

Media Release: European College of Neuropsychopharmacology (ECNP)

"For the science and treatment of disorders of the brain"

[A single cocaine dose lowers perceptions of sadness and anger](#)

Embargo until: 00.05 (Central European Summer Time, Amsterdam) Sunday 30th August 2015

A single dose of cocaine can interfere with the ability to recognise negative emotions, according to new research presented at the ECNP conference in Amsterdam.

In a placebo-controlled within subject study, researchers from the Netherlands and Germany took 24 students (aged 19 to 27) with light to moderate cocaine use, and gave them either 300mg of oral cocaine, or a placebo. After 1 to 2 hours, each participant was then subject to a series of biochemical tests, as well as the facial emotion recognition test to measure response to a series of basic emotions, such as fear, anger, disgust, sadness, and happiness.

They found that in comparison with placebo, a single dose of cocaine caused an increased heart rate, as well as increased levels of the stress hormone cortisol. In addition, the researchers found that the subjects who took cocaine found it more difficult to recognise negative emotions.

They also found that the subjects who showed a larger cortisol response after taking cocaine had a less marked impairment of negative emotions. When they were intoxicated with cocaine, their performance was 10% worse compared to their performance during placebo, in recognising sadness and anger'.

As lead researcher, Dr Kim Kuypers (*Maastricht University, The Netherlands*) said:

'This is the first study to look at the short-term effect of cocaine on emotions. It shows that a single dose of cocaine interferes with a person's ability to recognise negative emotions, such as anger and sadness. This might hinder the ability to interact in social situations, but it may also help explain why cocaine-users report higher levels of sociability when intoxicated – simply because they can't recognise the negative emotions'.

Commenting for the ECNP, Dr Michael Bloomfield (University College, London) said:

"There are many mental illnesses in which our brains' ability to recognise the emotions of others are impaired and this new study shows that cocaine may interfere with this process too. Since cocaine changes the level of the brain chemical dopamine, this new study may have implications for other mental illnesses such as depression and schizophrenia – where dopamine may also be involved in how we recognise emotions. We know that cocaine is a powerful and addictive drug and an important question remains: does cocaine mess up this process so that when cocaine users are off the drug they feel like other people have more negative emotions?"

ENDS

Notes for Editors

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The European College of Neuropsychopharmacology

The ECNP is an independent scientific association dedicated to the science and treatment of disorders of the brain. It is the largest non-institutional supporter of applied and translational neuroscience research and education in Europe. Website: www.ecnp.eu

The annual ECNP Congress takes place from 29th August to 1st September in Amsterdam. It is Europe's premier scientific meeting for disease-oriented brain research, annually attracting between 5,000 and 8,000 neuroscientists, psychiatrists, neurologists and psychologists from around the world. Congress website: <http://www.ecnp-congress.eu/>

ABSTRACT

P.1.e.007 **Emotion recognition during cocaine intoxication** K. Kuypers¹ °, L. Steenbergen², E. Theunissen¹, S.W. Toennes³, J.G. Ramaekers¹ *1Maastricht University, Department of neuropsychology and psychopharmacology, Maastricht, The Netherlands; 2Leiden University, Department of Cognitive Psychology – Faculty of Social Sciences, Leiden, The Netherlands; 3Goethe University of Frankfurt, Department of Forensic Toxicology – Institute of Legal Medicine, Frankfurt, Germany*
Cocaine is the most commonly used illicit stimulant in Europe, with a last year prevalence of 1.7% in the young adult population. Chronic or repeated cocaine use has been linked with impairments in various cognitive domains (e.g. attention, memory, psychomotor performance) but also in social skills (e.g. cognitive empathy). It is not clear whether cocaine is responsible for the impairment of cognitive empathy or whether other factors, like polydrug use, distort the observed relation. Therefore, the primary aim of the study was to investigate the causal relation between cocaine and cognitive empathy. Furthermore, cocaine can be regarded as a biological stressor, as administration leads to elevated cortisol levels. Besides effects on cortisol, stressors are known to affect cardiovascular parameters and engage more heavily specific parts of the limbic system, which plays a role in emotion processing. Therefore, the secondary aim of the present study was to investigate whether the cocaine-induced effects on cortisol and cardiovascular parameters are associated with potential effects on emotion recognition.

Twenty-four healthy poly-drug recreational users of cocaine (5 female, 19 male), aged between 19–27 years participated in this placebo-controlled within-subject study. Participants were tested between 1 and 2 hours after treatments with oral cocaine (300 mg) or placebo. Emotion recognition of low and high intensity expressions of basic emotions (fear, anger, disgust, sadness, and happiness) was tested. Cortisol levels were assessed in blood, 1 hour post-treatment and heart rate and blood pressure were assessed three times on each test day (i.e. at baseline, before tests, after tests). The study was performed in accordance with the Helsinki Declaration of 1975 (and subsequent amendments) and was approved by the Medical Ethics Committee of the Academic Hospital of Maastricht and the University of Maastricht.

Findings show that cocaine caused an increment in heart rate and cortisol levels, and impairment in recognition of negative emotions compared to placebo. The latter was mediated by the intensity of the presented emotions. When high intensity expressions of Anger and Disgust were shown, performance under influence of cocaine 'normalized' to placebo-like levels while it made identification of Sadness more difficult. The normalization of performance was most notable for participants with the largest cortisol responses in the cocaine condition compared to placebo. To conclude, the present study demonstrated that a single dose of cocaine impairs recognition of negative emotions, dependent on the intensity of

expression. Some of these effects were associated with stressor-related parameters, with larger cortisol responses during cocaine, compared to placebo, leading to less impairment. The impairment in emotion recognition was more subtle than the chronic effects in regular users. Further research including a larger sample with a sex-equal distribution and a more diverse range of empathy measures, including for example emotional empathy, is needed.