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Some Psychological Correlates of Long-term Heavy Cannabis Users

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Fifty persons who had all been heavy cannabis users for a long time were given psychological tests measuring psychomotor, perceptual and other variables. Half of these persons were 'Charas' smokers, half 'Bhang' drinkers. The duration of cannabis use was 4–10 years, with an average daily dose of 150 mg tetrahydrocannabinol. A matched control group of twenty-five persons were given the same tests. Compared with this group, the cannabis users were found to react more slowly, to be poorer in concentration and time estimation, to have higher neuroticism and greater perceptuo-motor disturbance. The Charas smokers were the poorest performers and also showed poor memory, lowered psychomotor activity, and poor size estimation.

Introduction

Interest in the psychological effects of cannabis has existed for a long time, but it is only during the last decade or so that any objective assessment with the help of sensitive psychological tests has been attempted. A number of studies have appeared in recent years on the psychological changes following *acute* intake of the drug (Manno *et al*, 1970; Abel, 1971; Dornbush *et al*, 1971; Souiff, 1971; Raefelson *et al*, 1973; Bowmen and Phil, 1973; Darley *et al*, 1973a, 1973b; WHO Technical Report, No. 478, 1971). However, there are still very few studies available on the psychological changes following heavy and long-term cannabis use. The reason for this discrepancy is mainly that cannabis intake is relatively a recent habit in the West and there are not yet many persons there who have taken the drug for many years in high quantity. Moreover, cannabis users in the West often take alcohol and other drugs as well, and this makes it difficult to study the effect of cannabis in isolation.

The situation in India is different. Cannabis in its various forms has been traditionally used for centuries. Although in recent years many of the Indian States have totally banned all products of cannabis, the wild growth of the plant is so common that it is virtually impossible to eliminate the habit, which has considerable social sanction. Most of the users take cannabis singly without much use of other drugs, and the route of intake (smoking or ingestion) is fairly well fixed. India thus presents an excellent opportunity to study various aspects of the effects of cannabis; and the present study, one of the first of its kind in India, was undertaken to find out the long-term physical, psychological and psychiatric effects on the individual. A part of the study, dealing with psychiatric effects, has already been reported (Mendhiratta and Wig, 1975). The present paper deals with the findings related to psychological tests.

Material and Method

Sample

Fifty chronic cannabis users, i.e. who had been taking the drug daily (at least 25 days in a month) for more than four years, were studied. Twenty-five of these used predominantly Bhang, a common drinking preparation made with cannabis leaves. The other 25 smoked cannabis mostly in the form of Charas/Ganja, a combination of the resinous material and flowering tops from the plant. Considering the Bhang as having 1 per cent and the

Charas/Ganja as having 3 per cent of THC (WHO Technical Report No. 478, 1971), the average daily dose of cannabis per subject was calculated as about 150 mg △9 Tetrahydrocannabinol (THC) in both the groups (Mendhiratta, 1972; Mendhiratta and Wig, 1975). Cannabis users are known to be unreliable informants (Sharma, 1975), and as most of the present subjects were illiterate it was difficult to get a good estimate of the amount used daily. To overcome this difficulty each subject was asked separately, sometimes pointedly, sometimes indirectly by showing the measured quantity of cannabis preparations, to indicate his approximate daily consumption. Wherever possible and available, this information was confirmed by his friends. The final information thus obtained seemed quite reliable. The average duration of cannabis use was more than 10 years in both groups of users. The duration and amount are shown in Table I.

The control group consisting of 25 psychiatrically normal persons of comparable age, sex, education and occupation. These were selected from poor socio-economic groups such as unskilled workers, hospital attendants and sweepers. Only two in the Charas group and one in the Bhang group were without jobs. The rest were gardeners, sweepers and unskilled labourers. Thus the two experimental and the control groups were of similar occupational status. The control subjects had never taken cannabis in their life. All subjects in the three groups were males, coming from urban areas in Punjab, and all belonged to the lower socio-economic status (class IV of Kuppuswamy's scale, 1962) except one each of the Charas and Bhang groups, who belonged to Class V.

TABLE I

Duration and amount of drug intake of 50 cannabis users

	Charas/ Ganja smokers (N = 25)	Bhang drinkers (N = 25)
A. *Duration of use*		
4–10 years	15	8
11–20 years	9	12
21 years and over ..	1	5
B. *Amount of cannabis used daily*		
Average amount	5 g	14 g
Range	2–16 g	5–40 g
Probable amount of THC in average daily intake*	150 mg	140 mg

* Considering the Bhang having 1 per cent and the Charas having 3 per cent THC (WHO Technical Report No. 478, 1971).

The mean age of the control group was 32 years (range 16–45 years), of the Bhang users 33 years (range 21–45 years) and of the Charas smokers/Ganja, 27 years (16–45 years).

The subjects came from the city of Amritsar in Punjab. Religious places (temples) and common meeting places of cannabis drinkers were visited. They were approached either personally or by paid motivators. They were assured of the confidentiality of the information gathered. None of the persons investigated belonged to any particular religious sect. All the cases in the present study were from the Hindu and Sikh religions. Only one was Christian, in the group of Bhang drinkers. Fourteen Charas smokers were married compared with six Bhang drinkers and two of the control group.

Almost all subjects had taken alcohol occasionally (once a month or so), but only 4 Charas smokers, 5 Bhang drinkers and one control subject were using it more than once a week; none was a regular daily user. All subjects in the Charas group smoked tobacco, compared with 15 in the Bhang group and 21 in the control group. Opium had been occasionally (once a month or so) used by 12 Bhang drinkers, 10 Charas smokers and one control subject, but none was currently using it.

Physical examination did not reveal any gross pathological condition. No subject showed evidence of definite psychosis related to cannabis, though minor neurotic complaints, in the form of vague anxiety, depressive and somatic symptoms, were present in nearly one-third of users (8 out of 25 each) and 3 of controls (Mendhiratta and Wig, 1975). However, in two Bhang drinkers and three Charas smokers the symptoms seemed of sufficient clinical severity to be regarded as constituting a depressive neurosis.

Psychological tests

Each subject was given a set of psychological tests by the same person and with the same instructions. It was not possible to keep persons completely free from the use of cannabis for a long time but it was ensured that the last dose was not taken less than 12 (and preferably more than 24) hours before taking the test. The subjects were approached either through self or through paid motivators. Each subject was paid Rupees 7/- (about one Dollar) for his co-operation on the psychological tests. This was in addition to bus or rickshaw fare he had spent in coming to the place of investigation.

Digit span tests

Digits forwards and backwards, taken from Wechsler's Adult Intelligence Scale (Wechsler,

1955), were used. The standard instruction and scoring methods were followed.

Recognition test

Each subject was shown five designs, drawn on a paper, for 15 seconds. Immediately after, he was asked to recognize those designs, out of ten designs of the same size drawn on another paper. The number of designs correctly identified gave his score.

Pencil tapping test

Each subject was provided with a pencil and asked to tap on a piece of paper as quickly as possibet for 30 seconds. Size and shape of paper were kepi constant from subject to subject. Total numbers of dots made in half a minute were used as scores.

Speed and Accuracy tests

Five designs (star, circle, triangle, cross and square), randomly scattered over five rows (10 in each row) printed on one page, were presented to each subject who was asked to put a cross on each of the two predetermined designs (circle and cross). The total number of correct responses, in 20 seconds, constituted the score on this test.

Time perception test

The instruction was given: 'Sit quietly. After some time, I shall ask you how much time has elapsed starting from this moment.' The time interval was always two minutes, regulated by a stop watch. The time period, in minutes, guessed by the subject to have elapsed, was recorded. This constituted the score for that subject.

Reaction time

A list of 20 words was read, one by one, to each subject. On hearing each word, he was asked to report whatever ideas came to his mind as quickly as possible. The time taken to start the response, after the stimulus word had been given, was noted. The mean time taken for 20 responses was taken as the subject's score on this test.

Bender Visuo-Motor Gestalt test (BVMG)

Each subject was asked to reproduce all the nine designs of the BVMG test, one by one, on a standard size paper. The scoring was done by Hain's method (Hain, 1964).

Maudsley Personality Inventory short scale (MPI)

This test (Eysenck, 1955), measures neuroticism and extraversion. For the present study, the modified Punjabi version by Sanatan and Wig (1967) was used. As the literacy level of the subjects was low, only the short scale was given orally. Standard instructions and scoring method were followed.

Size estimation test

Each subject was shown the outline drawings of the shapes of the coins of 50 paise, 25 paise and 5 paise, in four different sizes each. The subject was asked to tell which of the four sizes was the correct size for each of the three coins. The number of times the subjects gave incorrect responses (chose smaller or larger size) was counted.

Results

On the psychological tests the Charas group showed a poorer performance than either Bhang drinkers or controls. The control group almost always gave the best performance on all these tests. Tests on which Charas smokers did better than the Bhang drinkers were Digit span backward and the Bender test. The differences between the two cannabis groups, however, were not statistically significant except for the pencil tapping and time perception tests, where the Charas smokers were the poorer performers. The detailed findings are shown in Table II.

Discussion

Both in India and in the West there is paucity of literature on the effects of chronic cannabis use on the psychomotor, perceptual and personality variables. The various psychological function tests reported include:

(i) Personality, using 16-PF and Motivational Analysis Test (Burdsal *et al*, 1973), Taylor Manifest Anxiety Scale (Souiff, 1967, 1971, 1972), Eysenck Personality Inventory (Beaubrun and Knight, 1973), etc.

(ii) Memory (Abel, 1971; Souiff, 1971; Darley *et al*, 1973a, 1973b).

(iii) Intelligence (Bowman and Phil, 1973).

(iv) Attention and concentration using Digit Substitution Test (Weil *et al*, 1968), and

(v) Perception and other sensory-motor functions (Manno *et al*, 1975; Dornbush *et al*, 1971; Schwin *et al*, 1974).

Still, 'the contradictions and ambiguities are widespread in the research to date' . . . and 'further study under controlled conditions is

TABLE II

Mean scores on psychological tests

S. No.	Tests	Mean scores (N = 25 in each group)			Significant differences between*
		Charas/ Ganja smokers	Bhang drinkers	Controls	
1.	*Digit span test*				
	Digit forward	4·68	4·92	4·96	NS
	Digit backward	2·32	2·28	3·12	Cannabis users and controls
2.	Recognition test	4·52	4·68	4·88	Charas smokers and controls
3.	Pencil tapping test	154·0	165·0	170·0	Charas smokers and other groups
4.	Speed and accuracy test ..	9·59	10·24	11·6	NS
5.	Time perception test (2 minutes time interval) ..	5·36	3·72	2·70	Among all groups
6.	Reaction time (in seconds) ..	1·63	1·54	·82	Cannabis users and controls
7.	BVMG (Hain's score) ..	10·32	12·32	7·6	Cannabis users and controls
8.	*MPI (short scale)*				
	Neuroticism	7·76	7·0	3·28	Cannabis users and controls
	Extraversion	10·00	8·48	9·44	Charas smokers and Bhang drinkers
9.	*Size estimation test*				
	Incorrect	30	18	20	Significant differences among the three groups
	Correct	45	57	55	

* Significance level was calculated by applying t-test for all the psychological test scores, except the size estimation test, where the chisquare test was used (P at ·05 level).

essential before any conclusion can be accepted as fact' (Fourth Report to the US Congress, 1974). However, the failure to demonstrate impairment does not necessarily mean that no impairment exists (Bowman and Phil, 1973; Burdsal *et al*, 1973; Grant *et al*, 1973; Mendelson and Mayer, 1972).

Against this background, the findings of the present study become significant. Eight out of the nine tests employed significantly differentiated the controls from the users, particularly the Charas smokers. Both long duration of use and heavy use appear to contribute to this.

Comparison of the large number of studies on cannabis use is made difficult by the variations in such factors as type of subjects (volunteers *vs.* drug users), duration, extent and frequency of drug use, different motivational factors, etc. Comparison can therefore be made only in very broad terms. It is interesting to note that Souiff (1967; 1972) also reported slowing down of time but only in the case of city dwellers; and in fact 64 per cent of drug-takers from semi-urban and rural areas found time to be running faster. Similarly the over-estimation of size was also reported by Souiff in 43 per cent of cases from the city but in 62 per cent of cases from semi-urban and rural areas. Higher emotional unstability in drug users was also reported by Souiff, who used the Taylor Manifest Anxiety Scale (we used the MPI). Beaubrun and Knight (1973), using the Eysenck Personality Inventory found no significant difference on either N or E scales, and in the present study the E factor of the MPI did not differentiate between users and controls.

Regarding attention and concentration, Weil *et al* (1968) reported that the chronic users started with good baselines on the Digit Substitution Test and improved after taking the drug,

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while the non-users showed gross impairment after taking a similar dose. Probably drug tolerance affects the performance here and the effect may be transient only. In the present study the tests were given after at least a 12 hour drug-free period; and it can be expected that this would have ensured overcoming of any short-term effects of the drug. The significant reduction of concentration score in the present study (as opposed to other studies) could be attributed to the cumulative effect of chronic drug use.

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