Longitudinal changes of MRI intensity contrast in autism: direct observations and predictions from cross-sectional data

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Dataset: ABIDE1+2 (360 subjects in the cross-sectional sample, 21 subjects x2 time points in the longitudinal [1])
MRI data processing: done with CIVET-2.1 pipeline ([2], version released November 2016)
Measure: contrast between white and gray matter intensity values (the ratio henceforth abbreviated as WGR [3])

We explored how WGR changes with age in ASD and typical development (TD)
This change was assessed by the "angle" metric in the longitudinal sample [4]

PLS analysis [5] identified clusters characteristic for diagnostic group differences (bootstrap ratio, BSR)
singular values indicative of inter-subject differences in the cross-sectional sample, were predictive of severity scores in the longitudinal sample (Figure 5)...

...following correlation with raw ADOS scores and total severity within the cross-sectional sample (Figure 6):

Conclusions
1) Exploration of data distributions gives hint on inter-study variability
2) General age-related cortical contrast decrease in autism spectrum disorder is consistent across investigated longitudinal and cross-sectional samples
3) A Bayesian modelling approach predicts diagnostic outcomes in the longitudinal sample from independent data in the cross-sectional sample
4) Symptom severity scores in autism correlate with brain patterns related to the diagnostic group difference

References

Acknowledgements
This research was supported by Azrieli Foundation BC, Azrieli, MIR_3388, Brain Canada, Compute Canada, JS McDonnell Collaborative Research Grant 2200020255. We would like to thank Yuval Yakubov, Kevin Tran, Vesly Valeron, Andri Trifonov.

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