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INTRODUCTION

With the advent of modern technology, the prevalence of mild head injury (MHI) has increased, leading to a greater understanding of the impact it has on cognitive performance and decision making. Evidence from clinical populations demonstrates that individuals with MHI demonstrate reduced performance on tasks requiring cognitive control and decision-making abilities compared to those without MHI.

METHODS

Participants:
N = 27; 44.4% self-reported sustaining an MHI
Of those reporting an MHI, 50% were male and 50% were female.

Procedure:
Arousal Manipulation
Participants were randomly assigned to a "No Music" or "Negative Music" condition.

Dependent Measures
- Self-report indices of MHI, affect, and arousal state
- Positive and Negative Affect Schedule (PANAS) recording
- Continuous Physiological Electrodermal Activity (EDA)11 recording
- Iowa Gambling Task (IGT)12 performance

RESULTS

Hypothesis I:
Figure 1 depicts the mean EDA amplitude of Non MHI and MHI individuals at baseline. There was not a significant difference, but the result is in the expected pattern direction, (t(24)) = 1.13, p = .16.

Hypothesis II:
Figures 2 and 3 depict mean EDA amplitude across 10 blocks (of 10 trials each) on the IGT for MHI and non MHI individuals across the two arousal conditions (no music, negative music). A significant interaction effect was found of EDA x Arousal Condition (no music, negative music) x MHI status, (F(9,54)) = 97.99, p < .001. Whereas MHI remain physiologically underaroused across trials in the no music condition relative to the non MHI group, physiological arousal is increased when music is introduced, regardless of deck choice.

Hypothesis III:
Figure 4 and 5 depict a significant trend with respect to a 3-way interaction of Deck Selection (A and D) x Arousal Condition (no music, negative music) x MHI. (F(1,23)) = 3.27, p = .08, such that MHI subjects are more likely to make advantageous deck selections when their arousal is increased, whereas non MHI perform optimally under control conditions.

DISCUSSION

Although the difference between individuals with and without a MHI was not statistically significant at baseline, the decreased physiological levels of arousal of MHI subjects as compared to Non MHI cohorts was in the expected direction. An increase in sample size and, thus, an increase in power may enhance this finding. Further, music (associated with negative valence) increased levels of arousal significantly in individuals reporting a MHI.

Finally, there was a significant trend for the 3-way interaction on IGT performance (i.e., frequency of overall deck choice). Individuals with MHI who were exposed to music, and demonstrated a consequent increase in physiological arousal, demonstrated an accompanied increase in their frequency of advantageous decisions. Conversely, non MHI individuals, under the negative Music Condition, increased in their frequency of disadvantageous decisions.

In summary, these results demonstrate arousal has an impact, and may act as an important mediator in, social decision making and cognitive function in persons with and without MHI. Increases in attention and alertness can improve one’s decision making (at least in situations of uncertainty) perhaps by making one more aware to both the social context and outcomes as well as to one’s physiological feedback (‘gut feeling’).

This research also has implications for the possible therapeutic intervention of using music to ameliorate deficits in decision making, arousal, and emotional dysregulation which can persist in individuals with head injuries, even those that are mild in nature and in persons who are asymptomatic (i.e., University students).