

**Adolescent male substance use disorder and the “with limited prosocial emotions” specifier: brain activation during decision associated with increasing other harm and self-benefit**

**ABSTRACT**

Important work has examined reward processing, motivational drive, and inhibition, among other areas but limited work has explored the role of social cognition in substance use disorders. **Aim:** To image prosocial decision making and examine the relationship with adolescent substance use disorders (SUD) and the limited prosocial emotions specifier (LPE). **Methods:** Adolescents males with SUD+LPE (n=21), SUD without LPE (n=21) and controls (n=24) played a game of prosocial decision making in 3T research-dedicated MRI. We modeled trial-by-trial changes in activation for decisions where (1) other harm increased but benefit-to-self was held constant, and (2) benefit-to-self increased but other harm was held constant. Analyses were completed within controls, across the three groups, and for all two-group comparisons. **Results:** Within controls, activation in the insula, inferior frontal gyrus, temporal-parietal junction, and other regions was reduced as the magnitude of harm to others increased. Analysis of variance showed variation in a similar set of regions. Pairwise-group analyses showed differences in similar regions in both SUD groups relative to controls. As benefit-to-self increased activation in control participants increased in the posterior cingulate cortex, precuneus, parahippocampal gyrus, middle frontal gyrus, parietal regions, and other areas. Adolescents with SUD+LPE showed greater activation in task-sensitive regions than those with SUD without LPE and controls. **Conclusions:** Using a game of prosocial decision making, our results discriminate associations with LPE specifically and separately with SUD. These findings align with an emerging literature suggesting the importance of social cognition in substance use disorders.