Impaired Consolidation Processes Underlying Ecstasy-Group Deficits in Verbal Memory

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INTRODUCTION

The study aimed to examine the cognitive mechanisms underlying ecstasy consumer’s impaired performance on verbal list learning tasks [1-5]. This was achieved by comparing levels of forgetting across a related and a non-related word list. Forgetting a word that was previously recalled once indicated forgetting at level one, forgetting a word that had been recalled twice is forgetting at level 2, and so on. Thus, a higher frequency of low level forgetting indicates slower memory consolidation, whereas higher levels of forgetting indicate failure to retrieve learnt information [1].

METHOD

Participants were regular consumers of ecstasy only (n = 15), cannabis only (n = 17) regular consumers of both ecstasy and cannabis (n = 20) and drug naïve participants (n = 17). Participants were presented with a non-related list of words, at the end of which they were asked to recall all the words they could remember. This procedure was repeated across five learning trials. A related list was also administered, where each word belonged to one of five categories.

RESULTS

To compare the number of words recalled for each group across the unrelated and related word lists, a 2(Cannabis: present, absent) x 2 (Ecstasy: present, absent) x 2 (List: related, unrelated) repeated measures ANOVA was performed. All groups recalled significantly more words on the related compared to the non-related word list F (1, 69) = 108.22, p < .001. The effect of Ecstasy was significant F (1, 69) = 17.13, p < .001, indicating that the Ecstasy group recalled fewer words compared to the Cannabis, Ecstasy + Cannabis and Drug Naïve groups for both list types.

For the measures of forgetting, a 2 (Cannabis: present, absent) x 2 (Ecstasy: present, absent) x 2 (List: related, unrelated) x 4 (Level 1, 2, 3, 4) was calculated. There was a main effect for List, F (1, 69) = 185, p < .001, with participants forgetting fewer words for the related compared to the non-related word list. The effect of Level was significant, as was the Level x Ecstasy interaction, F (1, 69) = 5.98, p < .01. Follow up ANOVAs showed the Ecstasy group forgot significantly more words at levels 1, F (1, 71) = 13.83, p < .001 and 2, F (1, 71) = 8.99, p < .01, compared to the other groups, however, this effect ceased once a word had been previously recalled on four occasions.

DISCUSSION

Although all groups recalled more words on the related word list, indicating that they benefitted from the provision of a categorical list, the ecstasy group forgot more words at levels 1 and 2 across both lists. This suggests that although memory consolidation was assisted with categorical cues, the ecstasy group’s speed of consolidation was still significantly slower than that of the other groups.

CONCLUSION

The reported deficit in ecstasy user’s explicit verbal memory is consistent with previous research [1, 6]. These deficits may be attributed to consolidation rather than retrieval deficits, and implicate the role of serotonin in memory processes associated with the hippocampus [7, 8].

REFERENCES


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