What affects return to driving in mTBI: Preliminary evaluation of clinical characteristics and emotional distress

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BACKGROUND & OBJECTIVES

- ~75% of mild traumatic brain injury (mTBI) cases result from motor vehicle accidents (MVAs).[1]
- Returning to driving (RTD) is imperative for recovery, yet many individuals with an TBI do not RTD in their lifetime, and those who do typically do so in the first year since injury.[2]
- MTBI is linked to higher levels of emotional distress that typically peak in the first year since injury.[3] Heightened emotional distress may delay recovery as driving-related distress is associated with avoidance.[4]
- We examined whether time since injury (TSI) and emotional distress impact RTD in individuals with an mTBI following an MVA.

METHODS

- Participants sustained an mTBI following an MVA (n=139) as a driver, passenger, or pedestrian.
- Participants underwent a clinical assessment with a psychologist and indicated whether they have RTD as a driver or a passenger.
- Questionnaires were completed for anxiety, mood, and fear of driving:
  - Hospital Anxiety and Depression Scale (HADS-A; HADS-D).
  - Accident Fear Questionnaire (AFQ).

RESULTS

Logistic regressions were conducted to assess whether emotional distress and TSI impacted RTD. Fear of driving had a significant effect on RTD ($p = 0.003$). TSI, anxiety, and mood were not predictive of RTD.

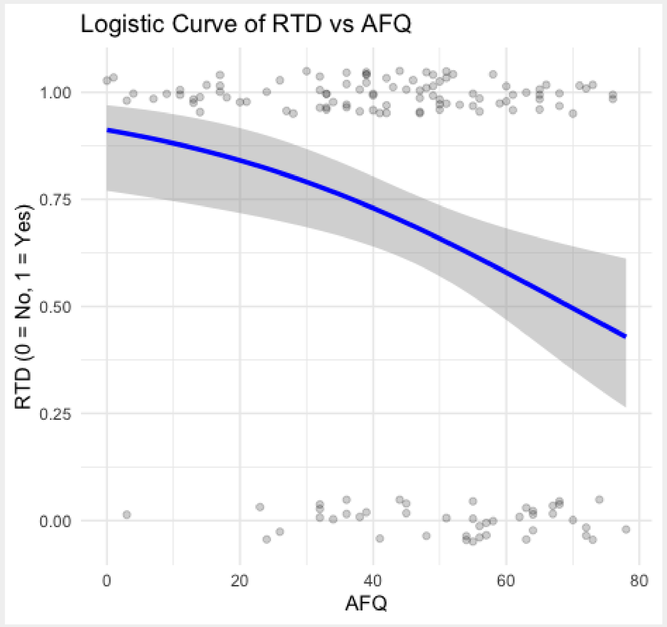

Figure 1. Logistic regression curve showing the relationship between AFQ scores and RTD status

An exploratory logistic regression assessed whether accident type (i.e., being the driver, passenger, or pedestrian) predicted RTD. Compared to drivers, both passengers (estimate = -1.700, SE = 0.445, $z = -3.817$, $p < 0.001$) and pedestrians (estimate = -1.875, SE = 0.565, $z = -3.319$, $p < 0.001$) had significantly lower odds of RTD.

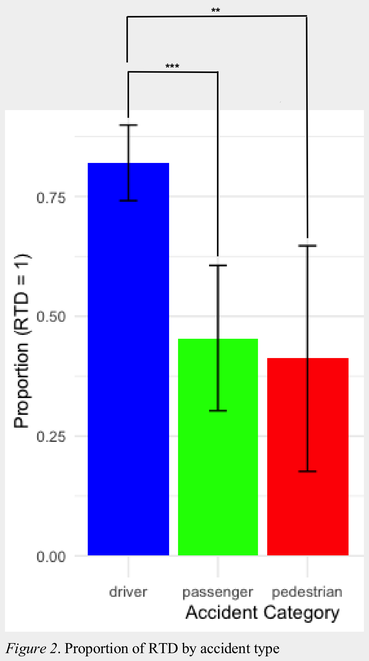

Figure 2. Proportion of RTD by accident type

Post-hoc pairwise comparisons using estimated marginal means showed that pedestrians and passengers had statistically significant lower RTD compared to drivers but did not differ from each other.

Contrast	Odds Ratio	SE	P-value
Driver-Passenger	5.47	2.44	$< 0.001^{***}$
Driver-pedestrian	6.52	3.68	0.003^{**}
Passenger-Pedestrian	1.19	0.719	0.955

SUMMARY & CONCLUSIONS

- Higher levels of fear of driving may lead to a lower likelihood of RTD.
- TSI, anxiety, and depression do not appear to be associated with RTD.
- Being the pedestrian or passenger in an MVA appears to have negative effects on RTD.
- Future studies are warranted to further investigate TSI, emotional distress, and exploratory variables on mTBI to better understand what impacts recovery and RTD.

REFERENCES

1. Craig, A., Tran, Y., Guest, R., Gopinath, B., Jagnoor, J., Bryant, R. A., Collie, A., Tate, R., Kenardy, J., Middleton, J. W., & Cameron, I. (2016). Psychological impact of injuries sustained in motor vehicle crashes: Systematic review and meta-analysis. *BMJ Open, 6.* http://dx.doi.org/10.1136/bmjopen-2016-011993
2. Anschutz, J. R., Luther-Krug, M., & Seel, R. T. (2010). A verbal cuing device for persons with brain injury: Development and proof-of-concept case study. *Topics in Stroke Rehabilitation, 17*(5), 337-344. https://doi.org/10.1310/tsr1705-337
3. Novack, T. A., Zhang, Y., Kennedy, R., Rapport, L. J., Watanabe, T. K., Monden, K. R., Dreer, L. E., Bergquist, T., Bombardier, C., Brunner, R., Goldin, Y., Marwitz, J., Niemeier, J. P. (2021). Return to driving after moderate-to-severe traumatic brain injury: A traumatic brain injury model system study. *Archives of Physical Medicine and Rehabilitation, 102*, 1568-1575. https://doi.org/10.1016/j.apmr.2021.02.006
4. Dischinger, P., Read, K., Kerns, T., Ho, S., Kufera, J., Burch, C., & Jawed, N. (2003). Causes and outcomes of mild traumatic brain injury: An analysis of ciren data. *Association for the Advancement of Automotive Medicine, 47*, 577-589.

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