

Severity of Post-Stroke Cognitive Impairment Moderates the Relationship Between Cognitive Change and Emotional Distress in the Months Following Stroke

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1. BACKGROUND

- Depression and anxiety are common psychological consequences of stroke.
- The “Y-Shaped” process model suggests that as stroke survivors develop an awareness and understanding of the impact of post-stroke cognitive changes on their functioning, they may experience a discrepancy between their ‘pre-stroke’ and ‘post-stroke’ identities, which may cause heightened distress (Gracey et al., 2009).
- In line with this, those with less severe post-stroke cognitive impairment have reported hyper-awareness of cognitive impairment and greater levels of anxiety and low mood (Boosman et al., 2014; Mitrushina & Tomaszewski 2020).
- Impairments in cognition and awareness can improve in the months following stroke. However, it is unclear whether the level of acute cognitive impairment impacts the relationship between cognitive change and emotional distress 6 months later.
- Based on the Y-shaped model, we hypothesised that individuals with greater cognitive impairment, and thus lower levels of awareness immediately post stroke, would report higher levels of distress as a function of cognitive improvement. Specifically, as they may develop skills to process their situation potentially leading to greater self-discrepancy.

2. RESEARCH QUESTIONS

Preliminary Research Questions:

1. What is the relationship between cognitive impairment and awareness of cognitive impairment at 6-months post stroke?
2. What is the relationship between awareness of cognitive impairment and emotional distress at 6-months post stroke?

Primary Research Question:

1. Does severity of acute post-stroke cognitive impairment moderate the relationship between cognitive change and emotional distress in the first 6-months following stroke?

3. METHOD

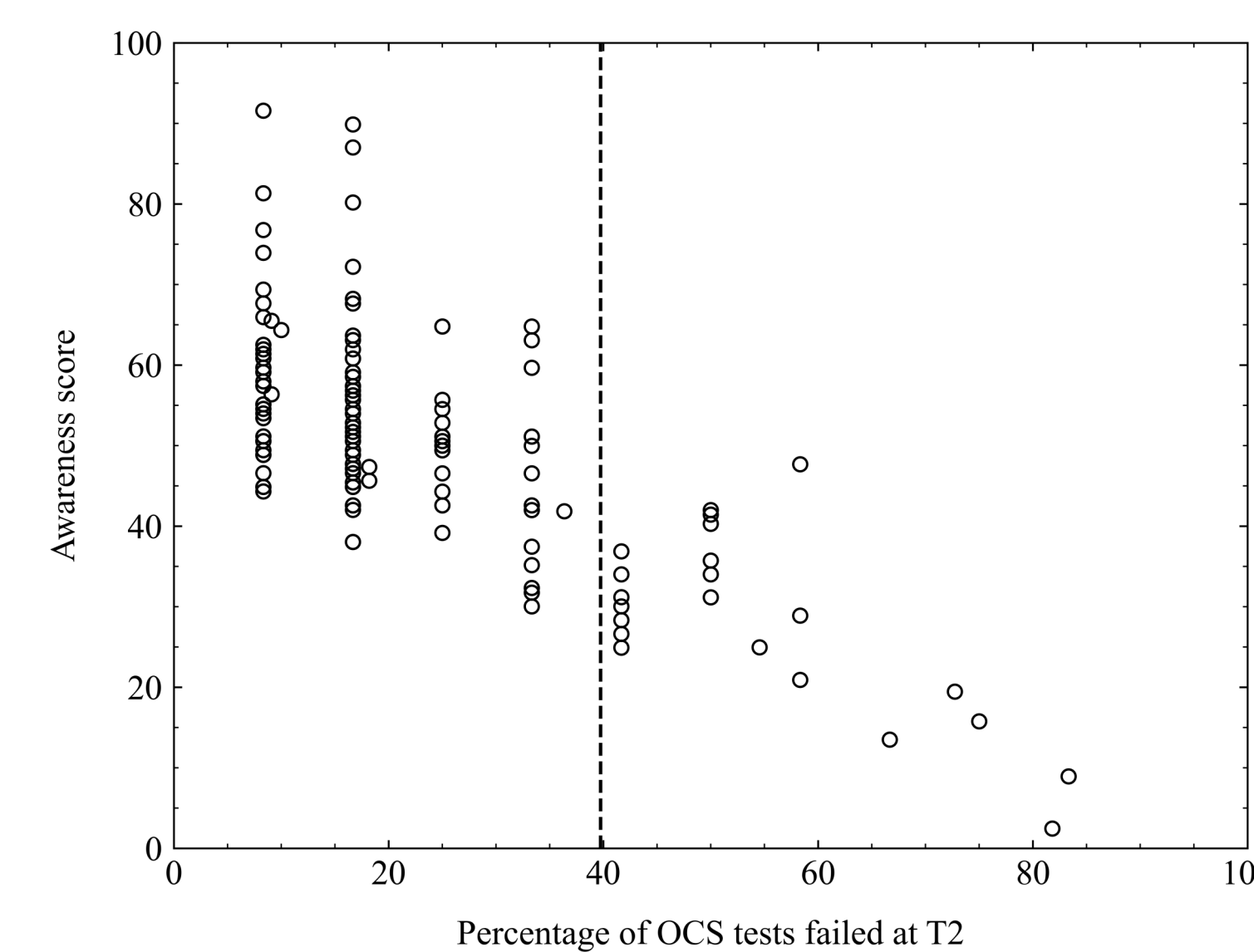
- This observational study involved a secondary data analysis of 143 participants recruited from an inpatient stroke ward during February 2015—February 2020.
- Patients were assessed at 3-weeks (T1) and 6-months (T2) post stroke.
- Objective cognitive impairment was assessed at both time points using the Oxford Cognitive Screen (OCS).
- Cognitive impairment was calculated as the number of OCS subtests failed at each time point, whereby higher scores indicated greater cognitive impairment.
- Cognitive change was calculated as the difference in the number of OCS subtests failed (T2-T1).
- Subjective awareness of cognitive impairment was measured by computing the difference between Z-scores on the Cognitive Failures Questionnaire at T2 and objective cognitive impairment Z-scores at T2, whereby higher scores indicated greater awareness.

4. RESULTS

Preliminary Research Question:

- Awareness of cognitive impairment was significantly lower in participants with moderate-severe cognitive impairment, than in participants with mild-no cognitive impairment ($F(1, 140) = 104.81, p < .001, \text{partial } \eta^2 = .43$; see Figure 1).
- Greater independence in ADL (Barthel Index) was associated with lower emotional distress ($b = -.63, 95\% \text{ CI } [-.86, -.40], t = -5.33, p < .001$).
- Greater awareness of cognitive impairment was associated with greater emotional distress ($b = .18, 95\% \text{ CI } [.11, .25], t = 5.03, p < .001$).

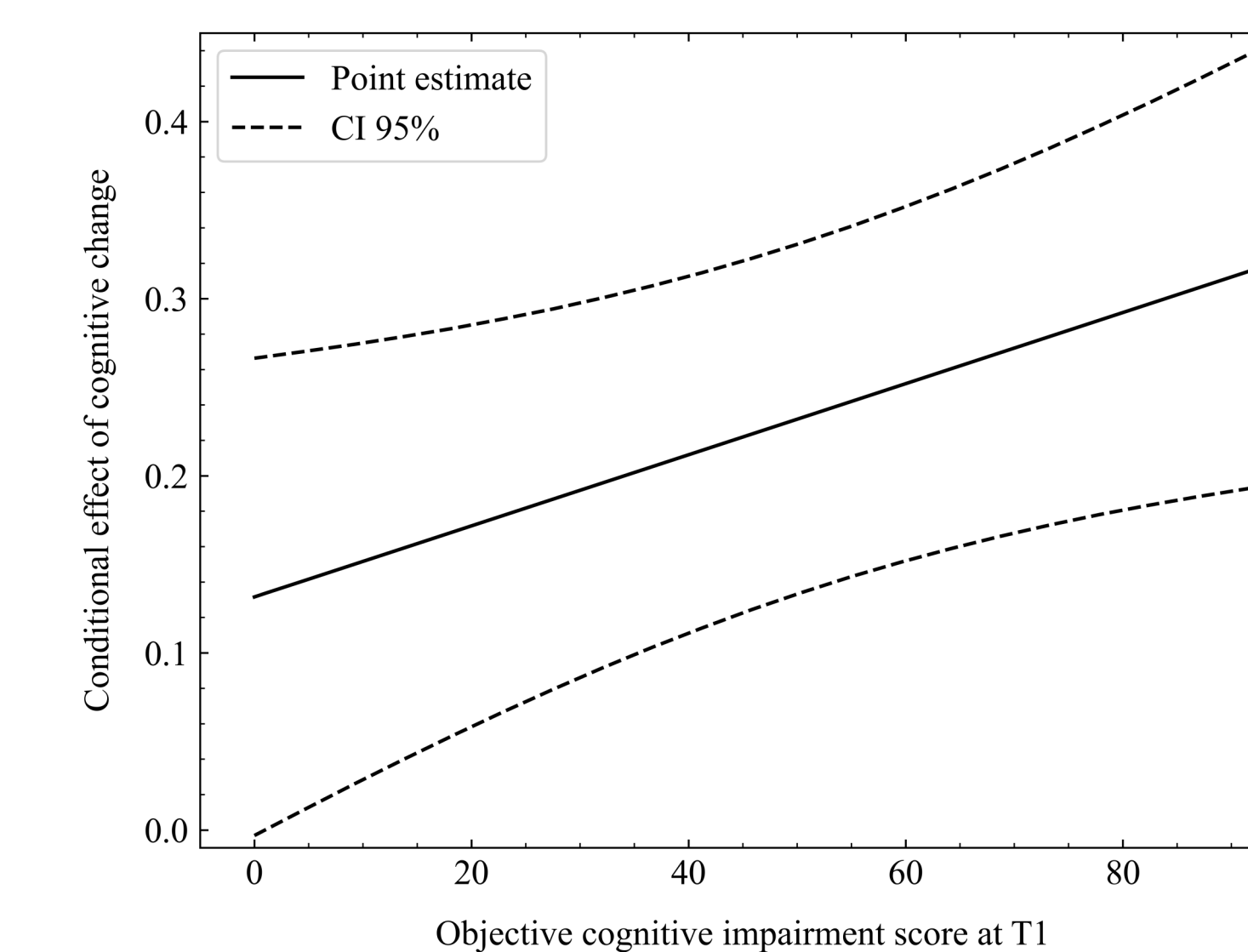
Figure 1. Scatterplot Illustrating the Relationship between Awareness and OCI at T2



Primary Research Question:

- A reduction in cognitive impairment over the first 6-months post-stroke was associated with lower reported emotional distress ($b = .19, 95\% \text{ CI } [.09, .30], t = 3.57, p < .01$).
- This effect was moderated by acute cognitive impairment ($b = .0020, 95\% \text{ CI } [.0002, .0038], t = 2.21, p < .05$), suggesting that this effect was largest for those most cognitively impaired in the first few weeks following stroke (see Figure 2).
- Together, predictors explained 36.9% variance in the model, whereby the interaction variable explained 2.2% variance.

Figure 2. The Conditional Effect of Cognitive Change on HADS Score as a Function of Acute Objective Cognitive Impairment Score



5. CONCLUSIONS

- In line with previous research, findings suggest a strong relationship between awareness of cognitive deficits, cognitive functioning, and distress.
- Findings indicate that emotional outcomes at 6-months post stroke depend, partially, on the interaction between cognitive change and the severity of acute cognitive impairment.
- Although reduced awareness of cognitive impairment may be protective against emotional distress post-stroke, findings suggest that cognitive improvement is associated with lower reported emotional distress, particularly for those most cognitively impaired in the days following stroke.
- This finding appears incongruent with the awareness hypothesis and suggests that awareness of cognitive impairment is not the dominant factor in determining the relationship between acute cognition and mood at 6-months post stroke.
- Improvements in cognition may enable more cognitively impaired individuals to implement compensatory strategies everyday functioning and mood and this should form the basis for future research.

KEY REFERENCES

- Boosman, H., Van Heugten, C., Winkens, I., Heijnen, V., & Visser-Meily, J. (2014). Awareness of Memory Functioning in Patients with Stroke Who Have a Good Functional Outcome. *Brain Injury*, 28(7), 959-964. <https://doi.org/10.3109/02699052.2014.888763>
- Gracey, F., Evans, J. J., & Malley, D. (2009). Capturing Process and Outcome in Complex Rehabilitation Interventions: A “Y-Shaped” Model. *Neuropsychological Rehabilitation*, 19(6), 867-890. <https://doi.org/10.1080/09602010903027763>
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