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Evidence for the involvement of D2 dopaminergic receptors in the effect of caffeine on impulsive choice behavior of rats

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Introduction: A growing body of data has shown the effects of stimulant drugs in free choice situations. However, effects of caffeine, the most widely used legal stimulant in the world, have not previously been assessed in details in formal learning models for impulsive behavior. **Materials and methods:** In the present experiment, the acute administration of caffeine and D2 dopaminergic receptor agents (quinpirole and raclopride) was assessed in a „delay discounting” paradigm. Male Wistar rats chose between a single food pellet delivered immediately after a lever press and four pellets delivered after a delay cued by different visual stimuli. The delay to the four pellets increased from 0 to 40 s between each consecutive session of 9 choices. **Results:** Caffeine dose dependently induced anti-impulsive behavior. Simultaneous caffeine and quinpirole administration enhanced the effect of caffeine, but quinpirole administered alone did not show this effect. Raclopride administered alone increased delay discounting and dose dependently attenuated the effects of caffeine administered simultaneously with caffeine. **Conclusions:** Results from the present study are consistent with previous findings in which stimulant drugs and dopamine D2 receptor agonists decreased delay discounting while D2 antagonists increased such behavior. Results strongly support the notion that caffeine indirectly influences the dopaminergic system through D2 receptors in the laboratory model of impulsive behavior.