

Publication

Acute Effects of Heroin on Negative Emotional Processing: Relation of Amygdala Activity and Stress-Related Responses

JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)**ID** 3720867**Author(s)** Schmidt, André; Borgwardt, Stefan; Gerber, Hana; Wiesbeck, Gerhard A.; Schmid, Otto; Riecher-Rössler, Anita; Smieskova, Renata; Lang, Undine E.; Walter, Marc**Author(s) at UniBasel** [Schmidt, André](#) ; [Riecher-Rössler, Anita](#) ;**Year** 2014**Title** Acute Effects of Heroin on Negative Emotional Processing: Relation of Amygdala Activity and Stress-Related Responses**Journal** Biological Psychiatry**Volume** 76**Number** 4**Pages / Article-Number** 289-96**Mesh terms** Adrenocorticotrophic Hormone, metabolism; Adult; Amygdala, physiopathology; Anxiety, physiopathology; Brain Mapping; Cerebrovascular Circulation, physiology; Cross-Over Studies; Double-Blind Method; Facial Expression; Fear; Female; Functional Laterality; Heroin, administration & dosage; Heroin Dependence, physiopathology; Humans; Hydrocortisone, metabolism; Magnetic Resonance Imaging; Male; Narcotics, administration & dosage; Oxygen, blood; Pattern Recognition, Visual, physiology; Stress, Psychological, physiopathology

BACKGROUND: Negative emotional states and abnormal stress reactivity are central components in drug addiction. The brain stress system in the amygdala is thought to play a key role in the maintenance of drug dependence through negative reinforcement. Although acute heroin administration was found to reduce anxiety, craving, and stress hormone release, whether these effects are reflected in amygdala activity has not yet been investigated. **METHODS:** With a randomized, crossover, double-blind design, saline and heroin were administered to 22 heroin-dependent patients, whereas 17 healthy control subjects were included for the placebo administration only. We used functional magnetic resonance imaging to investigate blood oxygen level-dependent responses during fearful faces processing. Stress reactivity was measured by adrenocorticotrophic hormone levels and by cortisol concentrations in serum and saliva 60 min after substance administration. Anxiety and craving levels were assessed with self-report ratings. **RESULTS:** Heroin administration acutely reduced the left amygdala response to fearful faces relative to the saline injection. Patients receiving saline showed a significantly higher left amygdala response to fearful faces than healthy control subjects, whose activity did not differ from patients receiving heroin. The left amygdala activity correlated significantly with scores on state-anxiety and levels of adrenocorticotrophic hormone, serum cortisol, and saliva cortisol among all patients and control subjects. **CONCLUSIONS:** Our results show a direct relation between the acute heroin effects on stress-related emotions, stress reactivity, and left amygdala response to negative facial expressions. These findings provide new insights into the mechanisms underlying negative reinforcement in heroin addiction and the effects of regular heroin substitution.

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