

Thought patterns

Specific thought patterns in chronic cannabis smokers observed during treatment

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Summary

Clinicians report that chronic cannabis users seem to have symptoms, such as mental confusion and memory problems when entering treatment. The present study systematizes observations that were made during treatment of cannabis users during and after cessation of cannabis use. Cognitive symptoms prior to cessation are described in the conceptual framework of cognitive categories in the I.Q. test. Normalization of these cognitive functions during therapy is discussed.

Clinical psychologists have reported that individuals who chronically smoke cannabis have cognitive problems during the detoxification phase, but little systematic observation of this phenomenon has been documented (1). At our out-patient clinic we have noticed that at admission, users appear to have developed thought patterns that make them unable to question, analyze, criticize or change their own behavior (2,3). This seems to be more prominent in users with longer duration of drug use and/or amount used. The present report describes cognitive symptoms observed in relation to conceptual domains of the I.Q. test. Patients begin to show improvement in cognitive functioning within 14 days of abstinence combined with therapy, and function normally at the end of 6 weeks of therapy.

Observations

Over the last ten years, approximately 400 patients with chronic cannabis use (use from six months through 25 years), were studied at admission and during detoxification, while participating in a treatment program (2,3). The symptoms listed were compiled from clinical notes and discussions over these years, in a framework of seven cognitive functions described below. The most common preparation used is hashish (6-8% THC). Each year we treat about 50 patients. Typically they are about 85% male and 15% female. Thirty-eight percent of the clients were referred to the clinic by social welfare, the judicial system, a school or the medical or psychiatric department of a hospital. Sixty-two percent were self-referrals. The clinic serves an urban, suburban and rural population of about 550,000 inhabitants. It has a multidisciplinary staff consisting of psychologists, drug counselors, nurses trained in psychiatry and psychiatrists. Counseling is voluntary, built on trust and confidence. For these cannabis smokers, the staff has designed a special program, tailored to compensate for the unique pattern of thought (the subject of the present report) associated with chronic cannabis use.

Description of the pattern of cognitive functioning

Chronic cannabis smokers develop a special way of thinking, or a pattern of thought more visible in long-term use, less in short-term use, but still observable. The descriptive structure for these observations is the same used in I.Q. profiles. These are: general verbal ability; logical-analytic ability (making accurate inferences); psycho motility (flexibility of thought); memory (short-term and long-term recall); analytic-synthetic (ability to synthesize); psycho spatial ability (perceiving environmental patterns), and gestalt memory. These psychological qualities are not independent of each other. On the contrary, the interaction between them is necessary. They are different aspects of one theme: cognitive control and management of behavioral patterns. Chronic users who have consumed high doses over the aforementioned periods usually show almost all the symptoms listed. Those having consumed lower doses usually show fewer of these symptoms.

Verbal Ability. We have an ability to know many words, which is a semantic memory process (quantitatively), associated with noetic (knowing) consciousness. We also have an ability to express thoughts and feelings so that others understand the meaning of the communication and that the words make sense to oneself. This ability is dependent on access to the episodic memory and its correlate auto-noetic (self-knowing) consciousness, and is influenced by emotions. Weaknesses are observed in the following areas: vocabulary appropriate to chronological age, finding exact words with which to express oneself, understanding what other people mean, abstract thinking and engaging in concrete thinking. These symptoms lead the patient to feel misunderstood and lonely.

Logical-Analytic Ability. We have an ability of logical reasoning, to critically examine what is being communicated, to use logical thought to correct errors and mistakes, and to make logical analyses of the behavior of self and others. This ability is dependent on an appropriate process of elaboration. Weaknesses are observed in the following: critical and logical self-examination, correcting errors and mistakes logically, thinking before answering, abstract and logical solving of problems and understanding of casual relationships. These symptoms lead the patient to feel inadequate and unsuccessful.

Psycho motility (Flexibility of thought). This ability makes it possible for us to shift attention from one stimulus/task to another, to maintain a train of thought in a complex situation, to carry on a dialogue in conversation, to see different sides of an issue, social situation or problem, and to establish an adequate focus of attention. Weaknesses are observed in the following: maintaining attention, shifting attention, understanding the points of view of others, changing opinions, changing mental set in problem solving and social perception.

Memory Working/Short-term Memory and Long-term Memory. Short-term memory refers to an active system of memory in which information is assembled and organized prior to recall. It is a working space for several cognitive processes, and it provides us with temporal integration. It has an immediate function (e.g. enables us to read books with pleasure). Long-term memory consists of episodic memory, which refers to knowledge about events that are marked as happening at a particular time, and semantic memory, which refers to memory for facts. Weaknesses are observed in the following: Working/short-term memory: remembering meetings, promises, remembering to remember (prospective memory), estimating the passage of time, imagining long time spans and maintaining the theme of a story. Long-term memory weaknesses include poor recollection of past events and poor

recollection of facts (semantic memory). These symptoms lead the patient to exhibit lack of patience.

Analytic-Synthetic Ability. This ability is based on a synthesis of the other six items and therefore is dependent on normal functioning. The result of this process is an identity. It makes it possible for us to develop points of views, to have morals and a set of values that make up the self, and to synthesize and see the whole. Weaknesses are observed in the following areas: sorting out information, synthesizing from parts to whole, e.g. classifying information in a correct way and understanding shades of meaning. These symptoms lead the patient to feel different and unique.

Psycho spatial Ability. This makes it possible for us to function in the time and space continuum. Weaknesses are observed in the following: differentiating the time of the year and/or time of the day, maintaining routines of the day or the week, having interest in what is going on, being aware of one's social position relative to others, having an accurate perception of the immediate environment and mental representation of localization in space (e.g. having a mental map of surroundings, structure of daily life). These symptoms lead the patient to feel that he or she does not belong to the society.

Gestalt Memory (Holistic memory). It helps us to create patterns and pictures of what we see, and to have a correct sense of direction. Weaknesses are observed in the following: creating patterns and pictures of the visual world and remembering the relationships between others. These symptoms lead patients to feel as if they are living in a world of their own. A typical client profile is listed below. It is important to note that this is a typical "picture" of a chronic user. Many individual differences have been observed, but the elements of the clinical picture are similar to the skilled observer. The clients:

- have problems finding exact words to describe what they really mean.
- have limited ability to enjoy reading, motion pictures, theatre, music, etc.
- have feelings of boredom and emptiness in daily life, loneliness, being misunderstood.
- externalize problems and avoid accepting blame.
- are certain that they function adequately.
- are not able to examine their own behavior critically.
- feel incapable and unsuccessful.
- are unable to maintain a dialogue.
- have difficulties with concentration and attention span.
- have fixed opinions and pat answers to questions.
- make statements like, "I am different, other people don't understand me, I don't belong to the community."
- don't plan the day.
- think that they are active because they have many ongoing projects, which are seldom finished.
- have no daily or weekly routine.

Conclusions and Discussion

Disruptions of the cognitive processes described occur after chronic use of cannabis preparations. The symptoms occur with remarkable regularity among clients who were observed over the last 10 years. These symptoms contribute to the emergence of a new pattern

of thinking that can be considered a cannabis-state-dependent set of cognitive processes. These changes lead to a mental and behavioral profile that seems unique to cannabis use. Clinical observations show that the use of cannabis more often than about every six weeks (elimination time of THC) for approximately two years, leads to changes in cognitive functioning. While experimenting with cannabis, the user is frequently acutely intoxicated and experiences this state in comparison with a normal non-intoxicated state of consciousness. After acute intoxication, the patient will be passive and blunt for a couple of days. If the user smokes again within periods of six weeks or less, these after-effects last longer. These effects vary with the doses used over time. After a critical period of chronic use, the acute state of intoxication is perceived as a state of being capable and normal. This state lasts for two to three hours after smoking. Observations show that it takes 14 days of abstinence before the user can begin to regain control of cognitive functioning. This is indirectly supported by a study in which hemispheric mean blood flow was 11% lower than normal controls in chronic cannabis users. Between 9 and 60 days after cessation of use, mean hemispheric blood flow normalized (4). These findings correlate well with the fact that it takes about six weeks before our patients show normal cognitive functioning (2,3). The association of hemispheric blood flow and cognitive functioning have not, however, been linked with each other in regard to causality. The general pattern of cognitive symptoms presented here is similar to clinical observations described by McGlothlin and West (1). Based on the present findings, it is suggested that the cannabis-induced thought pattern is a result of temporary prefrontal dysfunction, since the symptom pattern that has been described is very similar to the prefrontal syndrome (5). This hypothesis is also supported by the fact that cannabinoid receptors are more dense in the forebrain than in the hindbrain (6). It is possible that receptors in the forebrain are affected by chronic exposure to THC, leading to the observed cognitive changes. Clinicians frequently observe that chronic cannabis smokers experience delays in psychological maturation. Since some aspects of personality have been proposed to play a role in this process (7), and since it has been established that heavy cannabis use affects mood by increasing negative mood and reducing positive mood (8), it is hypothesized that loss of abstract and logical thinking leads chronic users to be unable to resolve normal emotional conflicts during psychological maturation. Further research is needed to confirm this hypothesis.

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