



# Understanding fruit and vegetable consumption in children and adolescents. The contributions of affect, self-concept and habit strength



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## ABSTRACT

Affective processes and the role of automaticity are increasingly recognised as critical in determining food choice. This study investigated the association of affective attitude, self-identity and habit with fruit and vegetable (FV) intentions and intake in children. Previous studies have not fully explored their implications for children of different age groups and have not considered their independent contribution as part of a coherent model of behaviour that also controls for other psychosocial and environmental determinants of intake. Data was collected through face-to-face interviews with 362 children, 9–15 years old. Children were asked to report on measures of affective attitude, cognitive attitude, self-concept, social norms and facilitating factors following Triandis' Theory of Interpersonal Behaviour (TIB). Three stage least squares was used to estimate the independent association of affective attitude and self-concept with intentions and of intentions and habit with intake. Self-concept had the most prominent role in explaining intentions irrespective of age for both fruit and vegetables. The importance of affective attitude varied by age and with fruit and vegetables, with greater importance for vegetables and for children aged 11–13 years. Cognitive attitude was more relevant than affective attitude for 14 to 15 year-olds' fruit intentions. Intake was more strongly associated with habit than intentions, with stronger associations for 14 to 15 year-olds. The current findings support the importance of self-concept for FV motivations and provide further evidence on the importance of habit to FV intake in young and older children and adolescents. Results also support a targeted usefulness of affective attitude for fruit and vegetable intentions. The discussion considers potential ways in which these constructs can be incorporated into interventions to increase FV intake in children.

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## 1. Introduction

### 1.1. Determinants of children's fruit and vegetable consumption

Several studies have shown that children can enjoy present and future health benefits from diets rich in daily fruit and vegetable (FV) intakes (Berenson et al., 1998; Dauchet, Amouyel, & Dallongeville, 2009; Prynne et al., 2006). Part of these benefits

are due to the fact that preferences for FV acquired during the early years translate into healthier dietary habits in adulthood (Craigie, Lake, Kelly, Adamson, & Mathers, 2011). However, children's and adolescents' FV intake in high income countries is low compared to the 5 portions a day recommendation with, for example, intake of 11–18 year-olds in the UK estimated at 2.8 FV portions/day, and intake of 3–17 year-old girls and boys in Germany between 2.7 and 2.4 portions/day respectively (Bates et al., 2016; Borrmann & Mensink, 2015; Kim et al., 2014; Yngve et al., 2005). It is therefore important to understand the correlates of children's FV consumption. This study explores factors associated to children's and adolescents' FV intake, specifically the role of affective attitude, self-concept and habit.

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Knowledge about what drives children's FV intake comes mainly from applications of social cognition models in which behaviour is linked with individuals' beliefs about themselves, about the behaviour and about their environment (Michela & Contento, 1986; Michela & Wood, 1986). This research has identified a range of environmental and psychosocial correlates of FV consumption in children and adolescents, such as accessibility of FV at the home and school environments, behaviour modelling, and intention to eat healthy (Backman, Haddad, Lee, Johnston, & Hodgkin, 2002; Geller & Dzewaltowski, 2009; McClain, Chappuis, Nguyen-Rodriguez, Yaroch, & Spruijt-Metz, 2009; Pearson, Biddle, & Gorely, 2009; Van Der Horst et al., 2007) and correlates of intentions such as parental subjective norms, perceptions of barriers (Backman et al., 2002; Fernandes-Machado, Gellert, Goncalves, Sniehotka, & Araujo-Soares, 2016), self-efficacy (Corwin, Sargent, Rheume, & Saunders, 1999; Domel et al., 1996; Granner et al., 2004; Kristjansdottir et al., 2006; Resnicow et al., 1997; Reynolds, Hinton, Shewchuk, & Hickey, 1999) and attitudes expressed as outcome expectations ("To eat fruit every day gives me more energy" and "To eat fruit every day makes me feel good") (Dennison & Shepherd, 1995; Lien, Lytle, & Komro, 2002). Nonetheless, important questions remain about the ability of these models to characterise children's FV intake. In particular, children's food intake intentions and behaviours may be less mediated by cognitive persuasion (such as information processing) (Kirscht, 1983) and more by affective factors or habitual and learned responses (Bower & Sandall, 2002; Fischhoff, 2008; Köster & Mojet, 2007; Martens, van Assema, & Brug, 2005; McClain et al., 2009; Reinaerts, de Nooijer, Candel, & de Vries, 2007; D.; Spruijt-Metz, 1999; Steinberg, 2005). For example, the study of Lien et al. (2002) used the Theory of Planned Behaviour (TPB) to explain FV intentions and self-reported intake amongst 12 to 13 year-olds and found direct influence of health outcome expectancies on intentions to eat FV, but low explanatory power from these type of attitude constructs.

The affective component of attitude refers to the feelings that individuals attach to a behaviour or to an attitude object, and because of these associations, individuals can be asked to rate behaviours as pleasant or unpleasant, enjoyable or disgusting, etc (Triandis, 1980, pp. 211–18).<sup>1</sup> The distinction between affective attitude and cognitive attitude is increasingly emphasized as important in the study of intentions from the recognition that feelings may play a separate and additional contribution in motivating intentions to that of cognitively processed aspects of behaviour (e.g. traits) (see Mark Conner, McEachan, Taylor, O'Hara, & Lawton, 2015). Research in adult populations comparing the influence of both cognitive and affective attitudes on intentions has shown affective attitudes to be strongly associated with intentions for a range of protective and risk health behaviours (French et al., 2005; Lowe, Eves, & Carroll, 2002). For children, the influence of affective attitudes on intentions may be stronger than in adults because children have not yet fully developed the cognitive abilities to comprehend abstract concepts such as nutrition and health, and to consider the future consequences of their actions (Doherty & Hughes, 2009; Steinberg et al., 2009). Indirect evidence of the potential contribution of affective attitude to better explaining children's FV intentions is seen in the work of Murnaghan et al. (2010), where the authors achieved strong associations with intentions in a TPB model that included measures of affective attitude as part of the global attitude construct. More recently, a randomized control trial study looking at affective and instrumental attitudes and

adolescents' FV intake found that changes in affective attitude influenced FV intentions and self-reported FV intake, and that this effect was stronger than that for instrumental attitudes (Carfora, Caso, & Conner, 2016). Affective responses to a food may also be influenced by the meanings assigned to that food (Donna Spruijt-Metz, 1995) including signalling self-concept (Bisogni, Connors, Devine, & Sobal, 2002; M.; Conner & Armitage, 2002). A meta-analysis of studies exploring the role of self-identity in research with adults showed a strong correlation between self-concept and intentions ( $r = 0.47$ ), with this variable explaining between 6% and 9% of the variance in intentions after accounting for the effect of attitudes, norms, perceptions of control and past behaviour (Rise, Sheeran, & Hukkelberg, 2010). In adolescents Wilson et al. (2002) found high correlations ( $r = 0.67, p < 0.05$ ) of self-concept associated to eating more FV and changes in FV intake from three-day diary records. In younger children the relevance of self-concept may be attenuated by the fact that children have a less developed ability to define their self-concept (i.e. who they are) in the same way as adolescents and adults. However, by the age of eight years children have a developmental structure of "self" that allows them to hold more or less accurate representations of personal traits and underlying competencies (see Marsh, Ellis, & Craven, 2002). Exploring the role of self-concept in children's FV intentions may therefore provide useful insights for the understanding of factors driving healthier eating in younger and older children.

Children's food choices may also be habitual or involving little cognitive mediation. Research with adults suggests that food choices may hold an important component of automaticity or habit as a result of the repetition of food choice decisions over time (van't Riet, Sijtsema, Dagevos, & De Bruijn, 2011). Habits have been found to be consistently and positively related to fruit and vegetable intake in several studies with adult populations (Guillaumie, Godin, & Vézina-Im, 2010). Children's automaticity or habit in food choices may arise from repetition of behaviours in stable contexts (Wood & Neal, 2009), such as during family meals. Processes of learning that result in disassociation of motives and behaviours could also underlie habitual FV behaviours in children (Köster & Mojet, 2007). The exploration of the role of habits in children's FV has been less extensive than in adults, but so far results seem promising. In a study of 4–12 year-olds in the Netherlands, Reinaerts et al (Reinaerts et al., 2007) found that strength of habit as reported by the children's parents was the strongest predictor of fruit and of vegetable intake; while in a study of Italian adolescents Canova and Manganeli (Canova & Manganeli, 2016) found that the consumption of fresh fruit and vegetables as snacks was influenced by both intentions and habit.

## 1.2. Differences with age in determinants of children's fruit and vegetable consumption

Evidence suggests that children of different ages are not a homogeneous group in terms of their FV consumption, with teenagers at higher risk of lower consumption (Albani, Butler, Traill, & Kennedy, 2017; Health and Social Care Information Centre, 2012). Possible explanations for these demographic differences are differences in motivations and facilitating conditions across groups. With age children are increasingly able to comprehend abstract concepts such as nutrition and health, to consider the future consequences of their actions, and to perceive and focus on social norms (Miller, 2011; Nguyen, Gordon, & McCullough, 2011; Steinberg et al., 2009; Tilston, Gregson, Neale, & Douglas, 1991). This progress has implications for children's food choice behaviours. Although only a limited number of studies compare factors associated with FV intake in both children and adolescents, considering the benefits of eating more FV was found to be a

<sup>1</sup> We make the distinction here from affective states (emotions or mood). For example, affective states can be elicited by the remembered feelings associated with a behaviour (Cohen & Areni, 1991, p. 191).

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