

**Cervantes Aldana, Cristian**

**Cristian P. Cervantes Aldana.** California State University San Marcos, Keith A. Trujillo. California State University San Marcos.

### **PSYCHOSTIMULANTS: THERE'S A FINE LINE BETWEEN PLEASURE AND PAIN**

Psychostimulants such as amphetamines produce strong pleasurable effects in users and these effects are thought to play a role in the development of drug addiction. Two highly rewarding and abused psychostimulant drugs are methamphetamine and d-amphetamine. The goal of the present research was to evaluate the dose-dependent effects of methamphetamine and d-amphetamine in laboratory rats using two behavioral measures: ultrasonic vocalizations (USVs) and locomotor activity. Ultrasonic vocalizations examine the subjective state (e.g. rewarding and aversive states) of rats under the influence of these psychostimulants and locomotor activity assesses the stimulant effects of these drugs. We were mainly interested in the positive and negative affective properties of these drugs across doses. We conducted two experiments, identical in methodology, with the only difference being the drug (methamphetamine or d-amphetamine). We found that acute administration of methamphetamine and d-amphetamine (0.5, 1.58 or 5.0 mg/kg) produced an inverted U dose-response with locomotor activity and reward-related ultrasonic vocalizations (FM 50 kHz USVs). The inverted-U shaped dose-response curve (dose plotted on the X-axis and response on the Y-axis) has been seen across different drugs and behaviors, however this phenomenon has not previously been reported with USVs. We also found that acute administration of the highest dose of methamphetamine or d-amphetamine produced aversive effects and that there was an interplay of reward (FM 50 kHz USVs) and aversion (22 kHz USVs) at this dose. In particular, reward USVs rose early after administration and then disappeared as aversive USVs emerged. These data provide a revealing picture of the complex relationship between dose and response, with particular attention to the affective component in drug addiction and abuse. A better understanding of the affective response to drugs of abuse will help build better therapies and gain further insight into the development of drug abuse and addiction.