Social Decision Making and MHI

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Background

Previous research has demonstrated that the frontal lobes are most susceptible to damage during a traumatic brain injury (TBI). The prefrontal cortex (PFC), especially the orbitofrontal cortex (OFC), is particularly susceptible (Wallis, 2007). The OFC is responsible for analyzing and directing behaviour, and is especially influential in moral decisions and behaviour. The OFC is influenced by physiological/somatic reactions to emotional and difficult decisions (e.g. moral) which, in turn, can bias the types of decisions made ("gut reaction") (Naqvi, Shiv, & Bechara, 2006). Dysruption to the OFC interferes with that input. People who have incurred mild head injuries (MHI) show similar neuropsychological deficits to patients with TBI but to a lesser degree, and may also demonstrate similar, but lessened, influences of emotional input in decision-making. The purpose of this study was to investigate social problem solving and moral behaviours in persons who have incurred mild head injuries.

Hypothesis 1:

University students who have experienced a MHI will rate themselves as having similar social problem solving skills as individuals with no MHI

Hypothesis 2:

When making social/moral decisions, we expect the MHI group will take less time to respond (be more disinhibited) and be less responsive to the personal moral dilemmas compared to non-MHI group

Participants

Brock University Students ($N = 47$)
- 57 % ($n = 27$) reported no MHI
- 43 % ($n = 20$) reported at least one MHI

Methods and Procedure

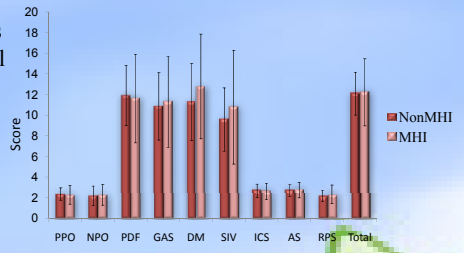
Indicators of previous MHI - Self-reported experience of altered state of consciousness:
- Have you ever hit your head against a hard surface sufficient to alter your consciousness (i.e. loss of consciousness, vomiting, dizziness)?
- Did it result in a concussion?

Measures of Social Problem Solving:
- Social Problem Solving Inventory (D'Zurilla, Nezu, & Maydeu-Olivares, 2002)
- Moral Judgment Task (Greene, Sommerville, Nystrom, Darley, & Cohen, 2001)

Results

Hypothesis 1:

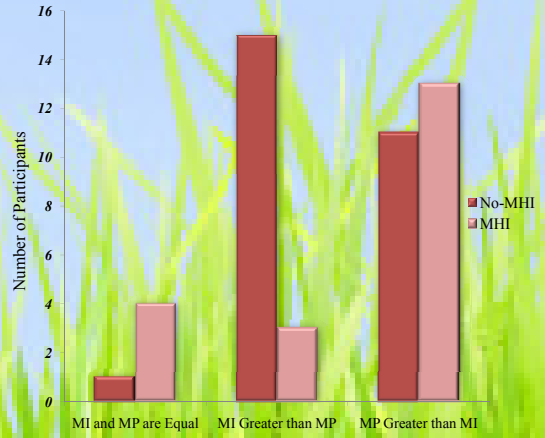
As predicted the MHI group rated themselves as having similar social problem solving skills as compared to individuals with no MHI on the Social Problem Solving Inventory- Revised (D'Zurilla, Nezu, & Maydeu-Olivares, 2002).



$F(1, 46) = 0.27, p = 0.61$

Hypothesis 2:

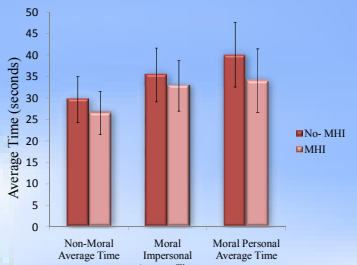
Despite the finding that the MHI group reported themselves comparable to the non-MHI group in terms of style of problem solving, they respond differently to difficult decision making as in social moral decisions: persons with MHI are more likely to accept making a moral transgression of harm/personal nature than an antisocial violation (e.g. stealing).



$\chi^2 = 9.13, p = .01$

Hypothesis 2 cont.:

As social situations become more complex, the non-MHI group takes more time to respond before making a decision. However, while the MHI group takes longer to commit to a moral decision as compared to a non-moral one, they do not discriminate between personal (i.e. harm) and impersonal (i.e. stealing) moral categories in terms of the length it takes to make a decision.



$F(1,45) = 5.37, p = .03$

NonMHI:
NM < MI < MP

MHI:
NM < MI = MP

Discussion

In summary, the MHI group rated themselves as having similar social problem solving skills as compared to those who did not report a previous MHI.

The MHI group takes less time (are relatively more disinhibited/less reflective or cautious) to respond to personal moral transgressions and are more likely to judge personal harm transgressions as being more socially acceptable than the non-MHI group. The results provide support for limits of top-down modulation/executive control when responding to socially compelling decision making in persons with MHI. OFC disruption is a key factor that may contribute to these differences in reponding to social dilemmas. Our results are consistent with other findings regarding the differences among social decisions in persons with more obvious traumatic brain injuries (Ciaramelli, Muccioli, La' davas, & Pellegrino, 2007).

Conclusion

Mild head injuries in persons who are cognitively competent and successful (i.e. university students), while relatively subtle as compared to sustained brain injury, can impact social decision making both in terms of relative risky/impulsive responding and types of (moral) decisions made.

References

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For original and complete testing materials (dilemmas), access: www.sciencemag.org/cgi/content/full/293/5537/2105/DC1