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Happy eating: The Single Target Implicit Association Test predicts overeating after positive emotions

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ABSTRACT

For many years, questionnaires have been considered the standard when examining emotional eating behavior. However, recently, some controversy has arisen about these questionnaires, and their usefulness in identifying emotional eaters has been questioned. The current study aimed to investigate the Single Target Implicit Association Test (ST-IAT) as a measure of emotional eating. Two ST-IATs (assessing food-positive and food-negative associations respectively) and the Dutch Eating Behaviour Questionnaire (DEBQ) were compared in undergraduate students. A positive, negative or neutral mood was induced by means of a film clip, and milkshake consumption was measured during and after the mood induction. It was hypothesized that participants with strong emotion–food associations on the ST-IATs (i.e., IAT-emotional eaters) would consume more food in the emotion induction condition corresponding to that emotion, as compared to those with weak emotion–food associations as well as to those in the neutral condition. Participants who scored high on both the positive and negative ST-IATs ate more during a positive mood induction than during a negative mood induction. This effect did not extend to milkshake consumption after the mood induction procedure. In addition, IAT-positive emotional eaters consumed more food than IAT-non-emotional eaters. No effects of the DEBQ on milkshake consumption were found. It is concluded that the ST-IAT has potential as a measure of emotional eating.

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1. Introduction

Most people have at one time or another experienced how emotional states influence their eating behavior. They may have not been able to eat when grieving or in love, or celebrated happy events or achievements with big dinners. However, for some people, eating and emotions have become too interconnected. So much, in fact, that they have considerable difficulties distinguishing emotional arousal from feelings of hunger or food desires, and even confuse emotions for hunger or desire. This observation was first made by Bruch (1964), and in the years thereafter interest in the concept of 'emotional eating' has grown (Van Strien, Frijters, Bergers, and Defares, 1986).

To measure emotional eating, several questionnaires have been developed (*Emotional Eating Scale* (*EES*) (Arnow, Kenardy, and Agras, 1995); *Emotional Overeating Questionnaire* (*EOS*) (Masheb and Grilo, 2006); *Emotional Eating subscale* of the *Dutch Eating Behavior Questionnaire* (*DEBQ*) (Van Strien et al., 1986)). Although the design of these questionnaires may vary, they all have the same goal: to retrospectively self-assess eating behavior in response to (mainly) negative emotions. A significant problem that arises with this kind of measure is that people are generally not very good at recalling their emotions, not good at recalling their eating behavior, and not good at all at recalling associations between the two. Evers, de Ridder, and Adriaanse (2009) therefore suggest that emotional eating scales may suffer from a 'triple recall bias'. Along the same lines, the idea that emotions and eating are related is a kind of common sense in the general population, which may lead people to be biased towards experiences that confirm this notion (Ganley, 1989). These problems with current emotional eating scales might explain recent findings that show that scores on such scales are poor predictors of food intake following induction of a positive or negative mood. Evers et al. (2009) conducted five studies in which positive and/or negative emotions were induced in emotional and non-emotional eaters as identified by the DEBQ subscale of emotional eating, before subjecting them to a bogus taste test. The way of inducing mood states (e.g., film excerpts or false feedback) and the type of mood induced (e.g., sad, happy or anxious) varied over studies. None of the studies showed increased food intake in DEBQ-emotional eaters as compared to non-emotional eaters, in either emotional or neutral conditions. Conner, Fitter, and Fletcher (1999) conducted a study in a more naturalistic setting in which participants kept track of daily hassles (i.e., stress) and filled out food diaries for one week. They found that, although the amount of daily hassles was positively related to snacking, this relationship was moderated by external eating (i.e. eating after being exposed to food stimuli), but not DEBQ-emotional eating. Another naturalistic study (Adriaanse, de Ridder, and Evers, 2011) was also unable to discover an influence of DEBQ-emotional eating

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scores on snacking, neither under neutral nor emotional circumstances. Adriaanse et al. (2011) subsequently hypothesized that emotional eating scales measure a person's *beliefs* about the association between emotions and eating, but not their actual eating *behavior* in response to negative emotions. These personal beliefs would follow from concern about one's own eating behavior. Indeed, Adriaanse et al. (2011) showed that higher self-reported emotional eating scores are significant correlates of more worrying about and monitoring of one's own eating behavior, lower control over one's eating behavior, and a higher extrinsic motivation for healthy eating. A similar suggestion was made by Jansen et al. (2011), who found that there was no discriminant validity of the emotional and external eating scales of the DEBQ, and a moderate correlation between the subscales. Jansen et al. (2011) concluded that the DEBQ, and possibly other eating scales as well, do not distinguish between emotional, external and restraint eaters, but simply indicate a general 'eating concern' in high-scoring people. A final problem with the emotional eating scales is that they mostly focus on negative emotions, while neglecting positive emotions, even though research has shown that positive mood can also increase food intake compared to neutral mood (Cools, Schotte, and McNally, 1992; Patel and Schlundt, 2001; Turner, Luszczynska, Warner, and Schwarzer, 2010).

To overcome the problems related to self-report eating scales, the present study tested whether a Single Target Implicit Association Test (ST-IAT; Karpinski and Steinman, 2006) is a better measure of emotional eating. The Implicit Association Test (IAT; Greenwald, McGhee, and Schwartz, 1998) is an implicit measure of associations between concepts. Implicit measures are defined by De Houwer, Teige-Mocigemba, Spruyt, and Moors (2009) as "measurement outcomes that are causally produced by the to-be-measured attribute in the absence of certain goals, awareness, substantial cognitive resources, or substantial time" (p. 350). In the IAT, participants distinguish two categories of words (e.g., pleasant and unpleasant; the attributes) presented on the screen, as well as two other categories of words or pictures (e.g., flowers and insects; the target-concepts), by either a left-hand or right-hand response. The general idea is that when associated attributes and target-concepts require pressing the same response button (e.g., right-hand response for flowers and pleasant words), responses are faster than when unassociated attributes and target-concepts share the same response key (e.g., right-hand response for insects and pleasant words). This difference in response time is taken as an implicit measure of an association between the target and attribute categories. The ST-IAT is a modification of the original IAT in that there is only one target category, and it has been found to be equally reliable as the IAT (Karpinski and Steinman, 2006). For the current study, the target-concept is food, and the attribute categories are 'emotional' and 'neutral'. To measure associations between food and both positive and negative emotions, two ST-IATs are administered.

The hypothesis is that high emotional eaters can be distinguished from low emotional eaters based on their ST-IAT performance: Participants with stronger ST-IAT food–emotion associations (referred to as 'IAT-emotional eaters') will (1) consume more food after an emotion induction than after a control procedure, and (2) show higher food intake in the emotional conditions than participants with weaker ST-IAT food–emotion associations (referred to as 'IAT-non-emotional eaters'). Furthermore, this overeating is expected to be emotion-specific: those scoring high on IAT-positive emotional eating will overeat in the positive mood condition, while IAT-negative emotional eaters will overeat in the negative mood condition. No effect of emotion induction on food intake is expected for the IAT-non-emotional eaters.

2. Methods

2.1. Participants

Participants were 122 female undergraduate students at Maastricht University. They were recruited through advertisements at the university, announcing a study on the relationship between empathy and perception. Participants were instructed not to consume any food in the 2 h prior to the experiment. No exclusion criteria were applied. Participants took part for either course credit or a monetary reward of € 7.50. The study's procedure was approved by the local ethical committee.

2.2. Measures

2.2.1. ST-IAT

Stimuli of the ST-IAT included neutral words (6), emotion words (6) and food words (6). Attribute category labels were presented in the top left ('neutral') and top right ('emotion') corners of the screen, and these remained on screen during the task. The target category label (i.e., 'food') was situated either below the 'neutral' label or below the 'emotion' label. Stimulus words and pictures were presented in the middle of the screen. Participants were instructed to sort the presented stimulus words by a button press (left or right) according to the category labels on screen. Stimuli remained on the screen until a response was given. After a practice-block of 24 trials with only neutral and emotional words, the combined ST-IAT blocks were presented, each consisting of 84 trials. Of these trials, 60 were attribute (i.e., emotional and neutral words) trials and 24 were target (i.e., food pictures) trials. In one block, target food words were combined with emotional words, whereas food words were combined with neutral words in the other block. Order of these blocks was counterbalanced over participants, and participants could take a short break between blocks. A red cross appeared shortly (500 ms) on the screen when a mistake was made. Within the food–emotion block, participants made 48 responses on the right response key, and 36 responses on the left response key. In the neutral–emotion block this was reversed, with 36 right-key and 48 left-key responses being made. Each participant completed two ST-IATs: one with neutral words, positive emotions and high-caloric food pictures, and one with neutral words, negative emotions and high-caloric food pictures. The order of the two ST-IATs was counterbalanced over participants, and participants started with the same block in both ST-IATs (i.e., if a participant started with the food–emotional block in the positive IAT, she also started with the food–emotional block in the negative IAT). Because research has shown that emotional overeating mostly involves palatable, high-caloric food (Ganley, 1989), only these types of food items were used in the task. Table 1 gives an overview of the neutral, positive emotional and negative emotional words that were used, as well as the content of the food pictures.

2.2.2. Films

Participants watched either a positive, negative or neutral film fragment, lasting for approximately 2 min and 45 s. The positive fragment was taken from the comedy film "When Harry Met Sally", showing a woman faking an orgasm in a full restaurant, in front of her male friend. The negative fragment was part of "The Champ", a film drama in which a young boy watches his father die after a boxing match. The neutral excerpt was taken from a BBC documentary on tidal waves in Australia. All three films were pilot tested among female students (N = 11) and were shown to induce the desired emotional effect: when watching

Table 1
Overview of neutral words, positive emotional words, negative emotional words and food pictures used in the ST-IATs.

Neutral words	Positive emotional	Negative emotional	Food (pictures)
Average	Happy	Sad	Potato crisps
Undecided	Joyful	Angry	Magnum ice cream
General	Satisfied	Gloomy	Chocolate
Normal	Cheerful	Lonely	Chocolate ice cream
Usual	Merry	Scared	French fries
Common	Relieved	Disappointed	Cupcake

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