

Schweizerische Anorexia Nervosa Stiftung
Fondation Suisse d'Anorexie Nerveuse
Fondazione Svizzera d'Anoressia Nervosa

The neural correlates of cognitive and emotion processing in children and adolescents with Anorexia Nervosa: Are different profiles related to stage of illness?

(project no. 58-16)

Authors

Kate Tchanturia, Steven Williams, Katie Lang, Mima Simic, Leon Fonville, Jenni Leppanen

Aim

The overall aim of the research is to study behavioural and neurobiological factors that may contribute to the development and maintenance of Anorexia Nervosa (AN) in children and adolescents.

Background

Effective treatment options for AN are lacking, and research suggests that longer illness duration is linked to treatment resistance. There is a need for research investigating underlying mechanisms linked to illness stage that are likely to be important in the pathogenesis and maintenance of AN. This could lead to developing more efficacious treatments.

Research has demonstrated an inefficient neurocognitive style and poor emotion processing in adults with AN, which is likely to contribute to the development and maintenance of AN. Children and adolescents appear to have similar profile, albeit in an attenuated form. Several studies from our group with adult AN investigated the neural underpinnings of such processing and demonstrated differential patterns of brain activation between AN and healthy controls (HCs) during the performance of cognitive or socio-emotional tasks. There is a need to investigate this further in younger AN populations. Demonstrating differential neural correlates related to illness stage will aid the development of stage-based targeted treatments.

Method

190 young women and girls aged 12 to 26 were recruited to take part in the study. Sixty-seven had a current diagnosis of AN, 50 were weight restored or recovered from AN, and 73 were HCs. All participants completed three behavioural tasks outside of the MRI environment. These included the Wisconsin Card Sorting task and the Rey–Osterrieth complex figure test assessing set-shifting and central coherence respectively, and the Frith-Happé Triangle Animation task assessing theory of mind. Inside the MRI environment participants completed a structural scan and four additional tasks including two facial affect processing tasks examining brain responses to implicit processing of happy and fearful

faces, the embedded figures task investigating brain correlates of attention to detail, and an MRI compatible version to the Frith-Happé Triangle Animation task. All AN and recovered/weight restored participants were additionally asked to complete 6-month follow-up questionnaires to indicate their current level of symptomatology. The 6-month follow-up questionnaires will be used to assess the impact of neurocognitive and social-emotional difficulties on treatment outcome.

Findings

The findings thus far have revealed significant differences in theory of mind ability between people with acute AN and HCs and recovered/weight restored participants. Those with AN had difficulties in accurately describing the complex animations and used fewer theory of mind terms when doing so. Interestingly, no significant group differences emerged in the tasks assessing set-shifting and central coherence.

The structural neuroimaging data has shown that people with acute AN have significant anomalies, both inward and outward deformations, in the shape of specific basal ganglia structures, the nucleus accumbens, putamen, and globus pallidus. These findings partially replicate findings from existing data from women with severe and enduring AN with the exception of anomalies in the shape of the putamen. The putamen has been linked to formation of rewarded actions and is often actively involved in supporting habit learning, while the globus pallidus has been found to support execution of habitual behaviours.

The project was funded by the Swiss Anorexia Nervosa Foundation.