

Social dysfunction relates to transdiagnostic shifts within socioaffective brain systems among schizophrenia and Alzheimer's disease patients

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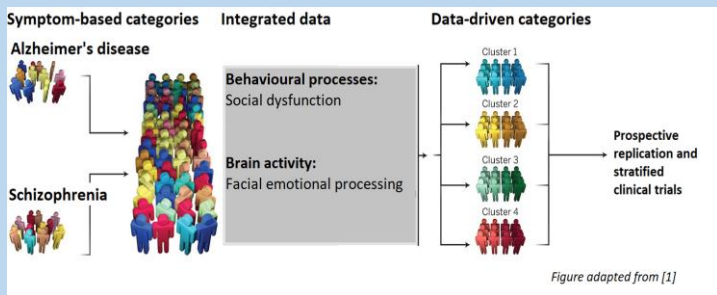
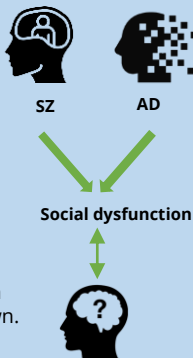
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Introduction

- Social dysfunction is commonly present in schizophrenia (SZ) and Alzheimer's disease (AD).
- While SZ and AD patients differ in clinical symptoms, there may be groups of patients with similar social dysfunction across SZ and AD.
- Perturbed socioaffective neural processing is crucially implicated in SZ and AD and linked to social dysfunction generally.
- Yet, transdiagnostic properties of social dysfunction and its neurobiological underpinnings remain unknown.



Aim: We explored whether social dysfunction is transdiagnostically associated with altered functional activity of socioaffective brain systems across SZ/AD patients and healthy controls (HC).

Methods

Participants:

Data for the current study were derived from the PRISM Project [2] and included patients with SZ (n=46), probable AD (n=40), and two age-matched HC groups (SZcontrols: n=26, ADcontrols: n=27).

Assessments:

Social function:

- Social Functioning Scale (SFS) (measures behavioural aspects of social dysfunction)
- De Jong-Gierveld Loneliness Scale (LON) (measures subjective experiences of social dysfunction)

Facial Emotional Processing fMRI task paradigm

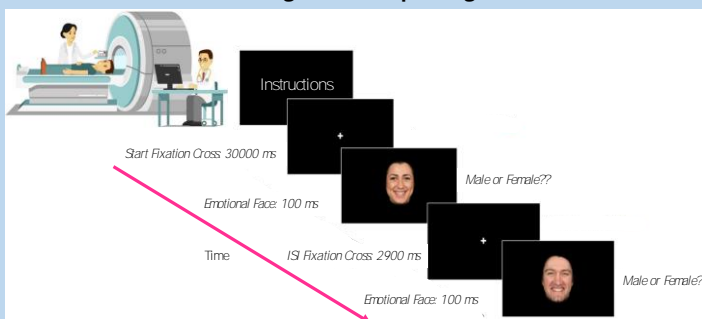


Figure 1. Time course of stimulus presentation for the implicit facial emotional processing task during the scanning session.

Analysis:

The following contrasts were tested: **Sad vs. Fear & Happy; Happy vs. Fear & Sad; Fear vs. Happy & Sad**. These subject-level statistical maps were then fed into a group-level General Linear Model analysis. The dimensional analysis described here tested whether across the sample any linear associations could be found between task-related neural activity and individual participant's SFS and/or LON scores. Multiple comparisons correction was achieved through Threshold-Free Cluster Enhancement with family-wise error correction at $P < 0.05$.

Results

- More behavioral social dysfunction (SFS scores) was associated with stronger neural responses to sad faces, independent of diagnosis (Figure 2).
- More behavioral social dysfunction (SFS scores) was associated with weaker neural responses to happy faces, independent of diagnosis (Figure 3).

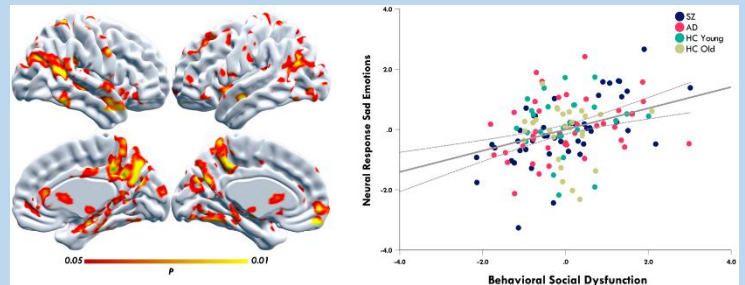


Figure 2. SFS scores and sad emotion processing. Values on the y and x axis are Z-score residuals, higher scores on the x axis indicate more severe social dysfunction.

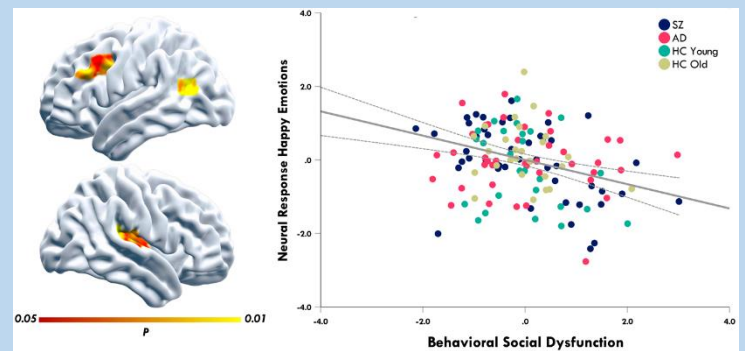


Figure 3. SFS scores and happy emotion processing. Values on the y and x axis are Z-score residuals, higher scores on the x axis indicate more severe social dysfunction.

- Total SFS scores were not associated with brain activity in response to fearful faces across SZ/AD/HC participants.
- Socioaffective neural processing was not transdiagnostically associated with total LON scores or the cumulative SFS + LON scores.
- Post-hoc analyses neither found any diagnosis x social dysfunction interaction effects.

Discussion

- High behavioral aspects of social dysfunction across SZ/AD/HC participants related transdiagnostically to hyperactivity within fronto-parieto-limbic brain systems in response to sad emotions, along with hypoactivity of these brain systems in response to happy emotions.
- The findings pinpoint altered socioaffective neural processing as a putative transdiagnostic marker for social dysfunction, and could aid personalized care initiatives grounded in social behavior.

LIMITATIONS

- The use of questionnaires to capture the notoriously complex phenomenon of social dysfunction is a vast simplification.
- It remains unclear if social dysfunction gives rise to suboptimal socioaffective neural processing or the other way around.

References

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