response. The second question
10 is, “What made you decide not to smoke cannabis at that time?” Participants are also
11 provided with a blank paragraph to write their response.

12

13 **Procedure**

14 Ethical approval for the study was obtained from the National Research Ethics
15 Service, South Birmingham Research Ethics Committee (Ref 11/WM/ 0284).
16 Participants from one of the four secondary schools (n=30) attended the University of
17 Birmingham for a research experience day. These participants volunteered to take part
18 in different research studies. They were administered information and consent forms
19 and took part only if they consented. For the three remaining secondary schools
20 (n=231), a teacher in each school identified classes of students that would be available
21 to take part in the study, according to the school timetable. Information and opt out
22 consent forms were sent to parents at least two weeks prior to the commencement of
23 the study. Those whose parents opted out of the study were excluded. The remaining
24 participants were administered information and consent forms in their schools. These
25 were presented to and collected from participants before the questionnaire was
26 completed.

1 Those consenting completed the questionnaires in groups under exam-style
2 conditions. No teachers were present in the classroom during the study. For
3 confidentiality purposes, no identifying information was included on the
4 questionnaires, and these were sealed into envelopes upon completion. The
5 questionnaires were collected and retained by the investigator immediately following
6 completion. Participants were then handed a debrief sheet.

7 ***Data analysis strategy.*** Thematic analysis was used to analyze the responses. An
8 inductive approach was utilized so that there were no pre-existing notions or theories
9 to guide in identification of themes. As a result, the themes identified were data
10 driven. Stages of thematic analysis were followed as has been previously outlined
11 (Braun & Clarke, 2006). The first stage of the analysis involved familiarization with
12 the data by reading and re-reading the participant responses. In the second stage,
13 codes were generated from the participant responses. The responses were then
14 classified according to these codes, and each response could be classified under
15 multiple codes. The third stage involved generating themes from the identified codes.
16 In order to achieve this, responses corresponding to each code were re-read, and the
17 codes were collapsed into themes. For the purposes of producing an inclusive dataset,
18 all themes generated were included in the final list regardless of the number of
19 responses falling into each theme. In the fourth stage of the analysis, the themes were
20 reviewed, named and defined. This involved re-reading the participant responses in
21 order to ensure that the themes were representative of the data. Some themes were
22 collapsed into one, if they were conceptually similar, whilst others were separated.

23
24
25
26
27
28

Results

Description of sample

1 14.5% (n=38) of the sample were cannabis users. Of these, only five reported
2 being current cannabis users, with the rest identifying as previous users. They
3 reported initiating cannabis between the ages of 13-17 years (mean= 15.33, SD =
4 1.38). Only 26.32% (n=10) of the cannabis users provided data of their previous and
5 current cannabis use frequency. Of these, two reported daily use, three once a week,
6 two once a fortnight, and three once a month. All cannabis users reported current
7 alcohol use, with the majority consuming >4 units at each sitting (90.91%). Only one
8 participant reported other drug use (i.e. cocaine, LSD, amphetamines and ecstasy).

9 89.47% (n=34) of the cannabis users reported experiencing voluntary
10 abstinences from cannabis. However, only 64.71% (n=22) of these participants
11 responded to the questions asking them to provide details of and reasons for these
12 abstinences. The majority of responses referred to specific incidents of abstaining
13 (54.55%), whereas only 27.27% referred to abstaining over longer periods. It was not
14 clear in the remaining 18.18% of responses whether participants were referring to
15 incidents or periods of abstinences.

16

17 *Reasons for voluntary abstinences by cannabis users*

18

19 The overall themes identified were ‘external’ and ‘internal’ influences on the decision
20 to abstain. Within the ‘external influences’ theme, the sub-themes identified were
21 ‘peers’, ‘before important events’, and ‘prior to family interactions’. In the ‘internal’
22 influences theme, ‘state of mind’, ‘negative effects’, and ‘attempt to quit’ were
23 identified as sub-themes. These will be discussed in turn and mapped onto triadic
24 influence theory (Flay & Petraitis, 1994).

25

26 *External Influences:*

1 *Peers*

2 Most of the participants (n=11) indicated that abstentions occurred in the context of
3 their peers. This involved either being offered by their peers, or simply being in an
4 environment where cannabis was being smoked by peers. Some reported actively
5 avoiding their peers if they knew they would be using cannabis.

6

7 *T0104P: My friends were smoking a spliff, they offered me some and I decided.*

8

9 This response indicates that some decisions to abstain from cannabis were
10 spontaneous, and were not necessarily a pre-planned response. By being able to resist
11 the well-documented peer influence on cannabis use, the participants show that
12 succumbing is not inevitable.

13 From the perspective of triadic influence theory (Flay & Petraitis, 1994), this finding
14 of abstaining in spite of peers suggests that social/normative influences may be
15 negated by other streams of influence (i.e. cultural & intra-personal). However, social
16 influence from the family is still possible.

17

18 *Prior to important events*

19 Four participants reported abstaining from cannabis prior to important events,
20 although the specific events reported varied (e.g. exams, sports etc.). This shows
21 awareness of cannabis' effects on performance. In some cases, abstention was
22 temporarily maintained following the important event.

23

24 *P0012S: I was given a date for a drug test, I did not smoke for a month before*
25 *and did not start again for a month after...to see the effect it had on me.*

26

1 In this case the cannabis user initially intended to give the impression of abstinence
2 with no real intentions to quit.

3 Abstaining prior to important events represents cultural/attitudinal stream of triadic
4 influence theory (Flay & Petraitis, 1994). Judgements are made based on previous
5 experience with cannabis use, and expected impact of using cannabis in that
6 environment. These kinds of expectancies are influential at the more proximal level
7 and are directly influence behaviour

8

9 *Prior to family interactions*

10 Five participants abstained prior to family interactions. Some of these mentioned
11 parents specifically.

12

13 *N0304N: ... Also didn't want to be caught high by family.*

14

15 This response indicates an issue of worry over intoxication being discovered by the
16 cannabis user's family, and other participants stated this as well. This indicates that
17 cannabis is used in spite of the family's disapproval, and abstaining is a strategy used
18 to avoid being caught.

19 Adjusting use prior to family interactions represents both cultural/attitudinal and
20 social/normative streams in triadic influence theory (Flay & Petraitis, 1994). From the
21 cultural stream, the family determines the cultural values and expectations that relate
22 to cannabis use, in terms of acceptability or not. Consequently, the young person is
23 aware of the normative beliefs held by the family in regards to cannabis use. If these
24 are not in line with their own beliefs of cannabis then they are inclined to desist when
25 interactions with family are predicted.

26

1 *Internal Influences:*

2 *State of Mind*

3 For 10 participants, decisions to abstain appeared to be influenced by what the
4 participants felt and thought at the time.

5

6 *NoID: Mind-set, but now I want to be more open to new things*

7

8 In this response, cannabis may be seen as getting in the way of new experiences,
9 representing a new way of thinking. Other participants also alluded to other changes
10 in their perceptions of cannabis (e.g. getting bored with it).

11 This reported influence of one's own state of mind represents the intra-personal
12 stream of influence in triadic theory (Flay & Petraitis, 1994). The participant extract
13 clearly shows a change in the sense of self that has influenced the decision to abstain.
14 This young person clearly did not see himself or herself as simply a 'cannabis user'
15 for that time when they chose to abstain. Perhaps maintenance of this behaviour
16 would result from other changes such as goal setting as previously identified
17 (Liebregts et al., 2015).

18

19 *Negative effects of cannabis*

20 Negative effects of cannabis were included in seven of the responses. This included
21 both experienced and anticipated effects.

22

23 *L0008R: ...plus had a bad feeling one time and it put me off it.*

24

25 This participant did not reveal the nature of the negative effects experienced as a
26 result of smoking cannabis. The so-called 'bad feeling' could be either physical or
27 psychological in nature. Other responses alluded to longer-term psychosocial effects.

1 The finding of negative effects as a reason for abstaining can be mapped onto the
2 intra-personal influence stream of triadic influence theory (Flay & Petraitis, 1994).
3 Within this stream is behavioral control, which, according to the theory of planned
4 behaviour from where it originates, is influenced by past experience (Ajzen, 1985).

5 *Attempt to quit cannabis*

6 The final theme emerging from the responses was an ‘attempt to quit’ cannabis, with
7 4 responses containing some reference to it. In these instances, voluntary abstinences
8 represent failed quit attempts.

9

10 *T0104J: When I say I'm going to stop*

11

12 In this case the participant expresses a resolution to quit using cannabis, but also
13 implies a struggle to maintain abstinence.

14 An attempt to quit cannabis represents the interaction of all streams at multiple levels.

15 According to triadic influence theory (Flay & Petraitis, 1994), behaviour (or
16 behaviour change) is ultimately influenced by an interaction of cultural/attitudinal,
17 social/normative and intra-personal factors.

18

19

Discussion

20 The majority of cannabis users in the present study indicated that they had
21 experienced periods and incidents of voluntary abstinence, which further necessitates
22 the need to understand the reasons behind this phenomenon. As shown in the results,
23 the themes identified broadly mapped onto triadic influence theory (Flay & Petraitis,
24 1994). Previously, short-term changes in circumstances have been cited as reasons for
25 voluntary abstinences (Terry et al., 2007). This is also comparable to the present
26 findings, notably in relation to the ‘external influences’ theme (i.e. family

1 interactions, prior to important events). This indicates that as cannabis users adapt to
2 changing situations and circumstances, they change their cannabis use accordingly.
3 This perhaps differentiates them from those presenting with a substance use disorder,
4 who by definition, continue to use in spite of consequences or changing circumstances
5 (Diagnostic and Statistical Manual of Mental Disorders- 5th Edition, American
6 Psychiatric Association, 2013).

7 Interestingly, it emerged that voluntary abstinences from cannabis occurred in
8 situations involving peers. This was characterized by either resisting peer pressure to
9 use, or avoiding situations where peers would be using cannabis. This finding
10 augments the existing literature identifying a prominent role of peers across various
11 stages of cannabis use (e.g. D’Amico & McCarthy, 2006; Coffey et al., 2000). The
12 present finding also shows that although there are some adolescents who feel
13 confident enough to resist peer influence, others are not as confident and thus employ
14 an avoidance strategy in order to remain abstinent. Additionally, the avoidance of
15 cannabis use triggers and the resultant change in peer groups have both been
16 identified as influential in maintaining change in former cannabis users (Ellingstad et
17 al., 2006). However, this is based on an assessment of cessation of cannabis use and
18 not brief abstinences. Nevertheless, it remains an informative finding in light of the
19 lack of research on brief voluntary abstinences in adolescent cannabis users.

20 Within the ‘internal’ influences theme, an attempt to quit cannabis emerged as
21 a reason that was given by cannabis users for voluntary abstinences, supporting
22 previous findings (Terry et al., 2007). It may be postulated that this attempt to quit
23 was related to the negative effects of cannabis, also identified as a reason for
24 voluntary abstinences. This is because a relationship between the negative effects of
25 cannabis and cessation has been previously identified (Ellingstad, Sobell, Eickelberry

1 & Golden, 2006). Thus these voluntary abstinences may represent failed quit
2 attempts.

3 Cannabis users also reported being influenced by their ‘state of mind’. This
4 was either composed of transient feelings and thoughts, or represented a shift in the
5 mind-set of the cannabis user. This is particularly informative; as the malleable nature
6 of a mind-set, especially in regards to health behavior means that assimilating new
7 information can alter it. This implies potential utility of information-based approaches
8 for addressing cannabis use in adolescents.

9 Overall, the reasons identified for voluntary abstinences broadly mapped onto
10 the steams of influence identified in triadic influence theory (Flay & Petraitis, 1994).
11 This is comparable to other studies of adolescent substance use, which have identified
12 utility of the theory for mapping out risk and protective factors (e.g. Grigsby et al.,
13 2016). Furthermore, as the reasons for voluntary abstinences were identified directly
14 from the young people’s perspective, it shows their awareness of the different types of
15 influence on their cannabis use behaviour.

16 ***Strengths and Limitations.*** The present study provides a useful insight into
17 previously unidentified reasons for voluntary abstinences in adolescent cannabis
18 users. The self-report approach utilized allowed for the identification of factors that
19 would normally be overlooked by multivariate approaches. However, no information
20 on the type (e.g. synthetic varieties) or the potency of cannabis used was collected
21 from the users. This limits the generalisability of the findings, as the type of cannabis
22 user studied is unclear.

23 A more in depth qualitative approach (e.g. interview) would have allowed for
24 greater understanding of adolescent cannabis users’ experiences. The present study’s
25 methodology did not allow for the collection of rich, detailed qualitative data.

1 Additionally, the sample was not followed up, which hindered ability to identify
2 changes and reasons for these changes prospectively. More in depth qualitative
3 research will need to be conducted utilizing larger sample sizes. Nevertheless, the
4 findings contained here are a useful starting point for informing a previously under-
5 researched area. As voluntary abstinences may represent failed quit attempts, it will
6 be useful to incorporate identified factors in interventions for maintaining cessation.

7 The present study findings have implications for current research practices in
8 the study of cannabis use patterns in adolescents. There is a need to incorporate more
9 self report approaches (both qualitative & quantitative). This will help to further
10 understand the processes behind changing patterns of cannabis use (Terry et al.,
11 2007). Self-reported reasons and motivations for substance use are cognitions that are
12 key in cognitive based interventions for substance misuse (e.g. Cognitive Behavioral
13 Therapy) (McHugh, Hearon, & Otto, 2010).

14 In summary, previously unstudied reasons for voluntary abstinences by
15 adolescent cannabis users were identified, and these incorporated both internal and
16 external influences. Future research will benefit from further qualitative study of the
17 factors that are salient to adolescent cannabis users. These may have significant
18 implications for health promotion and treatment approaches.

19

20

References

21

22 American Psychiatric Association. (2013). *Diagnostic and statistical manual*
23 *of mental disorders* (5th ed.). American Psychiatric Publishing, Arlington, VA

1 Arseneault, L., Cannon, M., Poulton, R., Murray, R., Caspi, A., & Moffitt, T.
2 (2002), Cannabis use in adolescence and risk for adult psychosis: longitudinal
3 prospective study. *British Medical Journal*, Vol. 325, No. 7374, pp.1212–1213.

4 Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology.
5 *Qualitative Research in Psychology*, Vol. 3, No. 2, pp. 77-101.

6 Bryant, A.(2003). How academic achievement, attitudes, and behaviours relate
7 to the course of substance use during adolescence: A 6 year multiwave longitudinal
8 study. *Journal of Research on Adolescence*, Vol.13, No.3, pp. 361-397.

9 Casey, B. J., Jones, R. M. & Hare, T. (2008). The Adolescent Brain. *Annals of*
10 *the New York Academy of Sciences*, Vol. 1124, pp. 111-126.

11 Chauchard, E., Levin, K. H., Copersino, M. L., Heishman, S. J., & Gorelick,
12 D. A. (2013). Motivations to quit cannabis use in an adult non-treatment sample: Are
13 they related to relapse?. *Addictive behaviors*, 38(9), 2422-2427.

14 Cheadle, J. E., & Sittner Hartshorn, K. J. (2012). Marijuana use development
15 over the course of adolescence among North American Indigenous youth. *Social*
16 *Science Research*, Vol. 41 No.5, pp.1227-1240.

17 Chen, C. Y., O'Brien, M. S., & Anthony, J. C. (2005). Who becomes cannabis
18 dependent soon after onset of use? Epidemiological evidence from the United States:
19 2000–2001. *Drug and Alcohol Dependence*, Vol. 79, No. 1, pp. 11-22.

20 Chen, K. & Kandel, D. (1998). Predictors of cessation of marijuana use: an
21 event history analysis. *Drug and Alcohol Dependence*, 50, 109-121.

22 Coffey, C., Lynskey, M., Wolfe, R., & Patton, G. C. (2000). Initiation and
23 progression of cannabis use in a population-based Australian adolescent longitudinal
24 study. *Addiction*, Vol. 95, No.11, pp. 1679-1690.

1 Coffey, C., Carlin, J. B., Lynskey, M., Li, N., & Patton, G. C. (2003).
2 Adolescent precursors of cannabis dependence: findings from the Victorian
3 Adolescent Health Cohort Study. *The British Journal of Psychiatry*, Vol. 182, No. 4,
4 pp. 330-336.

5 Copello, A., Orford, J., Hodgson, R., Tober, G., & Barrett, C. (2002). Social
6 behaviour and network therapy: basic principles and early experiences. *Addictive*
7 *Behaviors*, Vol. 27, No. 3, pp345-366.

8 Copello, A., Williamson, E., Orford, J., & Day, E. (2006). Implementing and
9 evaluating Social Behaviour and Network Therapy in drug treatment practice in the
10 UK: A feasibility study. *Addictive Behaviors*, Vol. 31, No.5, pp. 802-810.

11 Crano, W. D., Siegel, J. T., Alvaro, E. M, Lac, A. & Hemovich, V. (2008).
12 The at-risk adolescent marijuana user: Expanding the standard distinction. *Prevention*
13 *Science*, Vol. 9, pp. 129-137.

14 D'Amico, E., and McCarthy, D. (2006). Escalation and initiation of younger
15 adolescents' substance use: The impact of perceived peer use. *Journal of Adolescent*
16 *Health*, Vol. 39, pp. 481-487.

17 Dash, G. F., & Anderson, K. G. (2015). Marijuana use, motives, and change
18 intentions in adolescents. *Journal of psychoactive drugs*, 47(2), 100-106

19 Dawson, D. A., Grant, B. F., Stinson, F. S., & Chou, P. S. (2006). Maturing
20 out of alcohol dependence: the impact of transitional life events. *Journal of Studies on*
21 *Alcohol*, Vol. 67, No.2, pp. 195-203.

22 Ellingstad, P.T., Sobell, L.C., Sobell,M.B., Eickelberry, L. & Golden, C.L.
23 (2006). Self-change: A pathway to cannabis abuse resolution. *Addictive Behaviours*,
24 Vol.31, pp. 519-530.

1 EMCDDA (2012). Annual report on the state of the drugs problem in Europe.

2 The European Monitoring Centre for Drugs and Drug Addiction. Retrieved from

3 <http://www.emcdda.europa.eu/publications/annual-report/2012> on June 24th 2014

4 Farmer, R. F., Kosty, D. B., Seeley, J. R., Duncan, S. C., Lynskey, M. T.,

5 Rohde, P., ... & Lewinsohn, P. M. (2015). Natural course of cannabis use disorders.

6 *Psychological Medicine*, Vol. 45, No.1, pp. 63-72.

7 Flay, B. R., & Petraitis, J. (1994). A new theory of health behavior with

8 implications for preventive interventions. *Advances in Medical Sociology*, 4, 19-44.

9 Fuller, E. (2006). Smoking, Drinking and Drug Use Among Young People in

10 England-2005. Health and Social Care Information Centre, England, UK. Retrieved

11 from [http://www.hscic.gov.uk/catalogue/PUB00301/drug-smok-drin-youn-peop-eng-](http://www.hscic.gov.uk/catalogue/PUB00301/drug-smok-drin-youn-peop-eng-2005-rep1.pdf)

12 [2005-rep1.pdf](http://www.hscic.gov.uk/catalogue/PUB00301/drug-smok-drin-youn-peop-eng-2005-rep1.pdf) on March 15th 2014

13 Furman, W., & Buhrmester, D. (1992). Age and sex differences in perceptions

14 of networks of personal relationships. *Child Development*, Vol. 63, No.1, pp.103-115.

15 Gervilla, E., Cajal, B., & Palmer, A. (2011). Quantification of the influence of

16 friends and antisocial behaviour in adolescent consumption of cannabis using the

17 ZINB model and data mining. *Addictive Behaviors*, Vol.36, No.4, pp.368-374.

18 Griffin, K., Botvin, G., Scheier, L., Epstein, J. & Doyle, M. (2002). Personal

19 competence skills, distress, and well-being as determinants of substance use in a

20 predominantly minority urban adolescent sample. *Prevention Science*, Vol. 3, No.1,

21 pp. 23-33.

22 Grigsby, T. J., Forster, M., Unger, J. B., & Sussman, S. (2016). Predictors of

23 alcohol-related negative consequences in adolescents: a systematic review of the

24 literature and implications for future research. *Journal of adolescence*, 48, 18-35

1 Hammer, T., & Vaglum, P. (1990). Initiation, continuation or discontinuation
2 of cannabis use in the general population. *British Journal of Addiction*, 85(7), 899-
3 909.

4 Johnston, L. D., O'Malley, P. M., Bachman, J. G., & Schulenberg, J. E.
5 (2012). Monitoring the Future national survey results on drug use, 1975-2011:
6 Volume I, secondary school students. Ann Arbor, MI: Institute for Social Research,
7 the University of Michigan. Retrieved from
8 http://monitoringthefuture.org/pubs/monographs/mtf-vol1_2011.pdf on April 5th
9 2013

10 Juon, H. S., Fothergill, K. E., Green, K. M., Doherty, E. E., & Ensminger, M.
11 E. (2011). Antecedents and consequences of marijuana use trajectories over the life
12 course in an African American population. *Drug and Alcohol Dependence*, Vol. 118,
13 No. 2, 216-223.

14 Lee, J. Y., Brook, J. S., Finch, S. J., & Brook, D. W. (2015). Trajectories of
15 marijuana use from adolescence to adulthood predicting unemployment in the mid
16 30s. *The American Journal on Addictions*, 24(5), 452-459.

17 Liebrechts, N., van der Pol, P., de Graaf, R., van Laar, M., van den Brink, W.,
18 & Korf, D. J. (2015). Persistence and desistance in heavy cannabis use: the role of
19 identity, agency, and life events. *Journal of Youth Studies*, 18(5), 617-633.

20 Little M.A., Spruijt-Metz D., Pokhrel P., Sun P., Rohrbach L. A. and Sussman
21 S. (2013) Predicting self-initiated marijuana use cessation among youth at
22 continuation high schools. *Frontiers in Psychiatry* 4 (69), 1-7

23 Littlefield, A. K., Sher, K. J., & Wood, P. K. (2009). Is “maturing out” of
24 problematic alcohol involvement related to personality change?. *Journal of Abnormal*
25 *Psychology*, Vol. 118, No. 2, pp. 360.

- 1 MacLeod, J., Oakes, R., Copello, A., Crome, I., Egger, M., Hickman, M.
2 Oppenkowski, T., Stokes-Lampard, H. and Davey Smith, G. (2004) Psychological
3 and social sequelae of cannabis and other illicit drug use by young people: A
4 systematic review of longitudinal, general population studies. *The Lancet*, Vol. 363,
5 pp. 1579-1588.
- 6 Maggs, J. L., & Schulenberg, J. E. (2004). Trajectories of alcohol use during
7 the transition to adulthood. *Alcohol Research*, Vol. 28, No.4, pp.195.
- 8 McHugh, R. K., Hearon, B. A., & Otto, M. W. (2010). Cognitive behavioral
9 therapy for substance use disorders. *Psychiatric Clinics of North America*, Vol. 33,
10 No.3, pp. 511-525.
- 11 O' Malley, P. M. (2004). Maturing out of problematic alcohol use. *Alcohol*
12 *Research and Health*, Vol. 28, No.4, pp202.
- 13 Perkonigg, A., Goodwin, R.D., Fiedler, A., Behrendt, S., Beesdo, K., Lieb, R.,
14 Wittchen, H.U. (2008). The natural course of cannabis use, abuse and dependence
15 during the first decades of life. *Addiction*, Vol.103, pp. 439-449.
- 16 Petraitis, J., Flay, B. R., & Miller, T. Q. (1995). Reviewing theories of
17 adolescent substance use: organizing pieces in the puzzle. *Psychological bulletin*,
18 *117*(1), 67.
- 19 Pollard, M. S., Tucker, J. S., De La Haye, K., Green, H. D., & Kennedy, D. P.
20 (2014). A prospective study of marijuana use change and cessation among
21 adolescents. *Drug and Alcohol Dependence*, Vol. 144, pp.134-140.
- 22 Schaub, M., Gmel, G., Annaheim, B., Mueller, M., & Schwappach, D. (2010).
23 Leisure time activities that predict initiation, progression and reduction of cannabis
24 use: A prospective, population-based panel survey. *Drug and Alcohol Review*, Vol.
25 29, No. 4, pp.378-384

1 Schinke, S., Fang, L. & Cole, K. (2008). Substance use and early adolescent
2 girls: risk and protective factors. *Journal of Adolescent Health*, Vol. 43, pp. 191-194.

3 Swift, W., Coffey, C., Carlin, J. B., Degenhardt, L., & Patton, G. C. (2008).
4 Adolescent cannabis users at 24 years: trajectories to regular weekly use and
5 dependence in young adulthood. *Addiction*, Vol. 103, No. 8, pp. 1361-1370.

6 Terry, P., Wright, K. A., Terry, P., Wright, K. A., & Cochrane, R. (2007).
7 Factors contributing to changes in frequency of cannabis consumption by cannabis
8 users in England: A structured interview study. *Addiction Research & Theory*, Vol.
9 15, No. 1, pp.113-119.

10 Terry-McElrath, Y. M., O'malley, P. M., & Johnston, L. D. (2008). Saying no
11 to marijuana: why American youth report quitting or abstaining. *Journal of studies on*
12 *alcohol and drugs*, 69(6), 796-805.

13 Von Sydow, K., Lieb, R., Pfister, H., Hofler, M., Sonntag, H., and Wittchen,
14 H. (2001). The natural course of cannabis use, abuse and dependence over four years:
15 a longitudinal community study of adolescents and young adults. *Drug and Alcohol*
16 *Dependence*, 64, 347-361

17 von Sydow, K., Lieb, R., Pfister, H., Höfler, M., & Wittchen, H. U. (2002).
18 What predicts incident use of cannabis and progression to abuse and dependence?: A
19 4-year prospective examination of risk factors in a community sample of adolescents
20 and young adults. *Drug and Alcohol Dependence*, Vol. 68, No.1, pp. 49-64.

21

22