SENSITIVITY TO REWARD AND PUNISHMENT AND CHILDHOOD ALCOHOL USE: LABORATORY AND QUESTIONNAIRE ASSESSMENT

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Introduction

Sensitivity to reward (SR) and punishment (SP) represent individual differences in motivational drive. Existing theories suggest that SR and SP should be related to alcohol use, such that SR may be related to alcohol use via a positive reinforcement pathway, whereas SP may be related to alcohol use via a negative reinforcement pathway (Gray, 1970; Carte & White, 1994). Previous research found a consistent positive relation between SR and alcohol use (e.g., Franken & al., 2005), whereas findings with regard to SP and alcohol use were found to be weak and inconsistent (Knyazev, 2004). Most studies use questionnaires to assess SR and SP (e.g., Torrubia, eta, 2001), which are subjects to reporter bias. Thus, the goal of the current study was to improve SP and SR assessment by further developing a laboratory task.

Objective: The goal of the present study was to validate the modified PSRT task and to examine the relation between SR and SP and alcohol use in children. The incremental validity of this task to predict alcohol use over and above caregiver report of child SR and SP was also examined.

PSRT Design: The average error rate was 4.5%, the average non-response rate was 0.0%, and the average anticipation rate (responding faster than 250 ms) was 25%. Passive avoidance error (i.e., responding to red circles during punishment block) rate was 14%. Average reactions times in milliseconds were 721.94, 692.58, 965.45, and 609.72 for Block 1, Block 2, Block 3, and Block 4, respectively.

Methods

Participants: The sample included 11 children ages 10-15 (mean = 13) and their primary caregivers ages 35-56 (mean = 46). In terms of gender, most children were boys (64%) and all caregivers were females. In terms of self-identified ethnic background, most children and caregivers were Caucasian (73%).

Measures -SPSRQ-C Questionnaire (parent report): The SPSRQ-C (Colder & O'Connor, 2004) was used to assess child SR and SP, as reported by the caregiver. This measure consists of 32 items with a 5-point response scale. Sample item for SR subscale: “My child often does things to be praised”. Sample item for SP subscale: “My child is often afraid of new or unexpected situations”.

Sensitivity to Punishment (SP) and Sensitivity to Reward (SR).

- PSRT Task: Children competed the modified version of the PSRT task on a computer as part of a larger assessment battery. Participants were instructed to discriminate between two-digit odd and even numbers presented below a colored circle pressing the appropriate button on the response box and to work as quickly and accurately as possible. Each experimental block was 50 trials (5 red circles per block). Blocks were presented in a fixed order: 20 practice trials, no-reward, reward/pre-punishment, reward/punishment, and reward/post-punishment. If upon the completion of the practice block, the child received at least 70% accuracy, the task proceeded to Block 1 (no-reward). Otherwise, the practice block was repeated until 70% correct was achieved. Upon participant's response, the child received feedback in a form of an X (incorrect answer) or O (correct answer). In addition, the child's points earned per response and total points earned for the task were displayed at the bottom of the computer screen (see Figures below).

1. During the no-reward block (Block 1), participants were told that he/she would not be able to earn points for correct responses, but could lose 2 points for incorrect responses.

2. During the reward block (Block 2) participants were told that now they will be able to earn points for correct responses. They would still lose 2 points for incorrect responses.

3. During the punishment block (Block 3), participants were instructed to inhibit their response if a red circle appeared above a two-digit number and that responses to red circles would cost half of his/her points earned. Otherwise, instructions repeated those for Block 2.

4. During the post-punishment block (Block 4), participants were instructed to ignore the colored circles and respond to red circles as usual. The rest of the instructions repeated those in Block 2.

Task Structure: Practice Block (20 trials) Block 1 (No Reward trials) Block 2 (Reward, 50 trials) Block 3 (Punishment, 50 trials) Block 4 (Post-Punishment, 50 trials)

Results

• The PSRT task overcomes a significant limitation of existing questionnaire measures of SR and SP, which is reporter bias. Furthermore, the current version of the SPSRQ-C incorporated a no-reward block, thus allowing for the assessment of levels of SR independently of levels of SP. Finally, the modified PSRT is significantly shorter than the original task, thus reducing fatigue of the participants over time.

• These findings demonstrate validity of the modified PSRT task with respect to predicting child alcohol initiation. Caregiver reports of SR and SP were unrelated to alcohol initiation. Whereas PSRT SP and SPSRQ-C SP were moderately correlated, PSRT SR and SPSRQ-C SR were not related.

• Consistent with past research (Johnston, et al., 2005), older children were more likely to have initiated alcohol use as compared to younger children.

• Consistent with previous literature (Franken, et al., 2005; Knyazev, 2004), children high on PSRT SR were more likely to have initiated alcohol use as compared to children low on SR. This pattern may be explained by the propensity of these children to engage in alcohol use for its rewarding effects.

• Past findings are less consistent with regard to PSRT SP and alcohol use (e.g., Keayes, 2004). In the current sample, there was a weak association between SP and alcohol initiation, such that children high on SP tended to have initiated alcohol use. This may suggest that children high on SP use alcohol for self-medication purposes.

Discussion

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