Individual Differences in Preference for Economic Risk in Addiction

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Background
- Cocaine addicted individuals engage in risky behaviors.
- Studies have examined groups of behaviors that point to increased risky decision making in cocaine addiction but it is not yet clear which component of valuation is responsible for this.
- Questions: 1. Does technical (economic) risk aversion differ in cocaine addiction? 2. What is the neural basis of such risk preferences?

Methods
- 50 cocaine users and 37 healthy controls
- Ages 19-60 (mean of 44 y), 19 female
- 1-35 years of regular cocaine use (mean of 17 y)

Subjective Value: $EU(x,p) = x^\alpha \times p$

Results
1. Cocaine users are more risk tolerant than healthy controls. $P=0.11$ $P=0.12$ $P=0.03$ $P=0.05$

![Graph showing risk preferences comparison between cocaine users and healthy controls.]

2. Individual risk preferences correlate with: Trait Impulsivity

![Graph showing correlation between risk preferences and trait impulsivity.]

3. Neural correlates of decision variables (main effects controlling for diagnosis, $\alpha$, age, education, and non-verbal IQ).

![Brain imaging showing neural correlates of decision variables.]

Conclusions
1. Technical risk aversion ($\alpha$) is associated with cocaine use and (real-world) impulsive behaviors.
2. There is substantial within-group variability in $\alpha$, suggesting disease course can also modulate risk preferences.
3. Initial evidence suggests expected value and risk are encoded the same way across subjects but cocaine users have greater neural sensitivity to these variables, potentially contributing to the observed behavior.
4. More subjects are needed to examine effects of diagnosis, risk preference, and their interactions at the neural level.