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A review of instruments developed to measure food neophobia

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ABSTRACT

Background: Food choices are influenced by an individual's attitude towards foods. Food neophobia may be associated with less variety of diets, inadequate nutrient intake and high product failure rate for new food products entering the market. To quantify the extent of these challenges, instruments to measure the food neophobia in different target groups are needed. Several such instruments with significantly different measurement outcomes and procedures have been developed. This review provides an overview and discusses strengths and weaknesses of these instruments.
Objective: We evaluate strengths and weaknesses of previously developed instruments to measure neophobia and willingness to try unfamiliar foods.
Design: Literature was searched through the databases Web of Science and Google Scholar. We identified 255 studies concerning neophobia and willingness to try unfamiliar foods. Of these, 13 studies encompassing 13 instruments to measure neophobia and willingness to try unfamiliar foods were included in the review. Results are summarized and evaluated with a narrative approach.
Results: In the 13 instruments to assess neophobia and willingness to try unfamiliar foods, 113 to 16.644 subjects aged 2–65 years were involved, scales with 3–7 response categories were used and behavioral validation tests were included in 6 studies.
Conclusions: Several instruments to measure neophobia and willingness to try unfamiliar foods exist. We recommend selecting one or more among the 13 instruments reviewed in this paper to assess relevant aspects of neophobia.

Contents

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1. Introduction

Food neophobia is defined as a *reluctance to eat unfamiliar foods* (Dovey, Staples, Gibson, & Halford, 2008). The phenomenon has been hypothesized to occur due to the omnivore's dilemma: In the search for food, a human may need to approach novel foods. However, he has to protect himself from potentially poisonous foods, thus restricting his diet (Armelagos, 2014; Rozin, 1976). Although food neophobia has been investigated extensively, a recent research review proposed that the mechanisms behind food rejections have not yet been clearly identified (Lafraire, Rioux, Giboreau, & Picard, 2016).

Neophobia is an important determinant of food choices, which have great impact on the quality of a diet (Lafraire et al., 2016). It has been associated with less variety of diets and inadequate nutrient intake (Falciglia, Couch, Gribble, Pabst, & Frank, 2000). Several studies have revealed that intake of vegetables, salad, fruit, meat and fish is diminished in individuals with higher levels of food neophobia (Cooke, Wardle, & Gibson, 2003; Galloway, Lee, & Birch, 2003; Siegrist, Hartmann, & Keller, 2013). Moreover, it has been demonstrated that food neophobic individuals may experience deficits in intake of protein, monounsaturated fats, magnesium and vitamin E (Capiola & Raudenbush, 2012; Falciglia et al., 2000). High product failure rate for new food products entering the market is an additional result deriving from negative attitudes towards food and food neophobia (Barrena & Sánchez, 2013; Henriques, King, & Meiselman, 2009; Winger & Wall, 2006).

Modification of eating patterns through development of health strategies and sensory testing of new products would be favorable initiatives to help overcome these challenges. To do this, it is imperative to select and use appropriate instruments to determine neophobia and willingness to try unfamiliar foods. Several instruments to measure different aspects of neophobia and willingness to try unfamiliar foods exist, see Table 1. These instruments vary in measurement outcomes, samples, scales, items and behavioral tests included. One of the instruments currently most used to assess neophobia and willingness to try unfamiliar foods is the Food Neophobia Scale (FNS) developed by Pliner and Hobden (1992). The FNS has been widely used and provided reliable results (Galloway et al., 2003; Knaapila et al., 2007; Mustonen, Oerlemans, & Tuorila, 2012; Olabi, Najm, Baghdadi, & Morton, 2009; Ritchey, Frank, Hursti, & Tuorila, 2003; Rubio, Rigal, Boireau-Ducept, Mallet, & Meyer, 2008). However, it consists of ten items, which were developed over 20 years ago.

To our knowledge no review of existing instruments to measure neophobia and willingness to try unfamiliar foods is available at present. It is necessary to evaluate the relevance of varying instruments and measurement outcomes in the different studies to enable critical selection of the most relevant instrument according to the purpose of a given investigation. Moreover, such evaluation would provide information about important considerations for future development of instruments.

The aim of our work is to review instruments to measure neophobia and willingness to try unfamiliar foods. We do this by providing an overview and evaluate strengths and weaknesses of these instruments. We assess measurement outcomes, samples, items, scales and procedures, and evaluate the quality of evidence. Finally, we discuss relevance and establish recommendations for selection of instruments to measure neophobia and willingness to try unfamiliar foods.

1.1. Identification of relevant literature

We review direct instruments to measure neophobia and willingness to try unfamiliar foods. Literature was searched in English through the databases Web of Science by using the keywords “food neophobia”, “neophobia”, “willingness to taste new food”, “food attitude”, “pickiness”, “expectation” and “taste” in August to September 2015. Literature was searched by the first author and selection criteria were set by the first and last author. When full articles were not available in this database, Science Direct and Google Scholar were used. Pertinent literature was further identified through citations and bibliographies from articles. In total 255 studies were identified. Successive evaluation of relevance was based on 1) title, 2) abstract and 3) article content. Criteria for inclusion in this review were; that studies concerned development of instruments to measure food neophobia and willingness to taste unfamiliar food. Moreover, studies did not concern pickiness or food preferences unless other measures connected with neophobia and willingness to try unfamiliar foods were also included, items included in instruments were presented, more than one item related to food neophobia (to ensure the instrument incorporated a minimum of information) and human subjects were involved. Studies concerning instruments to measure food-related disorders and cognitive restraints were excluded. Moreover, studies, in which previously developed instruments were applied to new samples, were excluded. Initially, a total of 22 studies concerning 23 different instruments to measure neophobia and willingness to try unfamiliar foods were identified. Further evaluation based on the inclusion criteria, resulted in exclusion of ten instruments (Arnett, 1994; Bell & Marshall, 2012; Haidt, McCauley, & Rozin, 1994; Musher-Eizenman & Holub, 2007; Pearson, 1970; Pliner & Hobden, 1992; Schnettler et al., 2013; Steptoe, Pollard, & Wardle, 1995; Ullrich, Touger-Decker, O'sullivan-Maillet, & Tepper, 2004; Zuckerman, 1979). Finally, 13 instruments were included in this review (see Table 1). Data was extracted and included: population from which subjects were recruited, sample size, sex and age. Moreover, procedure, items, scales, behavioral validation tests and measures of reliability were extracted. In this review, results are summarized and evaluated with a narrative approach.

2. Review of instruments

2.1. Overview of instruments

Reviewing the 13 instruments leads to the immediate conclusion that different aspects of neophobia and willingness to try unfamiliar foods can be measured by several means. This implies that in a planned study a clear aim must be defined to enable selecting of an appropriate instrument to measure food neophobia, and/or willingness to try unfamiliar foods.

2.1.1. Subjects

Within the studies reviewed, sample size including all subjects involved in tests of the instrument ranged from 113 to 16.644 with most studies including from around 280 to 600 subjects. It has been proposed that 100 to 200 subjects are required to construct a scale (Spector, 1992). Accordingly, all studies included the minimum number of respondents required to construct a scale. However, the number of respondents involved in relation to the questionnaire and behavioral tests varied. Yet, more than 100 respondents completed the questionnaire in all studies.

Children, adolescents, adults and elderly alike were involved in development of the different instruments with subjects' ages ranging from 2 to 65 years. However, one study did not report age (van Trijp & Steenkamp, 1992). This implies, instruments are developed for varying age groups in accordance with their cognitive abilities. Seven instruments were developed for children (Kaiser et al., 2012; Loewen & Pliner, 2000; Pliner, 1994; Raudenbush et al., 1995; Rubio et al., 2008; Thomson et al., 2010;