INVESTIGATING AROUSAL AND STRESS LEVELS IN INDIVIDUALS WITH MILD HEAD INJURY


BACKGROUND

MHI can involve alterations in consciousness without extensive neural loss and following MHI persons may exhibit cognitive and emotional sequelae, although the chronicity has been debated. Typically it has been suggested that post-concussive symptoms (i.e., cognitive difficulties, changes in affect, and physical complaints) subside after a three month period and functioning is assumed to return to previous abilities.

Yet, for some (i.e. 15%), these difficulties may not be transient. Furthermore, it has been suggested that individuals with moderate or severe neurological compromise are particularly vulnerable to the adverse effects of stress and flattened affect/arousal. However, to date, the research that has been conducted to examine the cognitive and emotional sequelae following more subtle head injuries (i.e. MHI) especially with high-functioning individuals such as university students, has been, at best, variable, at worst, inconclusive, and otherwise silent with respect to arousal levels.

RESULTS: STUDY 1

Higher levels of self-reported anxiety enhanced cognitive performance for students with MHI, while lower anxiety interrupted performance, in contrast to students without MHI.

METHOD: STUDY 2

Participants

• University students (N = 91); 56% (n = 51) self-reported MHI history

Measures and procedure

• Neuropsychological measures (memory, attention, planning, abstract reasoning, and standard intelligence); indices of arousal/anxiety; manipulated arousal (via psychosocial stressor or relaxation)

• Indices of Anxiety: physiological recordings of heart rate, respiration, and electrodermal responsivity (EDR)

Most interestingly, individuals with MHI reported significantly less overall anxiety than individuals without, F (1, 48) = 4.23, p = .045.

CONCLUSIONS

Our findings of underarousal in high-functioning individuals with MHI history mimics decreased physiological arousal that is found for persons with moderate to severe traumatic brain injury typically associated with ventro-medial prefrontal cortex disruption. These findings suggest that underarousal may be implicated in MHI generally. Further, there is evidence that the neurological and emotional sequelae following MHI is not transient despite the subtle nature of the head trauma and the competency of the individuals involved. In short, our results demonstrate that sustaining an MHI is predictive of persistent differences in cognitive functioning which is differentially influenced by both reported and measured levels of arousal; specifically cognitive performance is particularly enhanced via heightened arousal.

REFERENCES


Figure 1. Results of Study 1: MHI and anxiety moderated cognitive performance.

Figure 2. Results of Study 2: MHI and anxiety moderated affect/arousal.

Figure 3. Results of Study 2: MHI and anxiety moderated stress response.

Figure 4. Results of Study 2: MHI and anxiety moderated cognitive performance.

Figure 5. Results of Study 2: MHI and anxiety moderated stress response.