EFFECTS OF ALCOHOL AND CANNABIS ON DIFFERENT TYPE OF SENSORY MEMORY

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ABSTRACT

The objective of this research was to investigate how cannabis and alcohol usage impacted people's memory. The study recruited 60 individuals, with 34 of them getting independent screening tests for cannabis (Severity Dependence Scale) and alcohol (Alcohol Dependence Scale) abusers (cannabis abusers and alcohol abusers). Prior to concentrating on alternative medicines that regulate the cannabinoid receptor, it is important to first grasp how this process is related to mental disease symptoms. The memory scale was developed to assess cognitive output and test memory factors. When the t-vale was calculated, it was discovered that marijuana and alcohol users showed a substantial difference between distant memory and immediate recollection. Information is stored in sensory memory unknowingly and unintentionally as it is interpreted. The null hypothesis was accepted since the conditions driving memory variables exhibited minimal significant change as opposed to the effects of cannabis and alcohol dependence on the other variables. Researchers discovered a link between cannabis and alcohol addicts in distant memory, attention and perception, delayed recall, instantaneous recall, verbal retention for dissimilar pairings, visual recognition, and identification after evaluating the association. Since of the effect of cannabis and alcohol dependence, the null hypothesis was rejected because there is a link between the factors affecting memory variables. Longitudinal and retrospective study of data from other drug users and from different areas of the globe may be conducted to create a wide frame of reference.

KEYWORDS: *Alcohol, Cannabis, Drugs, Effects, Information, Memory, Recall, Short, Term, Time.*

INTRODUCTION

Memory is the process through which individuals retain and remember information from the past in order to utilize it in the present. Memory refers to the complicated mechanisms for encoding, storing, and remembering information about past events as a process. Encoding, preservation, and retrieval are three typical memory processes described by cognitive psychologists. Each action corresponds to a memory processing level[1].

- Encoding is the process of converting sensory data into a conceptual image.

- In storage, encoded data is kept in memory.

- By retrieving material from memory, it takes it out or uses it.A new model was suggested of memory that divided it into three types of memory stores:

- A sensory store that can only store a small amount of data for a short period of time.

- A short-term store with a small size and the ability to store information over extended periods of time.

- A large-capacity long-term store capable of storing data for very long periods of time, perhaps forever.

1. Sensory Memory:

Tactile memory is the shortest term memory component. It's the ability to remember bodily sensations after the improvements have been finished. It serves as a buffer for impulses generated from the five senses of sight, hearing, smell, taste, and touch, which are sufficiently protected but only for a brief time[2].

Our talents detect improvements that may either be overlooked, in which case they disappear immediately, or they may be seen, in which case they are preserved in our concrete memory. This does not require any planned strategy and is frequently considered as totally beyond the control of the conscious mind. Data is unintentionally and accidentally stored in tactile memory as it is viewed. The tactile memory is utilized to represent visual improvements, echoic memory for auditory enhancements, and haptic memory for touch enhancements. Smell is more tightly connected to memory than other senses, maybe because the olfactory bulb and olfactory cortex are basically next to the hippocampus and amygdala, separated by only two or three synapses[3].

2. Short Term Memory:

Short-term memory is the capacity to recall information that is being stored at the time. It is defined as the ability to concurrently remember and process information. It maintains a small quantity of information in memory (usually around 7 items or even fewer) in an accessible, readily-available condition (generally from 10 to 15 seconds, or occasionally up to a minute).

It is generally thought that short-term memory decays with time, usually in the range of 10 to 15 seconds, although depending on the substance, things may be retained for up to a minute. It may, however, be extended by replication or rehearsal, enabling the information to re-enter the short-term storage and be retained for a longer length of time[4].

When multiple items are stored in short-term memory at the same time, they actively compete for recall. As a consequence, whether older information is intentionally protected from interruption by rehearsal or by calling attention to it, new content ultimately pushes out older content. Every outside interaction threatens to interrupt short-term memory retrieval, which is why individuals also have a strong desire to complete activities stored in short-term memory as soon as feasible[5].

3. Long Term Memory:

Long-term memory is a type of memory that retains data, changing visual storage memories constantly. That a person performing almost any task, it is frequently called as reference memory. Long-term memory is split in two types: the implicit memory as well as the explicit memory [6].

4. Sematic Memory:

Stored in semantic memory, which is used to store information learned from books, education, locations, facts, and concepts on what is likely to occur in specific circumstances[7].

5. Episodic memory:

In roundabout memory, more contextualised memories are retained. They are typically recollections of actual occurrences or situations from a long time ago. As a consequence, they contain not only the "who, when, where, and why" of the case, but also the accompanying feelings and emotions.

Personal memory (remember for specific events in one's own life) is generally regarded as either a subset or an approximation of long-term memory. A flashbulb memory is a highly informative, stunningly vivid "preview" that survives independently of everything else and circumstances in which a digit of astounding and important (or really stirring) news was received[8].

LITERATURE REVIEW

I. M. Birnbaum*et al.*presented in the article that among non-alcoholic individuals, the impact of alcohol intoxication on the recovery of information from memory was investigated. Alcohol intoxication impaired free-recall learning of a 60-word, categorized list in Experiment 1. Intoxicated individuals recalled fewer categories and words within categories, and providing group cues after the third trial enhanced memory somewhat more for intoxicated than for sober respondents. It was found that although alcohol intoxication may have hindered retrieval processes, changes in the intensity of memory traces may also explain for observed disparities in recall. Experiment 2 equated storage in order to evaluate the effect of alcohol on retrieval processes alone. Free-recall and paired-associate lists were experienced sober and recovered in either a sober or intoxicated condition one week later. Alcohol intoxication had no impact on pace, accuracy, or the amount of gain given by prompts, but it did impair new learning. Alcohol has minimal effect on the retrieval stage of memory, according to the results[9].

S. R. Doyle*et al.* pointed to the fact in the article that the main aim of this study was to offer a comprehensive assessment Alcohol Dependence Scale's (ADS) underlying factor structure. Objectives evaluating the overall subscales as well as ADS resultant investigations of variables related to alcoholism, as well as ADS stages. Participants in two large randomised Behavioural

Interventions Study were invited to complete the ADS. Validity coefficients were obtained using both exploratory and confirmatory factor testing. Analyses revealed a connected, three-factor answer that included lack of behavioural control and excessive drinking, psych observed across both trials. Other indications of dependence intensity, confidence in one's desire to not drink circumstances, intensive habits, concerns about hazardous alcohol-related consequences, and impression of problems drinking were all significantly linked to the ADS. These findings support its ability to consistently and accurately assess the concept of alcohol dependence[10].

EFFECTS OF CANNABIS AND ALCOHOL ON MEMORY

1. Cannabis:

Cannabis was initially utilized in the third millennium BC, according to historical sources. Cannabis is currently utilized for medical reasons as well as religious and spiritual ceremonies. Cannabis has been subject to legislative restrictions since the early twentieth century, with possession, use, and sale of psychoactive cannabis products being banned in most nations. Memory isn't something that can be measured fast. There are many kinds of memory, each of which is examined in a distinct way. Second, there are transitory (short-term) memory symptoms as well as possible long-term consequences. Finally, how cannabis affects memory is affected by dosage, frequency, and strains. THC attaches to receptors on brain cells that usually respond to natural THC-like substances. This natural substances help the brain develop and operate properly. Marijuana over stimulates the neurons in the brain that contain the most of them. People feel a "high" as a consequence of this.

Cannabis use throughout years and decades tends to produce long-term memory and cognitive deficits, particularly when cannabis use begins in youth. Chronic THC use appears to reduce the amount of CB1 receptors (i.e. "down-regulates" these receptors) in brain areas involved in memory and perception, according to the neurobiology of the cannabinoid system. Early drug use has been related to the development of serious mental health issues later in life, including addiction, major depression, anxiety, and psychiatric illnesses like schizophrenia. High amounts of marijuana may cause short-term acute psychosis, which includes hallucinations, paranoia, and a loss of sense of self-identity. Cannabis is a very stimulating chemical that is nearly as addictive as alcohol and lasts even longer in the body.

2. Alcohol:

Ethyl alcohol, or ethanol, is the active component in beer, wine, and liquor. It is also known as alcohol. CH_3CH_2OH or C_2H_5OH are chemicals. Alkanol is the formal name for alcohol in terms of chemical consistency. The amount of carbon atoms present in the solution and the position of the "OH" bond in the formula determine the kind of alcohol that will develop. The most common source of alcohol is ethanol. Via gas bubbles, carbon dioxide exits the process, leaving behind a combination of water and ethanol.

Over the years, a lot of study has been done on alcohol and its effect on perception and general cognitive functioning. Alcohol is a depressant that impacts the whole central nervous system, but it also affects particular areas of the brain. When brain cells are destroyed as a consequence of excessive drinking, the damage may be permanent. As alcohol interferes with substances in the brain that help transmit signals from one neuron to another, information from both short and long-term memory is recalled with difficulty.

With a complete absence of drinking, most physical and mental health problems worsened by alcohol abuse vanish quickly. Speech and hearing difficulties, movement issues, reflex and reaction slowdown, skin discoloration and slackening, fatigue, nausea, panic episodes, and blackouts are all signs of Parkinson's disease.

METHODOLOGY

To identify the influence of cannabis and alcohol abuse and its effect on human memory.

1. Objective:

- To identify the effect of drug abuse and alcohol abuse on human memory.

- To identify the variables that leads to memory deficits when influenced by cannabis and alcohol abuse.

- To estimate whether there is any significant difference existing among variables of memory due to the influence of cannabis and alcohol abuse.

2. Design:

2.1.Hypotheses:

There is no significant difference among the factors affecting the variables of memory due to the influence of cannabis and alcohol abuse. There is no relationship existing among the factors affecting the variables of memory due to the influence of cannabis and alcohol abuse

2.2.Variables:

- Independent variable: Memory

- Dependent variable: Cannabis and Alcohol.

2.3.Inclusion Criteria:

- Individuals who use cannabis everyday were considered after screening them using Severity Dependence Scale (SDS).

- Individuals who use alcohol everyday were considered after screening those using Alcohol Dependence Scale (ADS),

- Current residence of Bangalore.

- Individuals who can read and write Basic English language,

- Respondents between the ages 20-30 years.

2.4.Exclusion Criteria:

- Individuals who consume both alcohol and cannabis together were eliminated.

3. Sample Size:

- 17 cannabis abusers -7 females, 10 males

- 7 alcohol abusers - 5 females, 12 males

4. Sample Collection:

Two groups of 30 alcohol abusers and 30 cannabis abusers were selected via purposive sampling method. After obtaining their permission, Severity Dependence Scale was given on 30 cannabis abusers as a screening test and only those who scored more than 5 were included for the research since this score indicated significant participation in misuse of substances. Only 17 individuals were determined to be suitable for the research and subsequently Post Graduate Institute (PGI) Memory Scale was given on the chosen 17 cannabis abusers.

Similarly, Alcohol Dependence Scale was given to 30 Alcohol abusers as a screening test. After obtaining assent, those who scored more than 22 indicated an indication of Substantial degree of alcohol dependency (3rd quartile) and those who scored more than 31 showed an indication of severe level of alcohol dependence. PGI Memory Scale was given to the chosen 17 alcohol addicts.

5. Tools:

- Severity dependence scale

- Alcohol dependence scale

- PGI memory scale

The test has been extensively utilized in the evaluation of cognitive functioning in drug abusers, yoga practitioners, depressives, psychotics, neurotics, and suffering from brain dysfunctions. It is equally applicable for all genders as well as the literate and the uneducated individuals. Thus, it is applicable to both research and clinical contexts.

6. Reliability and Validity for PGIMS:

For the validity, correlations with Boston Memory Scale and Wechsler Memory Scale were determined to be 0.71 and 0.85 respectively. Age wise older individuals got substantially lower scores than the younger ones. Cases suffering from organic brain disease and functional psychoses score considerably less than normal and neurotics. It has strong connection with education and low with Intelligence quotient (IQ). It has good cross validity and gives quartile norms and a profile. Scores of individuals suffering from organic disease, functional psychoses and neuroses fell in the lowest 2nd and middle quartiles accordingly. Separate norms are provided for three educational levels which is 0 to 5th, 6th to 9th, and above 10th years of schooling.

7. Administration and Scoring for PGIMS:

It consists of three components. First item is alphabet that are scored 3 if all correct within 15 seconds, scored 2 if all correct after 15 seconds, scored 1 irrespective of time needed with one error/omission and scored 0 if more than one error/omission. Second item is counting backward (20-1) and the score will be the same as in item 1. Third item is counted backward by subtraction. The score is 3 if all accurate within 30 seconds, scored 2 if all correct after 30 seconds, scored 1 irrespective of time needed with one error/omission and scored 0 if more than one error/omission. Thus, maximum score would be 9.

In Verbal Retention for Similar Pairings sub exam there are 5 noun-noun pairs. Second noun is to be questioned after reading first noun to the subject. 1 mark for each correction of the related word of the pair is to be provided. The overall maximum score on this subtest is 5.

RESULTS AND DISCUSSION

From the Table 1, we can infer that the mean value obtained for both cannabis and alcohol abusers for remote memory was found to be 5.47, recent memory was found to be 4.97, mental balance was found to be 5.74, attention and concentration was found to be 10.24, delayed recall was found to be 9.29, immediate recall was found to be 8.50, verbal retention for similar words was found to be 5.00, verbal retention for dissimilar words was found to be 12.71, visual retention was found to be 7.09 and recognition was found to be 8.56.

TABLE 1: MEAN VALUE OBTAINED FOR THE FACTORS OF MEMORY AMONG CANNABIS AND ALCOHOL ADDICTS. THE MEAN VALUE OBTAINED FOR BOTH CANNABIS AND ALCOHOL ABUSERS FOR REMOTE MEMORY WAS FOUND

Variables	N	Mean
Remote Memory	34	5.47
Recent Memory	34	4.97
Mental Balance	34	5.74
Attention and Concentration	34	10.24
Delayed Recall	34	9.29
Immediate Recall	34	8.5
Verbal Retention for Similar Words	34	5.00
Verbal Retention for Dissimilar Words	34	12.71
Visual Retention	34	7.09
Recognition	34	8.56

From the Table 2, we can infer that the Karl Pearson correlational value obtained for both cannabis and alcohol abusers for remote memory was found to be 0.556 and significance value obtained was found to be 0.00, since the significance value is less than 0.05 level of significance, we can infer that there is a positive correlation/relationship existing among cannabis and alcohol abusers with respect to remote memory at 0.01 level of significance.　The Karl Pearson correlational value obtained for attention and concentration was found to be 0.453, and significance value obtained was found to be 0.00, since the significance value is less than 0.05 level of significance, we can infer that there is a positive correlation/relationship existing for both cannabis and alcohol abusers with respect to attention sand concentration at 0.01 level of significance.　The Karl Pearson correlational value obtained for delayed recall was found to be 0.433 and significance value obtained was found to be 0.01, since the significance value is less than 0.05 level of significance, we can infer that there is a positive correlation/relationship existing for both cannabis and alcohol abusers with respect to delayed recall at 0.01 level of significance.

TABLE 2: SHOWING KARL PEARSON CORRELATION VALUES FOR VARIABLES OF MEMORY AMONG CANNABIS AND ALCOHOL ABUSERS. THE KARL PEARSON CORRELATIONAL VALUE OBTAINED FOR BOTH CANNABIS AND ALCOHOL ABUSERS FOR REMOTE MEMORY WAS FOUND

Variables	Correlation value	Significance Value
Remote Memory	0.556	0.00
Recent Memory	0.263	0.13
Mental Balance	0.123	0.49
Attention and Concentration	0.453	0.00
Delayed Recall	0.433	0.01
Immediate Recall	0.681	0.00
Verbal Retention for Dissimilar Words	0.485	0.00
Visual Retention	0.672	0.00
Recognition	0.355	0.04

The Karl Pearson correlational value obtained for immediate recall was found to be 0.681, and significance value obtained was found to be 0.00, since the significance value is less than 0.05 level of significance, we can infer that there is a positive correlation/relationship existing for both cannabis and alcohol abusers with respect to immediate recall at 0.01 level of significance. The Karl Pearson correlational value for verbal retention for dissimilar words was found to be 0.485 and significance value obtained was found to be 0.00, since the significance value is less than 0.05 level of significance, we can infer that there is a positive correlation/relationship existing for both cannabis and alcohol abusers with respect to verbal retention for dissimilar words at 0.01 level of significance. The Karl Pearson correlational value for visual retention was found to be 0.675, and significance value obtained was found to be 0.00, since the significance value is less than 0.05 level of significance, we can infer that there is a positive correlation/relationship existing for both cannabis and alcohol abusers with respect to visual retention at 0.01 level of significance. The Karl Pearson correlation value for recognition was found to be 0.355, and significance value obtained was found to be 0.04, since the significance value is less than 0.05 level of significance, we can infer that there is a positive correlation/relationship existing among cannabis and alcohol abusers with respect to recognition at 0.01 level of significance. From the Karl Pearson Correlation it was discovered that recent memory (0.263) and mental balance (0.123) were shown to have no connection existent among cannabis and alcohol addicts. Since, there is connection existing among the factors influencing the variables of memory owing to the effect of cannabis and alcohol addiction, we reject the null hypothesis.

The objective of this study was to look at the factors that affect memory variables in 17 individuals who were under the influence of cannabis and 17 people who were under the influence of alcohol. The research found that there is a significant difference in memory characteristics such as distant memory and immediate recall between individuals under the influence of cannabis and alcohol after obtaining the t-value. Bad episodic memory is expected among cannabis and alcohol users, according to the results. During the intervention program, there was a significant shift in different areas of memory on the memory scale. Between the research and control groups, there was a significant difference in recent memory, distant

memory, visual recall, and verbal retention. Cannabis was related to results of neurological diseases in a short-term and internally cued prospective study. Working memory and verbal episodic memory have been investigated lately for their poor transcription, preservation, manipulation, and retrieval processes of long-term cannabis memory.

The findings of this study provided insight on the effect of both alcohol and cannabis dependency on different elements of human memory. The findings revealed that while there is no substantial variation in human memory variables related to cannabis and alcohol dependence, there is a significant association with memory variables such as previous memory, focus and concentration, delayed recall, immediate recall, verbal retention for dissimilar pairs, visual retention, and recognition.

CONCLUSION

The objective of this study was to investigate the effect of cannabis and alcohol dependency on human memory. A total of 60 individuals were eligible for the research, with separate screening tests for cannabis (Severity Dependence Scale) and alcohol (Alcohol Dependence Scale) abusers administered to 34 people (17 cannabis abusers and 17 alcohol abusers) (17 cannabis abusers and 17 alcohol abusers). The Memory Scale was used to evaluate 10 memory variables and quantify cognitive output. It was found that marijuana and alcohol users had a significant gap between distant memory and immediate recall. The null hypothesis was accepted because there was no significant variance in the factors underpinning memory variables compared to the effects of cannabis and alcohol dependency in the other variables. After assessing the relationship, researchers found a connection between cannabis and alcohol abusers in distant memory, attention and awareness, delayed recall, instantaneous recall, verbal retention for dissimilar pairings, visual remembrance, and recognition. The null hypothesis was rejected because there is a connection between the components underpinning memory variables owing to the impacts of cannabis and alcohol dependency. Longitudinal and retrospective study should be conducted utilizing data from other alcohol abusers and from different areas of the globe in order to create a wide frame of reference.

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