

Disentangling alexithymia in autism: The roles of interoception and mentalizing as predictors of alexithymia in autistic adults

S. Sawant, W. Carson, J. Wolf, A. Naples, C. Cukar-Capizzi, J. Momsen, C. Carrow, I. Rodden, S. Eberle, J. McPartland

Background

- Alexithymia is a sub-clinical trait characterized by difficulties recognizing and expressing emotions.¹
- Co-occurring alexithymia, rather than autism itself, may account for the emotional processing difficulties observed in some autistic individuals.⁴
- Two main theorized contributors to alexithymia are reduced physiological awareness (interoception) and difficulty mentalizing; however, **their relative contributions to alexithymia in autistic individuals remain unclear.**^{2,3}

Objectives

- Examine diminished interoception and mentalizing difficulties as predictors of alexithymia in autistic adults.
- Determine the contributions of interoception and mentalizing to alexithymia.
- Explore neural measures of social perception as predictors of alexithymia.

Methods

Table 1. Participant demographics. Participants included 46 autistic adults between the ages of 30 to 71 ($M_{age} = 27.46$, $SD \pm 6.83$).

n (Male)	Age (\pm SD)	Race (% minority)	AQ (\pm SD)	FSIQ (\pm SD)	DASS (\pm SD)
33 (71.7%)	27.46 (6.8)	4 (8.7%)	26.2 (9.1)	108 (13.4)	19.1 (12.5)

Measures

Primary measures

- Alexithymia:** Toronto Alexithymia Scale (TAS-20)
- Interoception:** Interoception Sensory Questionnaire (ISQ)
- Mentalizing:** Social Responsiveness Scale (SRS) – Understanding Mental States (UMS); UMS derived from weighted SRS subscales developed in prior research⁵

Cognitive and clinical measures

- Autistic traits:** Autism Spectrum Quotient (AQ) scores
- Internalizing:** Depression, Anxiety and Stress Scale (DASS)
- Cognitive Ability:** Wechsler Abbreviated Scale of Intelligence (WASI – FSIQ)

Neural measures

- N170 amplitude and latency:** EEG marker of early face processing and social perception
 - A subset of participants ($n = 25$) completed an EEG face-processing task

Statistical Analysis

Two hierarchical multiple regression analyses were conducted to quantify the contributions of interoception and mentalizing scores to alexithymia scores. Block order depicted in Figure 1.

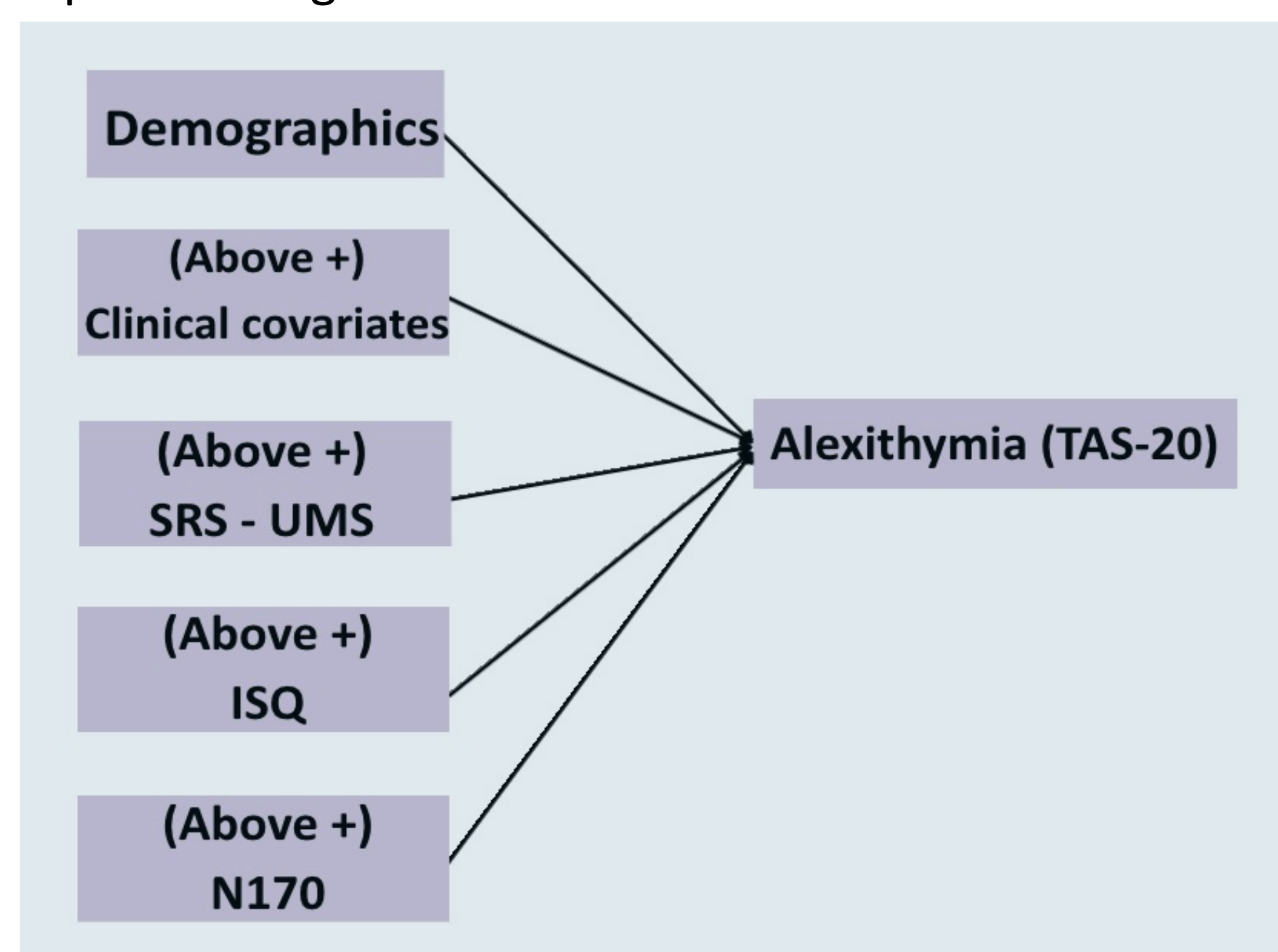


Figure 1: Hierarchical regression model structure. Blocks 3 and 4 were entered in alternate order across models to test sequence effects. N170 amplitude and latency were entered as exploratory measures.

Results

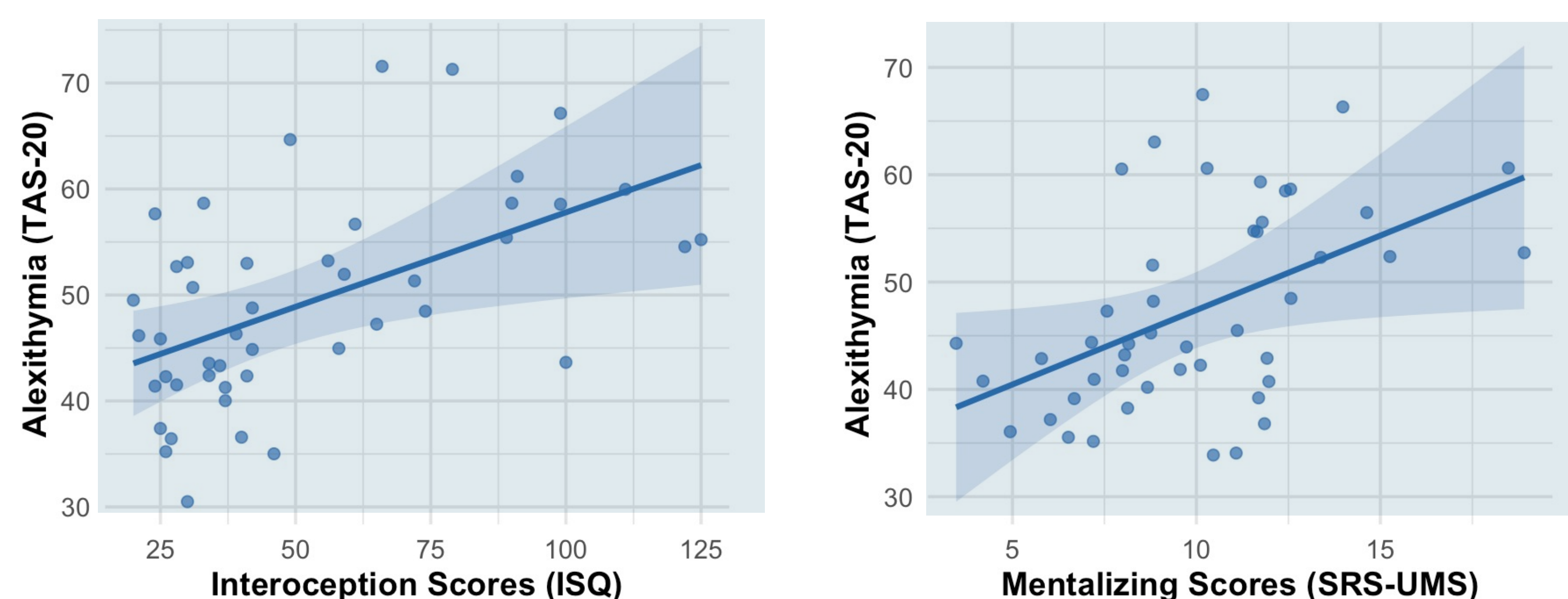


Figure 2: Partial regression plots. Association between **A)** interoception (ISQ) and alexithymia (TAS-20) as well as **B)** mentalizing challenges (SRS-UMS) after adjusting for demographic, clinical, and cognitive covariates.

- Interoceptive awareness scores significantly predicted alexithymia scores** ($\beta=0.178$, $p=0.012$) such that diminished interoception was associated with increased alexithymia.
- Mentalizing scores were significantly predictive of alexithymia scores** ($\beta=1.387$, $p=0.035$) such that reduced mentalizing ability was associated with increased alexithymia.
- In the EEG subsample, neither N170 amplitude ($\beta=0.078$, $p=0.917$), nor N170 latency ($\beta=-0.153$, $p=0.409$) were significant predictors of alexithymia scores.

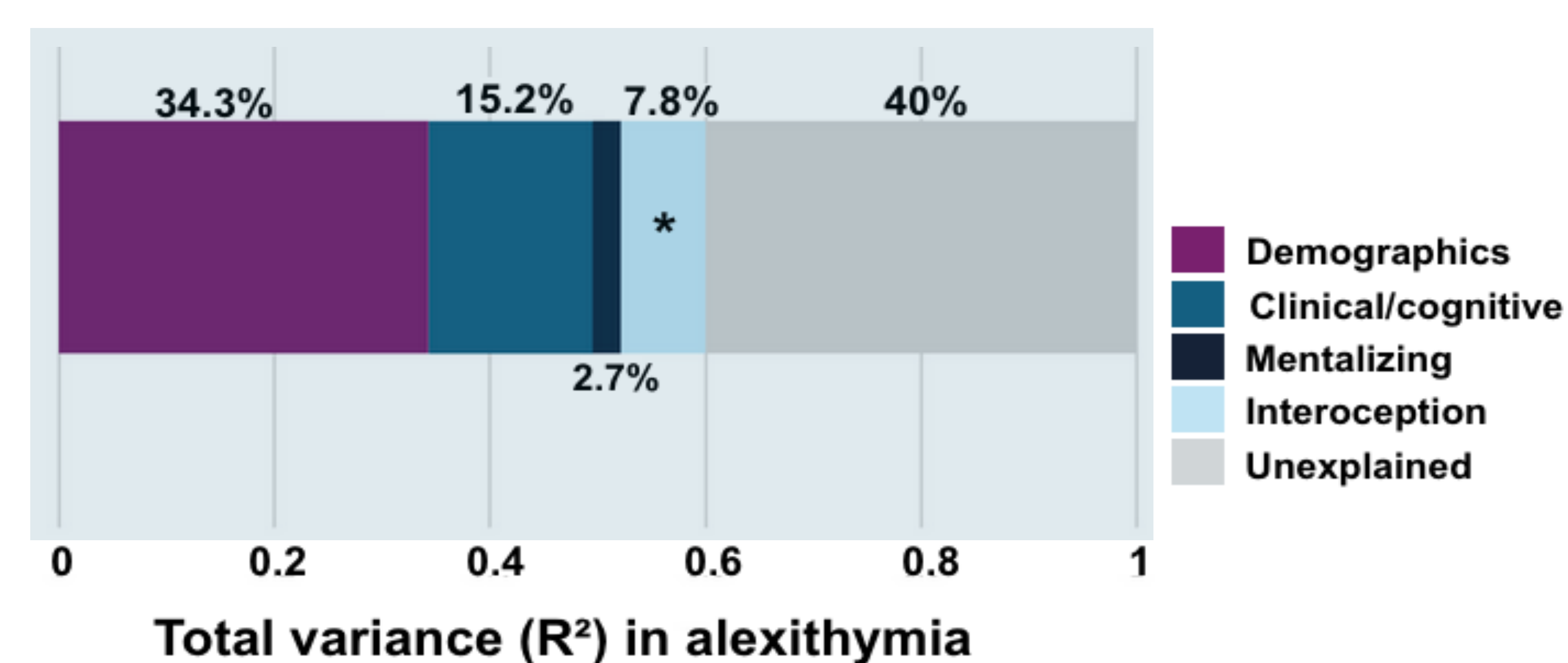


Figure 3: Variance in alexithymia scores explained by predictor blocks. The full model explained approximately 50% of the variance in TAS-20 scores (adjusted $R^2=0.500$, $F(9,36)=5.998$, $p<0.001$).

- Interoception explained a significant proportion of variance in alexithymia** after accounting for mentalizing ($\Delta R^2=0.078$, $p=0.047$).
- Mentalizing did not explain a significant proportion of variance in alexithymia**, regardless of hierarchy ($\Delta R^2=0.053$, $p=0.139$).
- In the EEG subsample, N170 amplitude and latency did not explain a significant proportion of variance in alexithymia ($\Delta R^2=0.001$, $p=0.865$).

Conclusions

- Interoceptive awareness significantly predicted alexithymia beyond mentalizing ability.**
 - This effect emerged only when interoception was entered after mentalizing in the hierarchical regression model.
- Mentalizing did not significantly explain variance in alexithymia, regardless of entry order.**
- Brain-based measures of social cognition (N170) did not explain variance in alexithymia in exploratory analyses.
- These findings suggest that reduced interoceptive awareness may play a key role in alexithymia among autistic adults, while potentially overlapping with mentalizing.

Implications

- The dependence on sequence order may indicate overlap between interoceptive and mentalizing-related processes, **highlighting the need for measures that better delineate their unique and shared contributions.**
- Interventions targeting emotional processing difficulties in autism may benefit from therapeutic strategies targeting interoceptive awareness.

References

- Bagby, R. M., Parker, J. D., & Taylor, G. J. (1994). The twenty-item Toronto Alexithymia Scale--I. Item selection and cross-validation of the factor structure. *Journal of psychosomatic research*, 38(1), 23–32. [https://doi.org/10.1016/0022-3999\(94\)90005-1](https://doi.org/10.1016/0022-3999(94)90005-1)
- Ben Hassen, N., Molins, F., Garrote-Petisco, D., & Serrano, M. Á. (2023). Emotional regulation deficits in autism spectrum disorder: The role of alexithymia and interoception. *Research in developmental disabilities*, 132, 104378. <https://doi.org/10.1016/j.ridd.2022.104378>
- Demers, L. A., & Koven, N. S. (2015). The relation of alexithymic traits to affective theory of mind. *The American journal of psychology*, 128(1), 31–42. doi:10.5406/amerjpsyc.128.1.0031.
- Kinnaird, E., Stewart, C., & Tchanturia, K. (2019). Investigating alexithymia in autism: A systematic review and meta-analysis. *European Psychiatry: the journal of the Association of European Psychiatrists*, 55, 80–89. <https://doi.org/10.1016/j.eurpsy.2018.09.004>
- Uljarević, M., Frazier, T. W., Phillips, J. M., Jo, B., Littlefield, S., & Hardan, A. Y. (2020). Mapping the Research Domain Criteria Social Processes Constructs to the Social Responsiveness Scale. *Journal of the American Academy of Child and Adolescent Psychiatry*, 59(11), 1252–1263.e3. <https://doi.org/10.1016/j.jaac.2019.07.938>

Funding Sources

Alan B. Slifka Foundation (McPartland); DOD W81XWH2110479 (McPartland); NIMH R21 MH091309 (McPartland)

McPartland Lab
mcp-lab.org
mcp.lab@yale.edu
mcpartland.lab on Instagram

