



Research Article

## Cannabis Associated Elation of Manic Symptoms in a University Cohort (Non-Clinical)

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### Abstract

Cannabis is the most frequently used drug worldwide and is a wide spread problem among the young adults. The use of cannabis in some countries such as Pakistan is a traditional habit for the elation of mood and the users are not aware of the link between cannabis use and manic symptoms. The present study aims to investigate the presence of manic symptoms in non-clinical population particularly adolescents and young adults, who use cannabis in a social context and did not report psychiatric illness/ or have no previous psychiatric history. For this purpose a cross sectional design study sample which comprised of non-clinical 100 participants from a general population, which include 50 individuals using Cannabis for social purpose and with no psychiatric diagnosis, and an equal number of non-cannabis users without cannabis use history and no psychiatric diagnosis were considered for this study. Our results indicated a positive correlation ( $p < .01$ ) between cannabis use and the presence of manic symptoms and subsequently demonstrate association between cannabis use and manic symptoms. Furthermore our results indicated a significant difference ( $p < .01$ ) between cannabis users and non-cannabis users on the basis of manic symptoms and impulsiveness. To conclude our findings highlighted the prevalence of manic symptoms in individuals who ingest cannabis in the social context but did not report other psychiatric disorders.

### Keywords

Cannabis; Pakistan; Psychosis; Elation; Depression

### Introduction

Cannabis products are the most commonly abused drugs on the illicit drug market worldwide [1-3], with increasing use demonstrated in most western countries over the last two decades, particularly in young adults [4-6]. A recent national survey conducted by United Nations Office on Drug and Crime (UNODC) in 2013 [7] indicated that cannabis is the most popular illegal psycho-active substance in Pakistan and is ingested by approximately four million people (3.6% of the adult population), with use particularly prevalent in younger individuals [7]. Data relating to trends in cannabis use in Pakistan are unavailable, given the lack of data prior to 2013, although given its low price and easy availability, it was previously thought to be

the most commonly abused illegal psycho-active substance [7,8]. Cannabis use in Pakistan is markedly more prevalent amongst men and in those who have attained lower levels of education although use and abuse occurs across both genders and all socio-economic classes [7]. The possession, exportation, importation, trading and cultivation of cannabis products are illegal in Pakistan, with no official statistics on cannabis cultivation, production and eradication available to date. However, it is known that large amounts of cannabis are transported into Pakistan from Afghanistan [7]. The pattern of cannabis in Pakistan is predominantly by inhalation of hashish (Charas) but also occurs from consumption of "bhang", a drink made from cannabis leaves.

There are multiple motives for young individuals to use cannabis in Pakistan. These include peer influence, using cannabis as a coping strategy secondary to psycho-social stressors, and using cannabis to experience its euphoric inducing effects [7]. Euphoric feelings secondary to cannabis ingestion in Pakistan include anecdotal reports such as "elation of the king" [9]. In addition, the consumption of "bhang" has previously been associated with symptoms of excitement, grandiosity and psychosis [10]. International studies have also suggested that cannabis is ingested predominantly for its euphoric inducing effects, its facilitation of social interactions and as a coping mechanism secondary to psycho-social stressors [11-13]. The use of cannabis for its induction of euphoria has also previously been noted in Iran where a "solid pie" called "Majoon Birjandi" is ingested to induce euphoria and make individuals "feel special" [14].

There is a burgeoning evidence base suggesting that cannabis use contributes to the development of psychosis and is associated with a poorer prognosis for those with a pre-existing vulnerability to psychosis [15-17]. Emerging evidence also suggests that cannabis use or dependence may be associated with inducing manic or depressive episodes in individuals both with and without an established bipolar disorder [18-22]. In addition, cannabis use has been associated with longer durations of acute episodes (including manic episodes) and increased relapse rates for individuals with bipolar disorder [23-25]. However, cannabis (and other psycho-active substances) has also been utilized by individuals to self-medicate in relation to manic or depressive symptoms [18] and consequently disentangling the mood altering effects of cannabis from non-psychoactive substance induced mood disorder can be problematic.

Consequently, there is an increasing evidence of a putative relationship between cannabis misuse and its effect on mood and mood disorders. In this study, we investigate in a young university student population in Pakistan, any putative association between recreational cannabis use (non-dependent on cannabis) and the production of hypomania or manic symptoms compared to a matched non-cannabis using university student population.

### Materials and Methods

#### Participants

Individuals were recruited by advertisement (Facebook, e-mail platforms; posters in computer laboratories) from Universities in Islamabad. All individuals provided informed consent and

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ethical approval was attained from the Department of Psychology International Islamic University Islamabad and the School of Health in Social Sciences University of Edinburgh UK. Exclusion criteria comprised individuals actively attending the mental health services, a past Axis I major mental illness, a first degree relative with a major affective disorder (e.g. bipolar disorder, recurrent depressive disorder, schizoaffective disorder), or a history of harmful use or dependence on alcohol, opiates or other (non-cannabis) illegal psycho-active substances. Participants included 50 individuals with low to moderate cannabis use (scoring 1 or 2 on Cannabis Abuse screening Test [26] and 50 non-cannabis users (score of 0 on CAST). As this study investigated students without a history of harmful use or dependence on cannabis, we excluded individuals who scored  $\geq 3$  on the CAST. We similarly excluded individuals who harmfully used or were dependent on alcohol (a score  $\geq 3$  on the Fast Alcohol Screening Test [27]).

### Demographic and clinical data

Demographic and clinical data collected included age, gender, employment, residential and marital status. Clinical data included past psychiatric and family psychiatric history and a history of psycho-active substance use. Psychometric scales were utilized to measure cannabis (CAST) and alcohol use (FAST) and evaluated the social context of cannabis [28] and alcohol usage [29]. In addition, we also measured symptoms of elation (Internal State Scale; ISS [30], impulsivity (Barratt Impulsivity Scale II; BIS-II [31]; Patton, Stanford, & Barratt, 1995) and the presence of distress or psychological symptoms across nine symptom dimensions [32,33]. A brief description of these instruments is provided below.

### Psychometric instruments

#### Cannabis Abuse screening Test (CAST)

The CAST is a 6 item self-administered scale utilized to screen problematic patterns of cannabis use (range 0-4 on each item) and is has demonstrated high internal consistency including in young populations (cronbach's  $\alpha=0.72-0.92$ ) [26,34,35]. A score  $\geq 3$  indicates harmful use or dependence.

#### Fast Alcohol Screening Test (FAST)

The FAST is a 4-item self-report screening test (range 0-4 on each item), derived from the Alcohol Use Disorders Identification Test (AUDIT) to detect alcohol misuse and dependence and is associated with good reliability (cronbach's  $\alpha=0.77$ , [36]. and sensitivity indices of  $>90\%$  [27].

#### Social Context of Cannabis Use Scale (SCCUS)

The SCCUS is a 24 item self-report scale that assesses the reasons why and the variety of situations where cannabis is used. It includes four sub-scales: social facilitation, peer acceptance, emotional pain and sex seeking with good internal consistency demonstrated for all sub-scales, including in a student university population (cronbach's  $\alpha$ 's=0.71 to 0.95, [12].

#### Social Context of Drinking Scale (SCDS)

The SCDS is a 30 item self-report scale that quantifies the frequency of alcohol use in 6 different contexts and is associated with good internal consistency (cronbach's  $\alpha=0.76-0.93$ ) [29,37].

### Internal State Scale (ISS)

The ISS is a 15 item self-report 100 point visual analogue scale quantifying participants experiences of their mood state over the previous 24 hours. It consists of four subscales: Activation (ACT), Perceived Conflict (PC), Well-Being (WB) and the Depression Index (DI). The ACT and WB sub-scales are validated for discriminating mood states and the ACT and DI correlate with clinical measures of mania and depression. The ISS has good internal consistency (Cronbach's  $\alpha$ 's of 0.81 to 0.92) for the various sub scales, [30] and good inter-rater reliability ( $\kappa=0.62-0.94$ ; [30,38] in a wide variety of populations [39], although lower sensitivity has been noted in inpatient settings in patients with acute mania [40].

### Brief Symptom Inventory (BSI)

The BSI is a 53 item self-report inventory derived from the SCL-90-R [41]. and was developed for use in a wide variety of settings. It encompasses 9 primary symptom dimensions: somatisation (SOM), obsessive compulsive (O-C), interpersonal sensitivity (I-S), depression (DEP), anxiety (ANX), hostility (HOS), phobic anxiety (PHOB), paranoid ideation (PAR), and psychoticism (PSY) [32,42]. It also includes three global indices of distress, the General Severity Index (GSI), the Positive Symptom Distress Index (PSDI) and the Positive Symptom Total (PST). All subscales of the BSI are associated with good internal consistency ranging from 0.75 to 0.89 [33].

### Barratt Impulsiveness Scale-II (BIS)

The BIS is a 34-item self-report questionnaire with three sub-scales measuring attentional motor and non-planning impulsivity. It is associated with good internal consistency (cronbach's  $\alpha = 0.79$  to 0.83) and has been used across several populations including university students [31]. Anonymised data was collected electronically [43] and all individuals were instructed to complete psychometric scales and demographic data when they had not ingested alcohol or cannabis for at least 48 hours.

### Statistical analysis

Statistical analysis was performed using the Statistical Package for Social Sciences 20.0 for Windows (SPSS Inc., IBM, New York, USA). We utilized the student t-test for parametric data and the Chi Square ( $\chi^2$ ) test for non-parametric categorical data where appropriate.

## Results

### Demographic and clinical data

Out of 153 respondents, 50 individuals fulfilled inclusion and exclusion criteria for the cannabis user group (CAST score of 1 or 2) and 48 individuals fulfilled criteria for the non-cannabis using group (CAST=0). Five individuals were excluded due to a CAST score  $\geq 3$  and 48 individuals were excluded due to a FAST score of  $\geq 3$ . Demographic data are presented in Table 1; with no differences noted between the groups in age, gender, or other socio-demographic indices measured.

### Cannabis use and clinical symptoms

In addition to higher scores on the CAST and SCCUS (Table 2), the cannabis using group had marginally higher scores on the FAST and SCDS (relating to use of alcohol in social contexts). Higher total scores on the ISS ( $p<0.001$ ) and higher sub-scale scores (particularly the ACT and WC), (Table 2) were present in the cannabis-using

group. Higher motor ( $p=0.016$ ) and attentional impulsivity ( $p=0.012$ ), and higher scores on the BSI ( $p=0.043$ ) and a number of subscales

**Table 1: Demographic Data.**

Variables	Cannabis Users F (%)	Non-Cannabis Users F (%)	Statistics	
			$\chi^2$ , df	p
<b>Age (years)</b>				
16-20	8 (34.8)	15 (62.2)	4.66, 3	0.194
21-24	26 (59.1)	18 (40.9)		
25-30	10 (43.5)	13 (56.5)		
31.34	6 (60.0)	4 (40.0)		
<b>Gender</b>				
Male	30 (60)	14 (28)	2.55, 1	0.112
Female	2 (4)	4 (8)		
<b>Education Completed</b>				
Secondary School	5 (10)	1 (2)	11.20, 2	0.004
Undergraduate Degree	28 (56)	16 (32)		
Higher Degree	17 (34)	34 (66)		
<b>Employment Status</b>				
Employed	10 (20)	15 (30)	0.48, 3	0.92
Unemployed	2 (4)	2 (4)		
Student	38 (76)	33 (66)		
<b>Residential Status</b>				
Urban	31 (62)	26 (52)	3.30, 2	0.129
Sub-urban	6 (12)	11 (22)		
Rural	13 (26)	13 (26)		
<b>Marital Status</b>				
Single	45 (90)	38 (76)	4.35, 3	0.226
Married	4 (8)	11 (22)		
Separated	1 (2)	1 (2)		

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

CAST = Cannabis Abuse screening Test, FAST = Screening for alcohol problem, SCCUS = Social Context of Cannabis Use Scale, SCDS = Social Context of Drinking Scale, ISS = Internal State Scale, ACT = Activation, PC = Personal Conflict, WB = Well being, DI = Depression Index, BIS = Barratt Impulsiveness Scale-II, BSI = Brief Symptom Inventory, SOM = Somatization, O-C = Obsessive Compulsive, I-S = Interpersonal Sensitivity, DEP = Depression, ANX = Anxiety, HOS = Hostility, PHOB = Phobic Anxiety, PAR =Paranoid Ideation, PSY = Psychoticism

**Table 2: Psychometric Measures.**

Variables	Cannabis Users (n=50) M (SD)	Non-Cannabis Users (n=48) M (SD)	Statistics		
			T	p	Cohen's d
CAST	8.42 (5.60)	.58 (0.06)	10.13	<0.001	1.72
FAST	2.90 (2.52)	1.00 (0.34)	5.36	<0.001	1.06
SCCUS	34.17 (11.56)	2.44 (0.76)	27.51	<0.001	3.90
SCDS	19.65 (14.69)	6.11 (1.6)	5.69	<0.001	1.30
ISS				<0.001	
Total	52.65 (29.39)	21.94 (20.44)	6.59	<0.001	1.25
ACT	18.60 (11.07)	8.64 (6.75)	6.36	<0.001	1.20
PC	13.67 (7.13)	7.66 (6.77)	5.78	<0.001	1.11
WT	15.51 (10.92)	7.00 (5.38)	5.15	<0.001	0.94
DI	4.85 (4.65)	2.48 (1.53)	4.60	<0.001	0.90
BIS					
Total	48.97 (16.53)	45.90 (19.80)	0.88	0.378	0.16
Motor	13.23 (5.04)	10.73 (5.55)	2.45	0.016	0.47
Non-planning	17.69 (7.89)	20.73 (8.69)	1.89	0.060	0.36
Attentional	18.04 (6.95)	14.43 (7.72)	2.54	0.012	0.49
BSI					
Total	35.57 (31.46)	32.62 (22.55)	2.04	0.043	0.10
SOM	4.13 (3.98)	3.75 (2.37)	2.02	0.046	0.11
O-C	4.39 (3.95)	4.66 (3.15)	1.84	0.142	0.07
I-S	4.30 (4.90)	3.99 (2.67)	2.02	0.046	0.09
DEP	5.02 (4.58)	4.38 (3.07)	2.17	0.032	0.16
ANX	4.29 (3.81)	3.91 (2.80)	1.94	0.054	0.11
HOS	3.14 (3.05)	3.60 (2.42)	1.10	0.270	0.16
PHOB	3.48 (3.42)	3.42 (2.20)	1.88	0.063	0.01
PAR	4.50 (4.32)	3.87 (2.60)	2.28	0.024	0.17
PSY	5.05 (4.92)	4.77 (2.92)	2.02	0.045	0.06

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

CAST = Cannabis Abuse screening Test, FAST = Screening for alcohol problem, SCCUS = Social Context of Cannabis Use Scale, SCDS = Social Context of Drinking Scale, ISS = Internal State Scale, BIS = Barratt Impulsiveness Scale-II, BSI = Brief Symptom Inventories

**Table 3:** Correlation between psychometric instruments in cannabis and non-cannabis using groups.

	Cannabis users (n = 50)					Non-Cannabis users (n = 48)				
	CAST	FAST	SCCUS	SCDS	BSI	CAST	FAST	SCCUS	SCDS	BSI
CAST	-	-0.10	-0.12	-0.10	-0.07	-	-0.08	-0.05	-0.04	-0.06
FAST		-	-0.12	0.29*	-0.17		-	0.21	-0.09	0.28
ISS										
Total	0.07	-0.34*	0.35*	-0.47**	-0.36*	-0.01	0.25	0.23	0.14	0.34*
ACT	0.11	-0.34*	0.33*	-0.52**	-0.43**	0.08	0.15	0.24	0.17	0.28
PC	0.02	-0.32*	0.34*	-0.37*	-0.33*	0.02	0.36*	0.20	0.01	0.40*
WB	0.07	-0.25	0.27	-0.45**	-0.40*	-0.12	0.09	0.12	0.12	0.17
DI	0.00	-0.26	0.29	-0.32*	-0.03	-0.05	0.43**	0.33*	0.28	0.34*
SCCUS	-0.12	-0.12	-	0.08	-0.16	-0.05	0.21	-	-0.05	-0.11
SCDS	-0.10	0.29*	0.08	-	0.33*	-0.04	-0.09	-0.05	-	-0.06
BIS										
Total	0.03	0.00	-0.16	-0.05	0.22	0.11	-0.07	0.11	-0.19	0.26
Motor	0.03	-0.14	0.04	-0.27	-0.14	0.02	0.00	0.13	-0.07	0.32
Non-planning	-0.01	0.22	-0.30	0.21	0.44**	0.15	-0.19	0.07	-0.22	0.03
Attentional	0.07	-0.17	-0.08	-0.12	0.22	0.12	0.01	0.09	-0.22	0.42**
BSI	-0.07	-0.17	-0.16	0.33*	-	0.69	0.08	0.48	0.70	-

particularly PAR ( $p=0.024$ ) was found in the cannabis using group.

In Table 3, we present correlation analysis between the psychometric measures utilized in this study. In the cannabis using group, the highest correlations ( $r>0.4$ ,  $p<0.01$ ) were noted between the ACT and WB sub-scales of the ISS and the total BSI score, between the ACT and WB subscales of the ISS and total SCDS scale and between non-planning impulsivity and the BSI scale. For non-cannabis users, the highest correlation was between the DI subcomponent of the BSA and the FAST, with other correlations ( $r>0.4$ ,  $p<0.01$ ) noted between the PC sub-scale of the ISS and the BSI and attentional impulsivity and the BSI.

## Discussion

In this study, university students without a history of major mental illness or substance dependence (alcohol or illegal psychoactive substances) who were recreational cannabis users demonstrated increased scores on measures of psychological well-being and in particular in relation to measures of elated mood. These symptoms were present in a cohort of students who previously had no reported psychopathology and who had never sought or attained support for any mental health related difficulty.

Although, not extensively investigated, our findings of cannabis induced mood elation are consistent with some previous research [22]. Whilst all sub-scales of the ISS were increased in the cannabis-using group, those pertaining to mood elation (ACT, WB) demonstrated the largest differences between the groups, with these sub-scales also correlated with total BSI score (the presence of psychological symptoms). Overall scores on the BSI were relatively low in both groups with a very minimal total score increase in the cannabis-using group compared to the non-cannabis using group. This potentially suggests that the most prominent symptoms experienced by the cannabis using group related to symptoms of elation, a finding consistent with some previous research [19]. The cannabis using group demonstrated higher levels of motor and attentional impulsivity, a finding consistent with previous research [25]. Such

impulsivity relates to impaired impulse control and is potentially associated with this group engaging in cannabis mis-use [44,45].

## Limitations

There are a number of limitations with this study. Firstly, measures of functionality and in-depth measures relating to educational achievement in university were not collected, and consequently a longitudinal follow-up study to ascertain the link between cannabis use and university performance and functionality will be undertaken. Secondly, we only included a homogenous group of individuals who recreationally ingested cannabis or consumed alcohol, rather than individuals who harmfully used or were dependent on these substances. This reduces the generalizability of our findings to non-recreational users. Thirdly, there was a minimal, albeit significant difference in the alcohol consumption between the two groups as measured on the FAST and SCDS which potentially could explain differences between the groups on the ISS. A re-analysis (ANCOVA) controlling for these factors did not however significantly alter our findings. Indeed, in the non-cannabis using group a correlation between the depression index (rather than the ACT or WB sub-scales) of the ISS and alcohol use (FAST) was noted. Finally, we cannot out-rule that a proportion of the students investigated were intoxicated on cannabis when completing this study and that this may have affected the accuracy of their results. However, it is probable that this could have affected several psychometric instruments and confounds more than just the findings related to elation and impulsivity.

## Conclusion

Cannabis use was demonstrated to be associated with symptoms of elation and impulsivity in a university student population who had no prior history of treatment by the mental health services. A greater awareness of the link between cannabis use and symptoms of elation and potentially bipolar disorder by clinicians is suggested.

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