



## Research report

## Automatic approach/avoidance tendencies towards food and the course of anorexia nervosa

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## ABSTRACT

**Objective:** The aim of the present study was to investigate the role of automatic approach/avoidance tendencies for food in Anorexia Nervosa (AN). We used a longitudinal approach and tested whether a reduction in eating disorder symptoms is associated with enhanced approach tendencies towards food and whether approach tendencies towards food at baseline are predictive for treatment outcome after one year follow up. **Method:** The Affective Simon Task-manikin version (AST-manikin) was administered to measure automatic approach/avoidance tendencies towards high-caloric and low-caloric food in young AN patients. Percentage underweight and eating disorder symptoms as indexed by the EDE-Q were determined both during baseline and at one year follow up. **Results:** At baseline anorexia patients showed an approach tendency for low caloric food, but not for high caloric food, whereas at 1 year follow up, they have an approach tendency for both high and low caloric food. Change in approach bias was neither associated with change in underweight nor with change in eating disorder symptoms. Strength of approach/avoidance tendencies was not predictive for percentage underweight. **Discussion:** Although approach tendencies increased after one year, approach tendencies were neither associated with concurrent change in eating disorder symptoms nor predictive for treatment success as indexed by EDE-Q. This implicates that, so far, there is no reason to add a method designed to directly target approach/avoidance tendencies to the conventional approach to treat patients with a method designed to influence the more deliberate processes in AN.

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## Introduction

Anorexia Nervosa (AN) is characterized by extreme concerns of gaining weight despite existing underweight. Effectiveness of leading treatments for adolescents with AN such as Family Based Therapy (FBT) and Cognitive Behavioural Therapy (CBT) is however limited and relapse rates after recovery are high (see Byrne, Fursland, Allen, & Watson, 2011; Hay, 2013; Lock et al., 2010). A key question is how to explain these limited success rates. One possible explanation for the relatively limited efficacy of those treatments might be their primary focus on conscious appraisals as the starting point of the interventions. Both CBT and FBT aim to target 'explicit' processes, by replacing dysfunctional thoughts with more effective thoughts, thus decreasing emotional distress and self-defeating behaviour. However, dual process models emphasize that next to these more explicit, deliberate processes, also more automatic, implicit, processes exist (Gawronski & Bodenhausen, 2006). Dual process models imply that behaviour is the consequence of

an interplay between the reflective and the more implicit, automatic processes. In the reflective system, behaviour is guided by deliberate decision-making processes. Executive functions are needed to plan behaviour, to weigh possible consequences, and to consequently behave in an intended goal-directed manner. In the implicit (or reflexive) system, behaviour is directly activated by associative clusters in memory and this may occur spontaneously and outside of people's awareness or control. These associative clusters are formed in long-term memory through repeated experience. No executive functions or cognitive effort are needed for activating behaviour, and therefore it is assumed that this system is predictive for behaviour in situations where less cognitive resources are available (e.g., time pressure, cognitive depletion, or stress) (Strack & Deutsch, 2004). Moreover, implicit cognitions are assumed to be critically involved in habit-like, repetitive behaviours (e.g., Strack & Deutsch, 2004; Walsh, 2013), which are typical for AN (e.g., rigid dieting).

Clearly, one could argue that the refusal to eat in AN is a more deliberate process. Consequently, conventional treatment is used to address problematic behaviour in a top-down manner by taking the reflective system as the starting point. However, also bottom-up processes might play a role in AN. Several studies provided

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evidence that implicit, automatic processes may be involved in (un-)successful dieting (Roefs et al., 2011). Accordingly, studies on attentional bias show that eating disorder patients, particularly those with BN, have an attention bias for food. While in AN evidence is mixed, in BN food stimuli might elicit greater incentive saliency, prompting the desire to eat food (Brooks, Prince, Stahl, Campbell, & Treasure, 2011). An attentional bias for food might therefore lead to increased intake (Werthmann, Jansen, & Roefs, 2014). In addition, non-successful dieters have been found to show enhanced automatic approach tendencies towards pictorial food items (Veenstra & de Jong, 2010). Although evidence is mixed and also some research points in the opposite direction (e.g. Fishbach & Shah, 2006), the view that automatic processes influence actual intake is further supported by a study that showed that implicit measures were predictive for food intake in case of low cognitive resources (Friese, Hofmann, & Wänke, 2008). Also in other areas of psychopathology a relation was found between intake and approach tendencies for the relevant substance, as for instance in alcohol (e.g. Field, Kiernan, Eastwood, & Child, 2008). Moreover, analogue studies have shown that experimentally reducing automatic chocolate-approach tendencies also reduced participants' craving for chocolates (Kemps, Tiggemann, Martin, & Elliott, 2013).

Whereas in disinhibited eating and addiction, heightened automatic approach tendencies may be involved, in AN, the opposite might be the crucial problem. The common approach tendencies for food might be absent in individuals with AN. In this way, AN patients are more similar to individuals with anxiety disorders, in that they too show an avoidance tendency away from disorder-relevant (threatening) stimuli (e.g., Rinck & Becker, 2007). Avoidance of high caloric food can become a well-established habit and very resistant to change (Walsh, 2013). The successful restriction of food intake in AN patients, even under conditions that typically impair self-control might then thus be explained by assuming that automatic responses towards food are weakened or perhaps absent among AN patients. In line with such a view, recent research using an indirect approach avoidance task, provided evidence indicating that indeed the common approach bias towards high caloric food was attenuated in AN patients compared to non-symptomatic controls (Veenstra & de Jong, 2011).

Possibly conventional treatment has a limited effect on this type of more automatic processes. It could therefore be hypothesized that treatment success is limited if these relevant automatic processes remain unaffected. In other words, limited treatment success in AN patients might be associated with a failure to enhance automatic approach tendencies towards food items. As a first step to examine whether the efficacy of the treatment of AN indeed critically depends on its success in normalizing the approach tendencies towards food, the present study tested whether approach/avoidance tendencies change over time, and examined whether the reduction in AN symptoms was associated with an increase in approach tendencies towards food. Moreover, if a lack of approach tendencies towards food indeed plays an important role in the persistence of eating disorder symptoms, relatively weak approach tendencies at baseline might be an important moderator of treatment success. Therefore, the next aim of the study was to test whether (low) approach tendencies towards food at baseline predicted (worse) treatment outcome at one-year follow up. The current study used a longitudinal design, in which approach tendencies for food and eating pathology of a large group of AN patients were measured at the moment of intake and at a fixed subsequent assessment at one-year follow up. In short, the major aim of the current study was to test whether (i) approach tendencies change between moment of intake and one year follow-up, (ii) a reduction in eating disorder symptoms is associated with enhanced approach tendencies towards food, and (iii) approach tendencies towards food at baseline are predictive for treatment outcome after one year follow up.

## Method

### Participants

Participants were 152 adolescents ( $M$  age = 14.97,  $SD$  = 1.63, range 10–20) who were admitted between 2007 and 2012 for treatment at the Department of Eating Disorders of Accare in Smilde, and who fulfilled the DSM-IV criteria for AN ( $n$  = 87), or EDNOS with characteristics of AN, as diagnosed by the child version of the Eating Disorder Examination (EDE) interview (EDE: Bryant-Waugh, Cooper, Taylor, & Lask, 1996). The content of the child EDE is very similar to the adult EDE interview. We used the child version for all participants because we preferred one diagnostic instrument for the whole group, and to reassure that younger patients would also understand the questions. The EDNOS-group consisted of patients who met most, but not all, criteria of AN. More specifically, this group consisted of patients who had menses ( $n$  = 11), were underweight but less than 15% ( $n$  = 20), were non fat phobic AN ( $n$  = 26), or had partial AN (i.e. missing 2 of the 4 criteria) ( $n$  = 7) (cf. Thomas, Vartanian, & Brownell, 2009).

### Materials

#### *Affective Simon Task Manikin version (AST-manikin)*

##### *Overview*

As an index of automatic approach/avoidance tendencies for food, a manikin task with food pictures was used that was based on the pictorial AST originally developed by De Houwer, Crombez, Baeyens, and Hermans (2001), and previously used in the context of eating disorder symptoms and has shown construct validity in the context of eating disorders (Veenstra & de Jong, 2011) as well as in other kinds of psychopathology (e.g. Wiers, Rinck, Kordts, Houben, & Strack, 2010). In order to measure the automatic reaction towards food, in a way that is relatively insensitive to strategic influences, the content of the stimuli (high-fat food, low-fat food, or neutral pictures) was a task-irrelevant stimulus feature. The required response (move towards or away) was defined by the perspective of the picture: top-view or side-view. So, perspective of the picture was task-relevant for the participants and the content of the picture (i.e. food or neutral) could thus be ignored. Assignment of the required response (move towards or move away) to the task-relevant feature (top-view/side-view) was counterbalanced over participants. The task was programmed in E-prime 1.1 (Schneider, Eschman, & Zuccolotto, 2002) and was run on a Windows XP computer with a 22 inch CRT monitor (resolution set to 1024 by 768 pixels).

##### *Stimuli*

The selection of stimuli was based on a study on the evaluation of high and low fat food (Roefs, Herman, MacLeod, Smulders, & Jansen, 2005) and has previously been used in studies on automatic approach tendencies in restrained eaters (Veenstra & de Jong, 2010) and anorexia patients (Veenstra & de Jong, 2011). Pictures are used because food pictures activate the same neural regions as tasting the actual food (Simmons, Martin, & Barsalou, 2005). Concrete, the stimuli consisted of eight high-fat food pictures (pizza, croissant, chocolate, crisps, chips, ice-cream, brown spiced biscuit, and toast with ham and cheese), eight low-fat food pictures (strawberries, melon, grapes, popcorn, carrots, cherries, pineapple, and chicken). Five neutral stimuli were pictures of bowls and mugs. Of every stimulus, two different pictures (380 × 285 pixels) were constructed: one top-view and one side-view picture.

##### *Trial specification*

Each trial started with a 1000 ms presentation of a fixation dot. Next, a picture appeared in the middle of the screen, and a black manikin appeared above or below the picture. Participants had to move the manikin as quickly as possible, depending on instruction, towards or away from the picture by pressing the arrow buttons until the manikin

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