



Comparison of implicit and explicit attitudes towards food between normal- and overweight French children



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ABSTRACT

In the food domain, attitudes reflect one's acquired predisposition towards food and combine hedonic and nutritional components. Implicit attitudes are assumed to influence spontaneous behaviors, whereas explicit attitudes are assumed to influence deliberative behaviors. The aim of this study was to compare hedonic- versus nutrition-based attitudes towards food between normal- and overweight children using both implicit and explicit tasks. Normal-weight ($n = 81$; mean BMI z-score = 0.06 ± 0.97) and overweight children ($n = 57$; mean BMI z-score = 3.5 ± 1.17) performed three tasks: an implicit pairing task in which they had to choose the two food items that “go best together” for 11 triplets that were either hedonically or nutritionally associated; an explicit forced-choice categorization task in which they were asked to categorize 48 foods into one of the following four categories: “yummy”, “yucky” (i.e., hedonic categories), “makes you strong”, or “makes you fat” (i.e., nutritional categories); a liking task in which they had to assign liking scores to the same 48 food items. No effect of weight status on the liking scores by food groups (all $P > 0.44$) or on the implicit pairing task ($P = 0.82$) were found; however, on the explicit categorization task, overweight children chose more nutritional categories than their lean peers ($P = 0.001$). Cluster analysis showed higher proportion of “*dissontant attitudinal pattern*” (characterized by many hedonic pairings but few hedonic categorizations) in overweight compared with normal-weight children. Thus, a discrepancy between implicit hedonic and explicit nutritional attitudes is more common in overweight children than in normal-weight children. Further studies are needed to understand the behavioral implications of such discrepancy in attitudes towards food in children.

1. Introduction

The high prevalence rates of overweight and obesity among children currently represents a public health issue (Bellisle et al., 2007). Indeed, the persistence of overweight into adulthood has been observed in several longitudinal studies (Singh, Mulder, Twisk, Van Mechelen, & Chinapaw, 2008) and has been associated with major health risks (Dietz, 1998). Early deleterious eating behaviors (e.g., eating in the absence of hunger, poor caloric compensation, external eating, emotional eating) have been associated with overweight in children (Carnell, Benson, Pryor, & Driggin, 2013). Nonetheless, the individual factors that are likely to drive such differences in eating behaviors remain unclear. It has been shown that children's food choices are largely driven by taste preferences and liking (Anliker, Bartoshuk, Ferris, & Hooks, 1991; Bere & Klepp, 2004; Birch, 1999;

Pliner & Pelchat, 1986; Raynor, Polley, Wing, & Jeffery, 2004). Hill et al. investigated whether children's adiposity was associated with a higher liking of foods thought to be involved in the development of obesity (fatty or sugary foods) and a lower liking of foods thought to be protective (fruit and vegetables) (Hill, Wardle, & Cooke, 2009). They did not find any association, and they suggested that differences in eating behaviors between normal- and overweight children are not driven by a heightened liking of unhealthy foods or a decreased liking of healthy items.

The aim of the present study was to explore the potential differences in the dominance of the nutritional (i.e., cognitive) versus the hedonic (i.e., affective) base of both implicit and explicit attitudes towards food between normal- and overweight children. We assume that whether a child explicitly likes a food might represent only one aspect of the child's drive to eat. A more global approach consists of exploring

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attitudes towards foods. We briefly review the literature on implicit and explicit attitudes towards food in the next part.

1.1. Conceptual background

1.1.1. Implicit and explicit attitudes towards food

Attitudes are described as memory structures that are activated when an object is encountered, and reflect one's acquired predisposition towards this object (Eagly & Chaiken, 1998). Attitudes towards a given object can be implicit or explicit and can coexist in memory (Perugini, 2005). Implicit attitudes are assumed to influence responses described as automatic, spontaneous, or uncontrolled, whereas explicit attitudes are assumed to influence responses described as non-automatic, deliberative, or controlled (Perugini, 2005). Implicit and explicit attitudes and how they predict behavior have been largely studied separately. Few attempts have been made to develop predictive models combining the measure of implicit and explicit attitudes and their impact on behavior (Fazio & Olson, 2003; Strack & Deutsch, 2004; Wilson, Lindsey, & Schooler, 2000). In particular, Wilson et al. presented a model of “dual attitudes”, according to which they hypothesized that “the attitude that people endorse at any point in time depends on whether they have the cognitive capacity to retrieve the explicit attitude and whether this overrides the implicit one” (Wilson et al., 2000). Their predictive model was supported in a food-choice context (Perugini, 2005). This highlights the importance of combining implicit and explicit measures of attitudes towards food in order to better understand eating behaviors under different conditions.

1.1.2. The affective and cognitive bases of explicit and implicit attitudes towards food

Besides its implicit or explicit nature, an attitude combines a cognitive and an affective component, which can be differentially assessed (Crites, Fabrigar, & Petty, 1994; Millar & Tesser, 1986, 1989). Research on explicit attitudes in the food domain has made the following conceptual distinction between the affective and cognitive bases of attitudes: the affective component pertains to the sensations, feelings and emotions experienced in response to a food item (e.g., the hedonic tone of consumption), while the cognitive component encompasses the positive and negative attributes and beliefs about a food item (e.g., nutritional value, health consequences) (Cantin & Dubé, 1999; Dubé & Cantin, 2000). Whether attitudes are affect-based or cognition-based has been shown to influence both liking and consumption of a beverage (Cantin & Dubé, 1999), and to modulate the persuasive power of informational vs. emotional communication promoting milk consumption (Dubé & Cantin, 2000). Regarding research on implicit attitudes in the food domain, the distinction between affective and cognitive bases has been made quite recently on the grounds of research on explicit attitudes towards food. The affective component of an implicit attitude towards food corresponds to the automatic hedonic reactions to a food item (e.g., spontaneous anticipated liking), and the cognitive component contains the automatic beliefs about a food item (e.g., spontaneous perceived healthiness, dieting effect) (Trendel & Werle, 2015). So far, only one study has distinguished the affective and cognitive bases of implicit attitudes towards food to predict eating behaviors (Trendel & Werle, 2015). The authors found that the affective and cognitive bases of implicit attitudes directly influence actual food choices under different conditions. Importantly, the relative dominance of affective or cognitive bases of attitudes towards a food item has been shown to impact behavior (Dubé & Cantin, 2000; Millar & Millar, 1990). Indeed, affective and cognitive attitudes towards food – either explicit or implicit – often do not have the same evaluative consequences. For instance, one could have a positive affective attitudes towards chips because it is tasty, and a negative cognitive attitude because it is unhealthy.

1.1.3. The role of the explicit and implicit attitudes towards food in eating behaviors

As discussed by Perugini, both explicit and implicit attitudes are assumed to influence behavior according to different predictive models (Perugini, 2005). Notably, the author demonstrated that the “double dissociation” predictive model of Wilson et al., according to which implicit attitudes are assumed to influence spontaneous responses, and explicit attitudes are expected to influence deliberative responses, is supported for predicting eating behaviors (Perugini, 2005; Wilson et al., 2000). The fact that the implicit or the explicit attitude is retrieved towards a food can be influenced by individual characteristics, such as being spontaneous versus thoughtful and reflective (Conner, Perugini, O’Gorman, Ayres, & Prestwich, 2007), or being impulsive or not (Friese, Hofmann, & Wänke, 2008). It has also been showed that the number of food choice options could impact the relationship between implicit and explicit attitudes and food choice (König, Giese, Schupp, & Renner, 2016). Interestingly, in the study of König et al., the authors found a significant interaction between the effect of implicit and explicit attitudes on food choices: participants served themselves a greater amount of confectionery compared to fruit when implicit and explicit attitudes indicated a preference for confectionery over fruit, and also when explicit and implicit attitudes towards confectionery were inconsistent and one was positive (König et al., 2016). These results suggest a shift from the “double dissociation” (Wilson et al., 2000) to the “multiplicative” predictive model (Strack & Deutsch, 2004), according to which implicit and explicit attitudes interact in influencing behavior, when multiple food options are offered. However, in the study of König et al., the scale measuring explicit attitudes only took into account affective considerations, namely tasty vs. not tasty, good vs. bad and appealing vs. unappealing but no cognitive consideration, such as healthy vs. unhealthy (König et al., 2016). Such explicit nutritional considerations could have influenced food choices but are not taken into account in their measure of explicit attitudes. Thus, these results have to be interpreted cautiously.

1.2. Scope of the present research: comparing normal- and overweight children's attitudes towards food

Previous attempts to investigate implicit and explicit attitudes towards food in obesity only focused on the evaluative aspect of attitudes (i.e., whether a certain food is viewed positively or negatively) without dissociating the affective and cognitive components of attitudes (Craeynest et al., 2005; Czyzewska & Graham, 2008; Roefs & Jansen, 2002). Specifically in children, Craeynest et al. investigated the positive vs. negative valence of explicit and implicit attitudes towards healthy and unhealthy food in normal- and overweight children (Craeynest et al., 2005). Their results revealed no differences between normal- and overweight children in their explicit attitude towards food. They also found that overweight children had a more positive implicit attitude towards both healthy and unhealthy foods. However, their approach reduced the explicit attitudes towards food to their affective basis: children rated the valence of healthy and unhealthy foods using a 7-point scale (−3: dislike; +3: like), and did not permit untangling whether a positive implicit attitude towards food was hedonic-based (e.g., “I like this food”) or nutrition-based (e.g., “This food is healthy”).

Exploring the hedonic versus the nutritional aspect of attitudes towards food is a complementary approach to previous investigations of attitudes towards food in normal- and overweight children. There are consistent evidence that normal- and overweight children do not differ on the valence of the affective basis of explicit attitudes (i.e., the liking for food) (Craeynest et al., 2005; Hill et al., 2009). In other respects, overweight children are known to declare themselves as more restrained than normal-weight children (for a review see Carnell et al., 2013) which may reflect cognitive-based explicit attitudes towards food. Thus, explicit attitudes could be more nutrition-based in overweight than in normal-weight children. Regarding the implicit atti-

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