EMOTIONAL SACCADe TASKS IN ATTENTION-DEFICIT HYPERACTIVITY DISORDER AND BIPOLAR DISORDER

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BACKGROUND

ADHD and BD share symptomatology, as well as cognitive and emotion processing deficits that complicate differential diagnoses.

Previous work from our lab comparing ADHD and BD performance on an emotional saccade task has shown that direction errors differentiate ADHD from controls, while reaction times following presentation of emotional face stimuli differentiate BD from controls.

Microsaccade behaviour has been shown to be reflective of both cognitive and emotional processing.

The goal of this study is to objectively compare executive functioning and emotion processing in ADHD and BD in order to establish how these processing systems may differentially interact to cause dysfunction.

METHOD

Participants:

- ✓ 21 healthy control (mean age = 37.05, range = 20-68, 11 male), 20 ADHD (mean age = 35.85, range = 19-64, 9 male), and 20 BD (mean age = 37.85, range = 22-72, 11 male) participants were recruited to take part in the study
- ✓ Patients groups were screened by author using DSM-V criteria and controls were screened using the MINI 5d.

Saccade Paradigm:

- Sex (male or female) of emotional face stimuli acted as the instructional cue to perform either a pro- or antisaccade
- Half of participants were instructed to make prosaccades on female faces and antisaccades on male faces, other half instructed the opposite

Data Analysis:

- Measures of interest: macrosaccade behaviour (SRT, direction error %) following target onset and microsaccade behaviour (microsaccade rate) preceding target onset
- Macro- and microsaccade behaviour analyzed with custom MATLAB scripts

RESULTS

Macrosaccade behaviour

Window of analysis

Executive Functioning: Both ADHD & BD groups made significantly more direction and anticipatory errors than controls

Microsaccade behaviour

Window of analysis

Executive Functioning: Controls exhibited significantly lower microsaccade rates preceding anti-vs. prosaccade initiation, yet this task-related modulation was absent in both ADHD & BD groups

Emotion Processing: The BD group exhibited a more global emotion processing deficit than the ADHD group

Emotion Processing: "No face" stimuli elicited significantly lower microsaccade rates than emotional face stimuli across the 3 groups

CONCLUSIONS

- Both ADHD and BD groups made significantly more direction and anticipatory errors than controls. Furthermore, while controls exhibited significantly lower microsaccade rates preceding anti- vs. prosaccade initiation, this important task-related modulation was absent in both patient groups
- Regarding emotion processing, the ADHD group performed worse than controls on trials with neutral faces, while the BD group performed worse than controls on trials with faces of all valence.
- This study supports previous findings suggesting that response inhibition deficits are central to both ADHD and BD, and that they are further exacerbated by more global emotion processing deficits in BD
- These results suggest further development of multidimensional transdiagnostic approaches aiming to identify homogenous and clinically relevant data driven biotypes.

References

1. Yep R., Soncin S., Brien D.C., Coe B.C., Marin A., Munoz D.P. (2018). Using an emotional saccade task to characterize executive functioning and emotion processing in attention-deficit hyperactivity disorder and bipolar disorder. Brain and Cognition, 124(July):1-13.
2. Soncin S., Brien D.C., Coe B.C., Marin A., Munoz D.P. (2016). Contrasting emotion processing and executive functioning in attention-deficit/hyperactivity disorder and bipolar disorder. Behav Neurosci., 130(5):531-43.
3. Kashiwara, Okanoyak, Kawai N (2014) Emotional attention modulates microsaccadic rate and direction. Psychological Research 78:166-179.