



## Research report

Associations of parenting styles, parental feeding practices and child characteristics with young children's fruit and vegetable consumption<sup>☆</sup>Carine Vereecken<sup>a,b,\*</sup>, Alisha Rovner<sup>c</sup>, Lea Maes<sup>b</sup><sup>a</sup>FWO Flanders, Belgium<sup>b</sup>Department of Public Health, Faculty of Medicine and Health Sciences, Ghent University, UH – Bloc A, 2nd Floor, De Pintelaan 185, B-9000 Ghent, Belgium<sup>c</sup>Prevention Research Branch, Eunice Kennedy Shriver National Institute of Child Health and Human Development, National Institutes of Health, 6100 Executive Blvd, Room 7B13A, MSC 7510, Rockville, MD 20852, USA

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## ABSTRACT

The purpose of this study was to investigate the role of parent and child characteristics in explaining children's fruit and vegetable intakes. In 2008, parents of preschoolers (mean age 3.5 years) from 56 schools in Belgium-Flanders completed questionnaires including a parent and child fruit and vegetable food frequency questionnaire, general parenting styles (laxness, overreactivity and positive interactions), specific food parenting practices (child-centered and parent-centered feeding practices) and children's characteristics (children's shyness, emotionality, stubbornness, activity, sociability, and negative reactions to food). Multiple linear regression analyses ( $n = 755$ ) indicated a significant positive association between children's fruit and vegetable intake and parent's intake and a negative association with children's negative reactions to food. No general parenting style dimension or child personality characteristic explained differences in children's fruit and vegetable intakes. Child-centered feeding practices were positively related to children's fruit and vegetable intakes, while parent-centered feeding practices were negatively related to children's vegetable intakes. In order to try to increase children's fruit and vegetable consumption, parents should be guided to improve their own diet and to use child-centered parenting practices and strategies known to decrease negative reactions to food.

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## Introduction

Fruit and vegetable intake may reduce the risk of chronic diseases such as obesity, cardiovascular disease, diabetes and some cancers (World Health Organization, 2003). However, many children in Belgium Flanders, consume less than the recommended amounts of fruit and vegetables (Huybrechts et al., 2008; Vereecken & Maes, 2010). Given that dietary patterns mainly develop within the context of the family, examining parent factors and their potential relationship with children's dietary intake is important. Parents influence their children's eating behaviours in several ways including controlling availability and accessibility of foods in the home and modelling food-related behaviours (Cullen

et al., 2001; Hanson, Neumark-Sztainer, Eisenberg, Story, & Wall, 2005). Also, general parenting styles (Kremers, Brug, de Vries, & Engels, 2003; Rhee, Lumeng, Appugliese, Kaciroti, & Bradley, 2006) and specific food-related parenting practices (Birch & Fisher, 2000; Birch, Fisher, & Davison, 2003; De Bourdeaudhuij, 1997; Fisher & Birch, 1999a, 1999b; Fisher, Mitchell, Smiciklas-Wright, & Birch, 2002; Vereecken, Keukelier, & Maes, 2004; Wardle, Carnell, & Cooke, 2005) may play an important role. Moreover, parenting does not occur in isolation, but rather in the context of other social-environmental factors as well as in response to child characteristics (Rhee, 2008).

General parenting style refers to the broad pattern of attitudes and practices that provide the emotional background in which parent behaviours are expressed and interpreted by the child (Rhee, 2008). On the other hand, food-related parenting practices refer to specific food-related interactions between parents and their children. For example, 'restriction', refers to limiting access to foods, usually sweets and snacks, and 'pressure to eat' refers to attempts to increase consumption usually of healthy foods (Birch et al., 2001). Although it has been suggested that parenting practices are domain specific (Darling & Steinberg, 1993), most investigations have supported associations between specific food parenting practices and parental styles (Blissett & Haycraft, 2008;

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Hubbs-Tait, Kennedy, Page, Topham, & Harrist, 2008; Hughes, Power, Orlet, Mueller, & Nicklas, 2005) with the exception of one study (Brann & Skinner, 2005).

Evidence suggests that a general authoritative parenting style is favourable for supporting positive food-related behaviours in adolescents (Kremers et al., 2003). However, other studies suggest that the association between general parenting style (authoritative, authoritarian, indulgent or neglectful) and children's dietary intake does not exist (De Bourdeaudhuij et al., 2009; Vereecken, Legiest, De Bourdeaudhuij, & Maes, 2009). Still others suggest that parenting style modifies or impacts the relationship between parent practices and child outcomes (Kremers et al., 2003; van der Horst et al., 2007). For example, in a study of 383 adolescents the association of parenting practices and sugar-sweetened beverage consumption was more pronounced among those who perceived their parents as moderately strict and highly involved (van der Horst et al., 2007).

Inconsistent results have also been reported for specific food related parenting practices and children's eating behaviour. One study found a positive association between pressuring and children's fruit/vegetable consumption (Bourcier, Bowen, Meischke, & Moinpour, 2003), while several others have found a negative association (Fisher et al., 2002; Galloway, Fiorito, Lee, & Birch, 2005) or no association (Vereecken et al., 2004). Differences in samples and methodologies may explain the inconsistent results among studies of parenting practices and children's dietary behaviours (Carnell & Wardle, 2007). In addition, it is fairly common for different researchers in this area to use different questions to measure the same construct. The questions used may vary in areas such as: level of control, level of parental demandingness and responsiveness to children's wishes so that some encouragement measures may refer to more authoritarian pressure to eat, while others may refer more to positive reinforcement to increase consumption of healthful foods. In addition, studies have used different methodologies to estimate dietary intake including three 24-h recalls (Fisher et al., 2002) or a single four point-likert scale (Bourcier et al., 2003). Additional confounding factors, such as parental intake or child characteristics, may contribute to these mixed results (van der Horst et al., 2007; Vereecken, Legiest, et al., 2009). For example, in one study the effect of parental control (including aspects of restriction and pressure) on children's intake was no longer present after controlling for food neophobia (Wardle et al., 2005).

Personality dimensions are also regarded as potentially important determinants of health related behaviours (de Bruijn, Kremers, van Mechelen, & Brug, 2005). A child's personality or temperament refers to the way in which he or she typically experiences the internal and external environments and responds to them (Carey, Hegvik, & McDevitt, 1988). Infants who are prone to negative emotional expression, low adaptability, high activity, and low emotional regulation may be described as having a "difficult" temperament style (Chess & Thomas, 1989). Over time, these children are more likely to develop behaviour problems (Chess & Thomas, 1989), including aggressive behaviour (Bates, Maslin, & Frankel, 1985) and social inhibition (Kagan, 1994). However, few studies have investigated whether there is an association between dietary intake and broad personality characteristics. Studies of adolescents that investigated associations between the 'Big Five' characteristics (extraversion, agreeableness, conscientiousness, emotional stability and openness to experience) and dietary intake demonstrated significant positive associations between agreeableness and vegetable consumption as well as between openness to experiences and fruit and vegetable consumption (de Bruijn et al., 2005). Additionally, the effect of parenting practices on soft drink

consumption was most pronounced in adolescents with moderate levels of agreeableness (de Bruijn, Kremers, de Vries, van Mechelen, & Brug, 2007). In another study of 2-year old children, child's behavioural characteristics also moderated the influence of parenting practices (Gubbels et al., 2009). A stronger association of parenting with dietary intake was found in non-depressed, low anxious, low overactive children as well as children with a favourable eating style (not slow, likes many foods, and not reluctant).

More research is needed to investigate the specific role of parent and child characteristics, in explaining young children's food intake. Most previous studies have included associations with only one of these domains or components; therefore, examining different components of each will help clarify the independent relationship between different parental components (i.e. their own eating behaviour, their general parenting styles and specific parental feeding practices) and children's dietary intake. We hypothesized that higher fruit and vegetable consumption in parents, and more adaptive parenting styles (less lax, and overreactive and more supporting) and more adaptive feeding practices (less parent-centered and more child-centered) would be associated with higher intakes of fruit and vegetables. Because of the importance of children's food neophobia in children's fruit and vegetable intake, the negative reactions to food scale (a measure of food neophobia) was also included in the analyses. Finally, we explored the role of child temperament characteristics with fruit and vegetable intake.

## Methods

### *Design and procedure*

The data were collected as part of the Familial Influences on Food Intake study (FIFI) (Vereecken, Covents, Haynie & Maes, 2009). The FIFI-study, a biennial longitudinal study that started in 2008, follows Belgian-Flemish children from the age of three until adolescence. The goal of FIFI is to identify familial influences on dietary intake during the transition from childhood to adolescence. The results presented in this paper are cross-sectional from the baseline data collection which occurred between January and April 2008. Ethical approval for the study was obtained from the ethical board of the Ghent University Hospital.

Eighty schools from East and West Flanders randomly selected from the list of schools provided by the Ministry Department of Education were invited to participate. Forty-six schools, with a total of 56 campuses, agreed to participate. Parents from children of the first grade of the nursery schools were invited by letter to participate in the study. In Belgium children begin nursery school between the ages of 2.5 and 3 years, and are there for three full years. Parents were asked to return the completed questionnaires and the signed informed consent in a sealed envelope to the school within one week. Parents were provided phone numbers and e-mail addresses of the project staff in case they had questions.

### *Measures*

The child's primary caregiver completed self-administered questionnaires on parent and child demographic characteristics, parent's and child's diets, and several aspects of general parenting styles, specific parental feeding practices and child's temperament, using mainly pre-existing scales and subscales. The measures are described below; psychometric properties (number of items, Chronbach's alphas, means and standard deviations), example items and response options are presented in Table 1.

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