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# Are Cannabis Expectancies Related to Subjective Drug Experiences and Schizotypy?

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## Abstract

**Objective:** There is an established literature on cannabis expectancies and how these relate to patterns of cannabis use and clinical outcomes. However increasingly we are becoming interested in how cannabis expectancies shape the subjective experiences people have during drug use, and vice versa. Here we present data reporting how cannabis expectancies relate to subjective experiences after cannabis. Additionally we will determine whether an index of psychosis proneness (schizotypy) is related to cannabis expectancies.

**Method:** A sample of recreational cannabis users (n=137) completed the brief Schizotypal Personality Questionnaire, the Cannabis Experiences Questionnaire and the Marijuana Effects Expectancy Questionnaire.

**Results:** Cannabis expectancies correlated with the subjective experiences reported in the immediate high from cannabis. However, only Cognitive and Behavioural Impairment expectancies were correlated with after effects from cannabis. There were no significant correlations between schizotypy and cannabis expectancies.

**Conclusion:** Cannabis expectancies are related to the immediate experiences subjectively felt after smoking cannabis. Further research is necessary to determine which clinically significant personality traits shape cannabis expectancies.

**Keywords:** Cannabis expectancies; Schizotypy; Substance use; Schizophrenia and cannabis experiences

## Introduction

Do expected effects of cannabis relate to the experiences people have when using the drug? An individual's expectancies for a substance capture how they expect to be affected during substance use and are shaped by information from the environment (e.g., media, peers, observing others) as well as subjective experiences with that particular substance when use occurs [1,2]. Traditionally, expectancies have been considered in alcohol research, and are related to both adult and adolescent drinking behaviours [3-5]. More recently expectancies have been investigated in relation to cannabis use, with the previous results from alcohol research largely being replicated [6-8]. Given the role for expectancies to shape patterns of substance use, the investigation of cannabis expectancies has relevance not only for substance use problems in the general (psychologically healthy) population, but also for individuals with serious mental health problems. For instance, compared to the general population, rates of cannabis use are elevated in patients with schizophrenia [9,10] and psychosis prone healthy volunteers from the general population [11]. In those with schizophrenia, substance use can lead to variability in treatment and symptom outcomes [12]. Therefore determining whether cannabis expectancies vary according to vulnerability for a mental illness such as schizophrenia could highlight reasons for use, potentially explain variations in subjective experiences with a substance and assist in the development of effective psychological interventions to target substance use in psychologically vulnerable populations [13].

Few studies have investigated cannabis expectancies in patients with schizophrenia. Green, Kavanagh and Young [14] reported that patients with psychosis had the same expectancies for cannabis and used the same quantities on each occasion but with less frequency when compared to healthy controls. However, psychosis patients displayed more cannabis dependent-like behaviours (e.g., withdrawal symptoms) and were more driven to change their consumption than healthy controls. Self-reported negative effects of cannabis predicted of cannabis use over a four week follow up period in the patients with psychosis but not control participants. Despite there being no differences between the patients and controls on their overall expectancies for cannabis, cannabis expectancies appeared to behave in differential manner in the two groups.

Given that experiences with a substance shape expectations of how the drug will affect people on future occasions, it is important to consider subjective drug experiences in a systematic manner. Indeed, the subjective experiences people have when smoking cannabis have been related to both patterns of and reasons for cannabis use [14-16]. Aside from the management of psychotic symptoms, patients with schizophrenia and healthy controls report using cannabis for the same reasons [17]. Subjective experiences after using cannabis may change as a psychotic disorder emerges in a young person. Those at risk for developing psychosis report feeling more anxious, depressed and suspicious after cannabis use [18]. Whilst, in those with recent onset psychosis, the first psychotic symptoms occurred after cannabis use [18]. Previously it has been reported that psychotic-like experiences after cannabis use are related to psychosis proneness or schizotypy in the general population [19-22].

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Given that the subjective experiences people report after cannabis appear to differ according to schizotypy or psychosis proneness, it is also possible that cannabis expectancies will also vary. Particularly since the experiences people have with cannabis influence cannabis expectancies [23]. Therefore we investigated the relationship between cannabis expectancies, self-reported subjective experiences with cannabis and schizotypy. Our primary hypothesize is that psychotic-like experiences during the cannabis high will be related to, and predictive of, negative expectancies and the pleasurable cannabis experiences to positive cannabis expectancies. The relationship between cannabis expectancies and other cannabis experiences will also be reported for completeness. Given that the findings for expectancies differing between patients with psychosis and healthy participants are limited we will test a secondary hypothesize that negative cannabis expectancies will be positively correlated with schizotypy scores. To ensure that our sample is in keeping with previous studies we hypothesize that we will replicate previous literature: expectancies will be related to patterns of cannabis use, more specifically people who had used cannabis at least once would score higher on the positive cannabis expectancies.

## Method

### Participants

An opportunity sample of 137 young adults (24% male; mean age 22.01 (SD 5.50) years) were recruited through a local university in Manchester, UK. Participants did not receive financial compensation for completing the study. Other data from these participants has been reported in Barkus et al. [20].

### Measures

**Schizotypy:** Participants completed the brief 22-itemed Schizotypal Personality Questionnaire (SPQB) [24] comprising the most reliable items from the longer Schizotypal Personality Questionnaire [25]. The SPQB produces a total score and three sub-scales: 'Disorganized' (SPQB-D), 'Cognitive-Perceptual' (SPQB-CP), 'Interpersonal' (SPQB-I) and a Total score.

**Drug use:** Frequency of cannabis use was categorized: Only once or twice, At least once a year, At least once a week, and At least once a month. We recorded when they smoked cannabis (During the morning, during the day, during the evening, frequently during the day and night) and other recreational drugs. Time of day when cannabis was smoked was recorded as an indicator of the degree of intrusiveness of cannabis use.

**Experiences with cannabis:** The properties of the Cannabis Experience Questionnaire (CEQ) have been reported elsewhere [20-22]. Briefly, participants respond to a list of experiences describing immediate ('high) and after effects associated with cannabis on a Likert scale: Never, Occasionally, Sometimes, More often than not, and Always. The items formed four subscales, two for the immediate effects (Paranoid-Dysphoric and Euphoric) and two for after effects (Amotivational and Psychosis after effects) [22]. The CEQ can be completed by participants who smoke cannabis at least once in their life.

**Marijuana effects expectancy questionnaire:** The MEEQ [26] was designed to record expectations for the effects of cannabis; it can be completed regardless of whether an individual has taken cannabis. It has six subscales: Cognitive and Behavioural Impairment (CBI), Relaxation and Tension Reduction (RTR), Social and Sexual Facilitation (SSF), Perceptual Cognitive Enhancement (PCE), Global Negative Effects (GNE), and Craving and Physical Effects (CPE).

### Procedure

Respondents completed the CEQ, MEEQ and the SPQB as fully and honestly as possible in their own time and returned them to a labelled post box in a communal area of the university. Respondents were only identifiable by a number. The current data analysis was performed using SPSS version 15. The study had ethical approval as part of a larger project examining psychosis risk factors in a non-clinical population.

### Statistical analysis

All variables approximated to a normal distribution except the SPQB subscales which required a logarithmic transformation. In the interests of reducing false positive results the significance level to be reached was 1%. In general terms, t-tests were used when the independent variable had two groups, analysis of variance (ANOVA) was used when the independent variable had three or more groups. Scheffe post hoc analysis was used if the ANOVAs proved to be significant. Chi-square tests were used when associations between categorical variables were being tested. The Pearson's correlations were used to explore the relationship between the MEEQ subscales schizotypy and cannabis experiences. Untransformed means are presented for ease of interpretation. In addition, regression analyses have been performed to determine which variables predict cannabis experiences.

## Results

### Participants

72.5% of our sample reported having used cannabis at least once. There was no association between gender and smoking cannabis or polydrug status. Of the total sample, 40.9% had used only cannabis, while 33.6% of the total sample were polydrug users (i.e., had used at least one other drug besides cannabis). The number of other drugs (besides cannabis) used by participants varied between 1 (41% of the polydrug users) and 10 (0.7%). Other recreational drugs of choice (listed according to frequency of reporting) included cocaine (19%), ecstasy (19%), LSD (13%), amphetamine (11%), magic mushrooms (7%), poppers (7%) and ketamine (4%). Drugs used by fewer than 2% of participants included: solvents, GHB, nutmeg, benzodiazepines, MDA, opiates and barbiturates. Three participants who had not smoked cannabis but had used other drugs (LSD, cocaine or morphine) were included in the analyses reported below as non-cannabis users.

There were no gender differences on MEEQ subscales, nor any associations between gender and patterns of cannabis or other drug use. There were no significant differences on the MEEQ subscales for the frequency of cannabis use. In keeping with the previous literature males had higher scores on the disorganised dimension from the SPQB (Male: 2.64 (SD=1.85), Female=1.56 (SD=1.65); t=3.41, df=46.62, p=0.002). There were no differences for cannabis use status, polydrug use status or frequency of use on the schizotypy scores.

### MEEQ and SPQB

There were no significant correlations between the subscales from the MEEQ and the SPQB subscales. Given that there were no significant correlations between MEEQ and SPQB, regression models using MEEQ subscales to predict schizotypy were not persuade further.

### MEEQ and cannabis use

There were significant differences between cannabis users and non-users on two of the MEEQ subscales. For the SSF subscale (t=3.99, df=58.33, p<0.001) those who had not smoked cannabis scored significantly higher (mean=5.41, SD=2.26) than those who had smoked

cannabis (mean=3.80, SD=1.80). For the GNE subscale (t=5.55, df=135, p<0.001) those who had not smoked cannabis had higher negative evaluations (mean=4.72, SD=2.24)) compared to those who had used cannabis (mean=2.39, SD=2.21) (Table 1).

Participants were divided into three groups according to whether they had used no drug (n=35), cannabis only (n=56) or had used one other drug besides cannabis (polydrug use; n=46). There were significant differences on four MEEQ subscales (Table 1). Both the no drug group and the polydrug group (at a trend level) scored higher than the cannabis only group on the CBI subscale. The no drug group scored significantly higher on the SSF compared to the cannabis only and the polydrug groups. For the GNE subscale the no drug group scored significantly higher than both the cannabis only and the polydrug groups. For the RTR subscale the no drug group had significantly higher scores than the polydrug group.

## MEEQ and CEQ subscales

The correlations between the MEEQ subscales and the CEQ subscales are presented in Table 2. Both the SSF and the GNE subscales did not correlate significantly with any CEQ subscales. There were significant correlations between the MEEQ and the immediate response to cannabis subscales, only the CBI subscale from the MEEQ was correlated with the after effect subscales from the CEQ.

In order to determine which MEEQ subscales provided unique variance in predicting cannabis experiences, a series of regression models using Enter method were performed. The results of these will now be described. When considering the immediate Psychosis-Dysphoric experiences from cannabis ($R^2$=0.284, adjusted $R^2$=0.237; F(6,92) =6.08, p<0.001), high Cognitive and Behavioural Impairment, low Relaxation and Tension Reduction, and high Perceptual Cognitive Enhancement scores predicted these immediate experiences from cannabis (Table 3).

The results for the immediate Euphoric experiences ($R^2$=0.380, adjusted $R^2$=0.339; F(6,92) =9.39, p<0.001) are displayed in Table 4. Low Cognitive and Behavioural Impairment, high Perceptual Cognitive Enhancement and high Craving and Physical Effects were predictive of high endorsement of Euphoric Experiences in the immediate high from cannabis.

Table 5 displays the results for the regression model predicting Amotivational after effects from cannabis ($R^2$=0.290, adjusted $R^2$=0.244; F(6,92) =6.26, p<0.001). High scores on Cognitive and Behavioural Impairment, Perceptual Cognitive Enhancement, and low scores on Relaxation and Tension Reduction predicted high scores on for Amotivational after effects.

Finally, the MEEQ subscales which predicted Psychosis-like after effects were also considered ($R^2$=0.213, adjusted $R^2$=0.161; F(6,92) =4.14, p=0.001). High scores on Cognitive and Behavioural Impairment and low scores on Relaxation and Tension Reduction were significant of the Psychosis-like after effects (Table 6).

## Discussion

The study examined the relationship between cannabis expectancies, subjective cannabis experiences and schizotypy. Those who had not used cannabis had higher scores on the Global Negative Effects subscale and Social and Sexual Facilitation subscales from the MEEQ.

| | Drug use | | | F value, df=2,134, p value | Scheffe values (p value) |
|---|---|---|---|---|---|
| | No drugs (n=35) | Cannabis Only (n=56) | Polydrug use (n=46) | | |
| **CBI** | 6.89 (1.75) | 5.48 (2.47) | 6.57 (2.32) | F=5.06, p=0.008 | No drugs V cannabis only (0.017)<br>Cannabis only V Polydrugs (trend 0.058) |
| **SSF** | 5.46 (2.21) | 4.16 (1.96) | 3.46 (1.66) | F=10.74, p<0.001 | No drugs V cannabis only (0.009)<br>No drugs V Polydrugs (<0.001) |
| **GNE** | 4.66 (2.26) | 2.75 (2.32) | 2.20 (2.20) | F=12.57, p<0.001 | No drugs V cannabis only (0.001)<br>No drugs V Polydrugs (<0.001) |
| **RTR** | 6.00<br>(2.13) | 5.46<br>(1.94) | 4.61<br>(2.12) | F=4.12, p=0.01 | No drugs V Polydrugs (0.012) |

Key: CBI: Cognitive and Behavioural Impairment; RTR: Relaxation and Tension Reduction; SSF: Social and Sexual Facilitation; PCE: Perceptual Cognitive Enhancement; GNE: Global Negative Effects; CPE: Craving and Physical Effects (CPE).

**Table 1:** The effects of polydrug use status on MEEQ subscales.

| | Paranoid Dysphoric | Euphoric | Amotivational After Effects | Psychosis-like After Effects |
|---|---|---|---|---|
| **CBI** | 0.434 (p<0.001) | ns | 0.463 (p<0.001) | 0.395 (p<0.001) |
| **RTR** | ns | 0.349 (p<0.001) | Ns | ns |
| **PCE** | 0.232 (0.021) | 0.473 (p<0.001) | Ns | ns |
| **CPE** | 0.200 (0.047) | 0.233 (0.020) | Ns | ns |

Key: n=99 (cannabis users only). CBI: Cognitive and Behavioural Impairment; RTR: Relaxation and Tension Reduction; SSF: Social and Sexual Facilitation; PCE: Perceptual Cognitive Enhancement; GNE: Global Negative Effects; CPE: Craving and Physical Effects (CPE).

**Table 2:** The correlations between the MEEQ and the CEQ subscales.

| | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| **MEEQ Subscale** | B | Std. Error | Beta | t | Sig. |
| **Cognitive and Behavioural Impairment** | 1.882 | .538 | .360 | 3.500 | 0.001 |
| **Relaxation and Tension Reduction** | -1.924 | 0.739 | -0.309 | -2.604 | 0.011 |
| **Social and Sexual Facilitation** | -.217 | 0.822 | -0.030 | -0.264 | 0.793 |
| **Perceptual Cognitive Enhancement** | 1.924 | 0.710 | 0.296 | 2.709 | 0.008 |
| **Global Negative Effects** | -0.357 | 0.646 | -0.061 | -0.553 | 0.582 |
| **Craving and Physical Effects** | 0.774 | 0.778 | 0.096 | 0.995 | 0.322 |

**Table 3:** The Enter Regression model results for Psychosis-Dysphoric immediate cannabis experiences.

| | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| **MEEQ Subscale** | B | Std. Error | Beta | t | Sig. |
| **Cognitive and Behavioural Impairment** | -0.912 | 0.337 | -0.259 | -2.705 | 0.008 |
| **Relaxation and Tension Reduction** | 0.177 | 0.463 | 0.042 | 0.383 | 0.703 |
| **Social and Sexual Facilitation** | 0.153 | 0.516 | 0.032 | 0.297 | 0.767 |
| **Perceptual Cognitive Enhancement** | 2.386 | 0.445 | 0.545 | 5.358 | 0.000 |
| **Global Negative Effects** | -0.731 | 0.405 | -0.184 | -1.804 | 0.074 |
| **Craving and Physical Effects** | 1.429 | 0.488 | 0.264 | 2.928 | 0.004 |

**Table 4:** The Enter Regression model results for Euphoric immediate cannabis experiences.

| | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| **MEEQ Subscale** | B | Std. Error | Beta | t | Sig. |
| **Cognitive and Behavioural Impairment** | 1.235 | 0.279 | 0.454 | 4.430 | 0.000 |
| **Relaxation and Tension Reduction** | -0.908 | 0.383 | -0.280 | -2.369 | 0.020 |
| **Social and Sexual Facilitation** | -0.202 | 0.427 | -0.054 | -0.473 | 0.637 |
| **Perceptual Cognitive Enhancement** | 0.797 | 0.368 | 0.235 | 2.163 | 0.033 |
| **Global Negative Effects** | -0.419 | 0.335 | -0.137 | -1.251 | 0.214 |
| **Craving and Physical Effects** | 0.180 | 0.404 | 0.043 | 0.445 | 0.657 |

**Table 5:** The Enter Regression model results for Amotivational after Effects from cannabis.

| | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|
| **MEEQ Subscale** | B | Std. Error | Beta | t | Sig. |
| **Cognitive and Behavioural Impairment** | 0.494 | 0.136 | 0.392 | 3.634 | 0.000 |
| **Relaxation and Tension Reduction** | -0.369 | 0.187 | -0.246 | -1.972 | 0.052 |
| **Social and Sexual Facilitation** | -0.037 | 0.208 | -0.021 | -0.176 | 0.861 |
| **Perceptual Cognitive Enhancement** | 0.308 | 0.180 | 0.196 | 1.711 | 0.090 |
| **Global Negative Effects** | -0.082 | 0.163 | -0.058 | -0.503 | 0.616 |
| **Craving and Physical Effects** | -0.091 | 0.197 | -0.047 | -0.463 | 0.645 |

**Table 6:** The Enter Regression model results for Psychosis-like After Effects from cannabis.

This suggests users minimise the general negative effects of cannabis, while non-users perceive cannabis to be more socially facilitating than users. Consequently, user's expectations about cannabis are not simply more positive than non-users as hypothesized, rather it appears cost-benefit reasoning exists potentially with anticipated positive effects not living up to expectations but negative expectancies about cannabis also not being realised after use. This is supported by previous research reporting that those who had not smoked cannabis have higher global negative expectations [6-8,14]. Many of the reason given by patients for cannabis use are centred on social situations [17], although in the current sample non-users had higher expectations for cannabis to be relaxing, socially and sexually facilitating. This suggests the perceived reasons for use in patients may not directly align with drug expectancies in users, particularly given that there were no significant correlations between schizotypy scores and cannabis expectancies.

When considering the degree of exposure to recreational drugs, the Global Negative Effects subscale and Social and Sexual Facilitation subscales were also sensitive to group differences. There was a linear effect for Social and Sexual Facilitation, Global Negative Effects and Relaxation and Tension Reduction subscales from the MEEQ with the no drug exposure group scoring highest, cannabis only an intermediary group and the polydrug group scoring the lowest. Polydrug users and those with no exposure to recreational drugs had higher ratings for the Cognitive Behavioural Impairment from cannabis. These results suggest polydrug users are more likely to minimise general negative effects of cannabis, but also do not perceive the relaxing benefits stereotypically associated with cannabis. However, we did not explicitly ask participants whether they used cannabis in combination with other recreational drugs so cannot conclude whether these scores reflect a general attitude to drugs or the effects of using other drugs contiguous with cannabis.

There was partial support for the hypothesis that psychotic-like experiences after cannabis use will be related to negative expectancies, and pleasurable cannabis experiences will be related to positive cannabis expectancies. Only the Cognitive and Behavioural Impairment subscale from the MEEQ was associated with both the immediate and after effects from cannabis, perhaps reflecting a recognition that the cognitive effects of cannabis persist after the initial high from cannabis has abated. The two immediate cannabis effects subscales from the CEQ were correlated with nearly all of the MEEQ subscales. In the regression models the Cognitive and behavioural Impairment subscale were predictive of all the cannabis experiences; Perceptual Cognitive Enhancement scores were predictive of the immediate cannabis experiences and the Amotivational after-effects. Lower scores on Relaxation and Tension Reduction were predictive of the more negative experiences from cannabis in both the immediate high and the after effects; this would suggest that those who have expectancies of enjoying cannabis are less likely to experience deleterious subjective effects. Conversely high Craving and Physical Effects expectancies were predictive of Euphoric immediate effects; perhaps pointing to immediate enjoyment of the high being a motivation for future use. The reasons for cannabis use are primarily focused upon the immediate effects of cannabis [17]. Peters et al. [18] reported that their patient groups (clinical high risk for and recent onset patients with psychosis) reported longer lasting subjective after effects from cannabis than healthy controls. Perhaps individuals, who are sensitive to the immediate high from cannabis, experience more after effects as well. Sensitivity to the effects of the immediate high from cannabis could strongly reinforce cannabis expectancies and shape expectations for future effects when smoking cannabis. An alternative explanation for cannabis expectancies being correlated with the immediate rather than after effects from cannabis, may be found in focus that the media

places on the immediate high from cannabis, paying little attention to the potential for longer lasting after effects. Learning environment and exposure to media messages will shape cannabis expectancies, which in turn may shape experiences, which will reciprocate to potentially modify expectancies over time with repeated exposure to the drug.

Schizotypy scores were not related to expectancies. This suggests that those who score high or low on schizotypy have the same expectations about the effects of cannabis. Perhaps lending support for individual differences in cannabis experiences being underpinned by biological (genes, dopamine regulation) rather than social factors (openness to unusual experiences). Additionally it may offer tentative evidence against those with higher schizotypy scores using cannabis to self-medicate. In support of these findings, previously Hides et al. [27] reported that cannabis expectancies were not related to psychotic symptoms in patients. However, some studies report patients with psychosis use cannabis to enhance mood [17,28]. This could be an indirect effect on symptoms and assist in facilitating social interactions. It would be possible to examine this mediating effect in healthy individuals with high schizotypy scores.

The current study only used a brief schizotypy measure and it may be that the items which are sensitive to cannabis expectancies were not included. There may be other aspects of personality which are more closely related to cannabis expectancies and use such as impulsivity (see data on the acquired preparedness model) [29] than schizotypy. Alternatively the effect of schizotypy may be too small to detect in the relatively small sample size reported here. Furthermore we used a relatively high functioning sample that only used cannabis recreationally. Collecting data from a different sample could produce alternative results. In the general population it may be possible to recruit individuals who use cannabis heavily, perhaps resulting in associations between schizotypy and expectancies.

In conclusion we found similar findings to previous research for the effects of patterns of use on cannabis expectancies. Schizotypy scores and cannabis expectancies were not related. Immediate effects from cannabis were correlated with a greater number of cannabis expectancy subscales than the cannabis after effects. Replication of the current data is required in a larger sample and with a more detailed schizotypy scale. Furthermore other personality traits need to be investigated which may be related to both cannabis experiences and expectancies. Additionally with a larger sample other analysis techniques such as mediation and structural equation modelling would be beneficial to address the direction of the relationship between cannabis expectancies, experiences and possible role schizotypy may play.

## References

1. Smith GT (1994) Psychological expectancy as mediator of vulnerability to alcoholism. Ann N Y Acad Sci 708: 165-171.
2. Fergusson DM, Horwood LJ, Lynskey MT, Madden PA (2003) Early reactions to cannabis predict later dependence. Arch Gen Psychiatry 60: 1033-1039.
3. Schuckit MA, Smith TL, Danko GP, Anderson KG, Brown, SA, et al. (2005) Evaluation of a level of response to alcohol-based structural equation model in adolescents. J Stud Alcohol 66: 174-84.
4. Ohannessian CM, Hesselbrock VM (2004) Do alcohol expectancies moderate the relationship between parental alcoholism and adult drinking behaviours? Addict behav 29: 901-909.
5. Shen S, Locke-Wellman J, Hill SY (2001) Adolescent alcohol expectancies in offspring from families at high risk for developing alcoholism. J Stud Alcohol 62: 763-772.
6. Linkovich-Kyle TL, Dunn ME (2001) Consumption-related differences in the organization and activation of marijuana expectancies in memory. Exp clin psychopharm 9: 334–342.
7. Willner P (2001) A view through the gateway: expectancies as a possible pathway from alcohol to cannabis. Addiction 96: 691-703.
8. Aarons GA, Brown SA, Stice E, Coe MT (2001) Psychometric evaluation of the marijuana and stimulant effect expectancy questionnaires for adolescents. Addict Behav 26: 219-236.
9. Gregg L, Barrowclough C, Haddock G (2007) Reasons for increased substance use in psychosis. Clin Psychol Rev 27: 494-510.
10. Degenhardt L, Hall W (2006) Is cannabis use a contributory cause of psychosis? Can J Psychiatry 51: 556-565.
11. Williams JH, Wellman NA, Rawlins JN (1996) Cannabis use correlates with schizotypy in healthy people. Addiction 91: 869-877.
12. Drake RE, Luciano AE, Mueser KT, Covell NH, Essock SM, et al. (2015) Longitudinal Course of Clients With Co-occurring Schizophrenia-Spectrum and Substance Use Disorders in Urban Mental Health Centers: A 7-Year Prospective Study. Schizophrenia Bulletin.
13. Thornton LK, Baker AL, Johnson MP, Lewin TJ (2012) Attitudes and perceptions towards substances among people with mental disorders: a systematic review. Acta Psychiatr Scand 126: 87-105.
14. Green B, Kavanagh DJ, Young RM (2007) Predictors of cannabis use in men with and without psychosis. Addict Behav 32: 2879-2887.
15. Scherrer JF, Grant JD, Duncan AE, Sartor CE, Haber JR, et al. (2009) Subjective effects to cannabis are associated with use, abuse and dependence after adjusting for genetic and environmental influences. Drug Alcohol Depend 105: 76-82.
16. Grant JD, Scherrer JF, Lyons MJ, Tsuang M, True WR, et al. (2005) Subjective reactions to cocaine and marijuana are associated with abuse and dependence. Addict Behav 30: 1574-1586.
17. Spencer C, Castle D, Michie PT (2002) Motivations that maintain substance use among individuals with psychotic disorders. Schizophr Bull 28: 233-247.
18. Peters BD, de Koning P, Dingemans P, Becker H, Linszen DH, et al. (2009) Subjective effects of cannabis before the first psychotic episode. Aust N Z J Psychiatry 43: 1155-1162.
19. Raine A (2006) Schizotypal personality: Neurodevelopmental and Psychosocial Trajectories. Annu Rev Clin Psychol 2: 291-326.
20. Barkus EJ, Stirling J, Hopkins RS, Lewis S (2006) Cannabis-induced psychosis-like experiences are associated with high schizotypy. Psychopathology 39: 175-178.
21. Barkus E, Lewis S (2008) Schizotypy and psychosis-like experiences from recreational cannabis in a non-clinical sample. Psychol Med 38: 1267-1276.
22. Stirling J, Barkus EJ, Nabosi L, Irshad S, Roemer G, et al. (2008) Cannabis-induced psychotic-like experiences are predicted by high schizotypy. Confirmation of preliminary results in a large cohort. Psychopathology 41: 371-378.
23. Halaris AE, Belendiuk KT, Freedman DX (1975) Antidepressant drugs affect dopamine uptake. Biochem Pharmacol 24: 1896-1897.
24. Davidson ES, Schenk S (1994) Variability in subjective responses to marijuana: initial experiences of college students. Addict Behav 19: 531-538.
25. Raine A, Benishay D (1995) The SPQ-B: A brief screening instrument for schizotypal personality disorder. J Pers Disord 9: 346-355.
26. Schafer J, Brown SA (1991) Marijuana and cocaine effect expectancies and drug use patterns. J consult clin psych 59: 558-565.
27. Hides L, Kavanagh DJ, Dawe S, Young RM (2009) The influence of cannabis use expectancies on cannabis use and psychotic symptoms in psychosis. Drug Alcohol Rev 28: 250-256.
28. Mueser KT, Bennett M, Kushner MG (1995) Epidemiology of substance use disorders among persons with chronic mental illnesses. Chronic Mental Illness and Substance Abuse, Harwood Academic Publishers, New York: 9-25.
29. Vangsness L, Bry BH, LaBouvie EW (2005) Impulsivity, negative expectancies, and marijuana use: a test of the acquired preparedness model. Addict Behav 30: 1071-1076.