



Swansea University
Prifysgol Abertawe



Cronfa - Swansea University Open Access Repository

This is an author produced version of a paper published in:

The Open Addiction Journal

Cronfa URL for this paper:

<http://cronfa.swan.ac.uk/Record/cronfa49864>

Paper:

Parrott, A. (2011). Cocaine vs Ecstasy/MDMA: Comparative Effects on Mood and Cognition in Recreational Users.

The Open Addiction Journal, 4(1), 36-37.

<http://dx.doi.org/10.2174/1874941001104010036>

Distributed under the terms of a Creative Commons Attribution Non-Commercial (CC-BY-3.0)

This item is brought to you by Swansea University. Any person downloading material is agreeing to abide by the terms of the repository licence. Copies of full text items may be used or reproduced in any format or medium, without prior permission for personal research or study, educational or non-commercial purposes only. The copyright for any work remains with the original author unless otherwise specified. The full-text must not be sold in any format or medium without the formal permission of the copyright holder.

Permission for multiple reproductions should be obtained from the original author.

Authors are personally responsible for adhering to copyright and publisher restrictions when uploading content to the repository.

<http://www.swansea.ac.uk/library/researchsupport/ris-support/>

Cocaine vs Ecstasy/MDMA: Comparative Effects on Mood and Cognition in Recreational Users

A.C. Parrott*, L.J. Evans, J. Howells and R. Robart

Department of Psychology, Swansea University, Wales, UK

Keywords: MDMA, ecstasy, cocaine, recreation drug - mood, memory, cognition.

INTRODUCTION

Cocaine powder has overtaken Ecstasy/MDMA in popularity as a recreational party drug in the UK [1]. However there is comparatively little empirical data on its mood or cognitive performance effects. This report describes the findings from three studies comparing Ecstasy users, cocaine powder users, and non-user controls. The three studies involved a variety of mood scales, self-rating questionnaires, and cognitive performance tasks.

METHODS

In study 1, the abstinent volunteers comprised 7 Ecstasy/MDMA users, 8 cocaine/ecstasy users, and 9 non-user controls. The test battery included working memory: consonant updating (updating), trail making (shifting), and random letter generation (inhibition) [2], also supraspan word recall [3], Tromso Social Intelligence Scale [4], and the Dysexecutive Questionnaire [4]. Study 2 involved 10 Ecstasy/MDMA users, 10 cocaine users, and 10 non-user

Table 1. Summary of Cognitive and Mood Findings from Three Independent Studies

Study 1: Lauren Evans. Memory & Cognition	Control Group	Cocaine/MDMA	MDMA
Dysexecutive Questionnaire (problem score)	22.1	38.2***	37.1**
Consonant updating (correct recall)	3.2	3.1	2.1
Random letter (number generated – two/seconds)	98.1	83.1***	96.6
Supraspan word recall (total words)	31.1	29.9	27.9
Study 2: James Howell. Self-rated mood states	Control/Alcohol	Cocaine	MDMA
Excitement (on-drug)	3.6	4.0	4.7*
Paranoia (on-drug)	1.5	3.0*	2.5
Clearheaded (on-drug)	3.0	3.1	1.8*
Aggression (on-drug)	2.3	3.1	1.5
Over-heated (on-drug)	2.5	3.5*	3.9**
Depressed (post-drug recovery)	2.1	2.7	3.2*
Paranoia (post-drug recovery)	1.6	2.6*	3.6***
Sociable (post-drug recovery)	3.7	3.1	2.3**
Clearheaded (post-drug recovery)	3.8	3.3	2.1**
Study 3: Rebecca Robart, Memory & Cognition	Control Group	Cocaine	MDMA
Rivermead Behavioral Memory (info recalled)	9.9	9.2	8.9
Auditory Verbal Learning task (words learned)	9.4	8.0	7.2*
Trail Making (task completion time)	15.9	19.9	21.4**

Tukey paired comparison tests with control group (two-tailed): * p<0.05 **p<0.01 *** p<0.001.

*Address correspondence to this author at the Department of Psychology, University of Swansea, Swansea SA2 8PP, Wales, UK; Tel: +44(0)1792 295271; Fax: +44(0)1792 295679; E-mail: a.c.parrott@swansea.ac.uk

controls (alcohol drinkers). They were assessed 48 hours after weekend drug use, on a self-rating questionnaire for feelings on-drug, and during post-drug recovery [5, 6]. Study

3 involved different groups of 10 Ecstasy/MDMA users, 10 cocaine users, and 10 non-users controls. Participants were assessed 2 and 4 days after weekend drug use, on the Rivermead Behavioural Memory task (paragraph recall), Auditory Verbal Learning (AVLT), and trail making. Model ages across all three studies were 18-30 years.

RESULTS

In Study 1 Ecstasy users and cocaine/ecstasy users had significantly raised scores on the Dysexecutive Questionnaire. On working memory, cocaine/ecstasy users were more impaired on cognitive inhibition, whereas ecstasy users were slightly more impaired on updating. In Study 2 Ecstasy users were more excited, less clearheaded, and overheated on drug, while cocaine users were more paranoid and overheated. Post-MDMA was associated with depression, paranoia, and reduced sociability. Post-cocaine was associated with paranoia, although to a significantly lesser extent than under MDMA ($p < 0.05$). In Study 3, trail making and AVLT were significantly impaired in Ecstasy users on recovery day 4, while cocaine showed non-significant impairments (Table 1). The recovery day 2 group means, and drug condition significance levels, were broadly similar (data not tabulated here).

DISCUSSION

Cognitive performance was reduced in both Ecstasy/MDMA and cocaine users. On some measures the two groups were impaired to a similar extent (dysexecutive functioning). On one task the cocaine/ecstasy group was more impaired (letter generation). On other tasks the Ecstasy users were more impaired (word recall, verbal learning, trail making). All these comparisons were limited by small sample sizes, and larger studies are required [2, 4, 8]. With the mood data, greater excitement and less clearheadedness under MDMA confirm previous findings [7]. Cocaine generated paranoia as expected [8]. Adverse recovery phenomena were pronounced after-MDMA, as in previous studies [5, 6]. One interesting finding was the significantly

higher paranoia post-MDMA than post-cocaine. Another was the comparative data on self-rated thermal stress under both hyperthermic drugs [9, 10].

CONCLUSIONS

We believe this is the first report to empirically compare the mood and cognitive effects of cocaine powder and MDMA. It shows that recreational Ecstasy/MDMA is at least as problematic as recreational cocaine, and may cause worse recovery effects afterwards. Larger studies are however needed to confirm and extend these novel findings.

REFERENCES

- [1] Treadwell SD, Robinson TG. Cocaine use & stroke. *Postgrad Med J* 2007; 83: 389-94.
- [2] Murphy PN, Wareing M, Fisk JE, Montgomery C. Executive working memory deficits in abstinent ecstasy/MDMA users: a critical review. *Neuropsychobiology* 2005; 60: 159-75.
- [3] Parrott AC. The effects of transdermal scopolamine and four doses of oral scopolamine (0.15, 0.3, 0.6, 1.2mg) on psychol performance. *Psychopharmacology* 1986; 89: 347-54.
- [4] Reay JL, Hamilton C, Kennedy DO, Scholey AB. MDMA polydrug users show process-specific central executive impairments, and social and emotional judgment processes. *J Psychopharmacol* 2006; 20: 385-8.
- [5] Parrott AC, Lasky J. Ecstasy (MDMA) effects upon mood and cognition; before, during, and after a Saturday night dance. *Psychopharmacology* 1998; 139: 261-8.
- [6] Parrott AC, Lock J, Connor AC, Kissling C, Thome J. Dance clubbing on MDMA and during Ecstasy/MDMA abstinence: prospective neuroendocrine and psychobiological changes. *Neuropsychobiology* 2008; 57: 165-80.
- [7] Davison D, Parrott AC. Ecstasy in recreational users: self-reported psychological and physiological effects. *Hum Psychopharmacology* 1997; 12: 91-7.
- [8] Woicik PA, Moeller SJ, Alia-Klein N, *et al.* The neuropsychology of cocaine addiction. *Neuropsychopharmacology* 2009; 34: 1112-22.
- [9] Freedman FR, Johanson C, Tancer ME. Thermoregulatory effects of 3, 4-methylenedioxymethamphetamine (MDMA) in humans. *Psychopharmacology* 2005; 183: 248-56.
- [10] Grandall CG, Vongpatanasin W, Victor RG. Mechanism of cocaine-induced hyperthermia in humans. *Ann Intern Med* 2002; 136: 785-91.

Received: November 4, 2010

Revised: November 13, 2010

Accepted: November 13, 2010

© Parrott *et al.*; Licensee Bentham Open.

This is an open access article licensed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/3.0/>) which permits unrestricted, non-commercial use, distribution and reproduction in any medium, provided the work is properly cited.