The Dynamics of Habituation: A Neural Study of the Effects of Repeated Exposures to Risky Behaviors on Cognitive Control and Emotional Responses in the Adolescent Brain

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Adolescents are more likely to engage in risky, impulsive, and thrill-seeking behaviors. Research shows that one key reason for this is that the adolescent period is a time of ongoing brain development and is easily influenced by both good and bad stimuli in the environment. Habituation, which refers to the progressive decrements in emotional responses to a stimulus when it is repeated, may also play a key role. As such, exploring the role of repeated exposures to risky environment in predicting risk-taking is critical to understanding how adolescents engage in real-life risks. With this in mind, the research was focused to investigate the impact of repeated risk taking behaviors on self control and emotional responses in adolescents. A novel approach with the combination of behavioral and Electroencephalography (EEG) method was applied to conduct the study. Emotional responses were measured by both objective (subconscious responses to stimuli) using EEG activity and subjective measures (participants' interpretation of their emotions) using Positive and Negative Affective Schedule (PANAS) and Spielberger State Trait Anxiety Inventory–State (STAI-S), while adolescents (n=86) completed the Balloon Analogue Risk Task (BART), a well-established risk-taking propensity assessment. A measure of response inhibition, Stroop, was used to evaluate cognitive functioning. By modeling outcome-processing-related changes sequentially with each BART trial (total of 12 trials) as an index of increasing risk, the results suggest that repeated risky exposures desensitize associated negative emotional responses escalating risky behaviors. The study would provide valuable new insights into neurobehavioral dynamics of risk taking to improve adolescent behavioral health and performance.

Awards Won:

First Award of $5,000

National Institute on Drug Abuse, National Institutes of Health &amp the Friends of NIDA: Third Award of $1,000

American Psychological Association: Certificate of Honorable Mention