Am I as fat as I think I am: Body image in adolescents with Anorexia Nervosa

**Research idea:** Understanding body image disturbances in adolescents with Anorexia Nervosa, from a multisensory perspective, whilst investigating potential contributing effects of intolerance of uncertainty (IU) and social anxiety.

**Research problem:** Body image in Anorexia Nervosa (AN) is disturbed and after recovery remains disturbed. These disturbances, and associated negative body image, affect patients daily lives and serve as maintaining factors for AN pathology. Existing studies included adults, yet the typical age of onset of AN is in adolescence, it is now time to investigate these potential disturbances in adolescents with AN.

**Research questions:** The overarching research question this project aims to answer is: Are there body image disturbances in adolescents with and without AN, and to what extent do these disturbances differ. Four subprojects will be run, each answering sub questions within the overall research question.

1) Firstly, do adolescents with AN display body image disturbances in the perceptual, cognitive-affective and/or behavioural domains, compared to adolescents without AN (i.e. Healthy Controls, HCs)? Secondly, how do social anxiety and an intolerance for uncertainty interact with these disturbances?
2) Do body image disturbances change after (weight) recovery from AN during adolescence?
3) Is there a specific IU component in body image associated to cognitive-affective components of body image and more severe eating pathology? Can we develop an assessment measure that assesses the uncertainty, and the intolerance thereof, that adolescents with AN experience with regards to their body and body image?
4) Does an intervention targeting IU-related aspects of body image, thereby also targeting social anxiety symptoms?

**Methods:** Study 1 follows an experimental design (AN vs HC), including the Visual Size Estimation (VSE), Tactile Estimation Task (TET), and Hoop Task (HT) (Engel & Keizer, 2017), and body image and anxiety questionnaires. Both group differences, as well as associations between measures within groups will be analysed (AN group n = 60, HC group n = 50). In study 2 AN participants will be asked to do the same assessments after 1 year. Differences in body image assessments will be tested for, in addition to exploring associations between body-image measures, anxiety measures and illness severity (expected n = 35 due to drop-outs). AN patients will be recruited from Altrecht Eating Disorders Rintveld, a top clinical center with a sound research infrastructure. HC participants will be recruited from local high schools. We will need to develop these collaborations, but as we intend to offer workshops providing information about AN and body image to these schools we feel confident these collaborations will be formed. In study 3, qualitative techniques will be used to develop a body-related IU scale. Subsequently, this questionnaire will be validated in 250-300 adolescents through online surveys. A subset of this sample will be asked to complete (experimental) measures of body image and anxiety. Study 4 will be a pilot intervention study using an open trial design, including Rintveld patients.

**Rationale and approach:** Body image is a multifaceted construct, with perceptual (i.e. ability to accurately perceive body shape and size), cognitive-affective (i.e. self image), and behavioral components (i.e. body checking, dieting) (Völbeck-Elsebusch, Vocks, & Legenbauer, 2013). One disorder dominated by extreme negative body image is Anorexia Nervosa (AN; American Psychiatric Association, 2013, pp. 338–339). Although there is research confirming cognitive-affective and behavioural components of body image dissatisfaction in AN, there are very few studies investigating perceptual and sensory components of body image. The existing studies confirm perceptual body image disturbances (Engel & Keizer, 2018, see Mölbert et al 2017 for a review), but include adults...
only. As the typical age of onset of AN is in adolescence, it is important to investigate these potential disturbances in adolescents with AN. Two constructs that have as yet remained unstudied, despite their potential effects on body image, are social anxiety and intolerance of uncertainty (IU). Firstly, IU refers to a tendency to react negatively to situations that are uncertain (Dugas, Schwarz, & Francis, 2004, p. 835). IU is pertinent to AN (o.a. Sternheim et al., 2011; 2018) and first evidence shows that IU contributes to a negative body image in students (Sternheim and colleagues, in prep). Secondly, social anxiety may be important considering that AN patients commonly report a strong fear for negative evaluations, a key symptom of Social Anxiety Disorder (APA, 2013). As one’s own body image is formed through socio-cultural factors, a heightened fear for the negative evaluation by other of your physical appearance is likely to result in body image dissatisfaction. This effect may be particularly strong for those people who have a low tolerance for the inherent uncertainty and ambiguity of social interactions. Indeed, research shows that IU is strongly associated to social anxiety symptoms (Boelen & Reijntjes, 2010) and that targeting IU reduces social anxiety symptoms such as fear of negative evaluations (Boswell et al., 2013). Pilot data (Sternheim & Harrison, 2018) shows potential benefits of an intervention for IU for adolescents with AN with respect to IU reduction. The proposed project will further investigate body-related aspects of IU and potential clinical implications for adolescents with AN.

**Institutional environment:** A large part of the research work will take place within the departments of Clinical Psychology and Experimental Psychology of Utrecht University. Recruitment and conducting of experiments for some studies will take place in Altrecht Eating Disorders Rintveld, one of the 3 top clinical centers for Anorexia Nervosa in the Netherlands.

**Relevance:** Currently, treatments for AN are suboptimal, mortality rates range around 6-15% and 20% of patients remains chronically ill (Hudson et al. 2007). Recent work by our team (Engel & Keizer, 2017) shows that after treatment a high number of patients have not recovered from body image disturbance symptoms, implying that the development of novel body image interventions is crucial. As AN typically starts in adolescence, it is critical to study causal mechanisms and treatment options in that period (Gowers & Bryant-Waugh, 2004). Moreover, body image-related alterations in the brain as an effect of starvation may be less salient, and thus more malleable, in adolescents (with a shorter illness duration) than in adults.

**References:**