Research report

Food neophobia, nanotechnology and satisfaction with life ☆

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ABSTRACT

This study investigates the relationship between food neophobia, satisfaction with life and food-related life, and acceptance of the use of nanotechnology in food production. Questionnaire data was collected from a sample of 400 supermarket shoppers in southern Chile. The questionnaire measured knowledge of nanotechnology and willingness to purchase food products involving nanotechnology, and included the SWLS (Satisfaction with Life Scale), SWFL (Satisfaction with Food-related Life) and FNS (Food Neophobia Scale) scales. Using cluster analysis, four consumer types were distinguished with significant differences in their scores on the SWLS, SWFL and FNS. The types differed in their knowledge of nanotechnology, willingness to purchase foods involving nanotechnology, age, socioeconomic level and lifestyle. The least food-neophobic type had the highest levels of satisfaction with life and with food-related life and also had the highest acceptance of packaging and foods produced with nanotechnology. The results suggest that the degree of food neophobia is associated with satisfaction with life and with food-related life, as well as with the acceptance of products with nanotechnological applications.

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Introduction

Food neophobia is the reluctance to try new foods, and people differ in their degree of food neophobia (Pliner & Hobden, 1992), with some individuals showing great pleasure in eating new foods and others showing a strong aversion to them (Ritchey, Frank, Hurstic, & Tuorila, 2003). Food neophobia is generally characterized as a personality trait, a continuum along which people can be placed in terms of their tendency to accept or avoid new foods. At the same time, food neophobia has been discussed as a form of behavior, involving the avoidance of novel foods in a particular situation (Pliner & Salvy, 2006). According to Rozin and Fallon (1980) and Rozin, Haidt, and McCauley (1993) there are three main reasons for food rejection by humans: (a) aversion, (b) danger and (c) disgust.

Research in food neophobia was aided by the development of the Food Neophobia Scale or FNS (Pliner & Hobden, 1992) which provided a standardized measure of food neophobia. The FNS consists of 10 questions, each measured on a 7-point agree–disagree scale. More recently, Ritchey et al. (2003) recommended eliminating several scale items. In addition, researchers have used varying numbers of items in questionnaires to measure neophobia. Some research has retained the original 7-point scale and others use shorter scales (Meiselman, King, & Gillette, 2010). Some examples are the investigations undertaken by Henriques, King, and Meiselman (2009), Meiselman et al. (2010), Camarena, Sanjuán, and Philippidis (2011) and D'Antuono and Bignami (2012). Numerous studies have shown that the FNS accurately predicts responses to novel or unfamiliar food (Ritchey et al., 2003; Tuorila, Lähteenmäki, Pohjalainen, & Lotti, 2001), but it is less suitable for assessing receptivity to foods produced by new technologies (Backstrom, Pirttila-Backman, & Tuorila, 2004; Cox & Evans, 2008; Grunert, Bredahl, & Scholderer, 2003; Lähteenmäki et al., 2002; Siegrist, 2008). Nevertheless, it must be pointed out that all these studies were conducted in developed countries.

Using the FNS several recent studies have shown that food neophobia is related to the extent in which consumers accept new and/or unusual foods (Barrena & Sánchez, 2013; Camarena et al., 2011; Chung et al., 2012; D'Antuono and Bignami, 2012; Hoek, Choe & Cho, 2011; Hoek, Luning, Weijzen, Engels, Kok, & de Graaf, 2011; Hersleth, Lengard, Verbeke, Guerrero, & Næs, 2011; Sanjuán-López, Philippidis, & Resano-Ezcaray, 2011; Henriques et al., 2009; Jaeger et al., 2011; King, Meiselman, & Henriques, 2008; Olabi,

Najm, Baghdadi, & Morton, 2009; Ritchey et al., 2003; Tuorila, Lähteenmäki, Pohjalainen, & Lotti, 2001). Some studies show different levels of food neophobia among consumers from different countries. Ritchey et al. (2003) found that people from Sweden are generally more willing to try novel foods as compared to people from the US and Finland. Chung et al. (2012) found that Koreans showed significantly higher food neophobic tendencies than US subjects. To our knowledge, still there is no information on food neophobia in South America. Differences in the level of neophobia have also been detected according to gender (Camarena et al., 2011; Sanjuán-López et al., 2011; Tuorila et al., 2001), age (Camarena et al., 2011; D'Antuono and Bignami, 2012; Frank, 2009; Meiselman et al., 2010; Ritchey et al., 2003; Sanjuán-López et al., 2011; Tuorila et al., 2001), occupation (Sanjuán-López et al., 2011), level of education (D'Antuono and Bignami, 2012; Frank, 2009; Meiselman et al., 2010; Sanjuán-López et al., 2011; Schickenberg, van Assema, Burg, & de Vries, 2006; Tuorila et al., 2001), income level (Camarena et al., 2011; Frank, 2009; Meiselman et al., 2010; Sanjuán-López et al., 2011) and expenses per month (Choe & Cho, 2011).

Some studies have focused on relating food neophobia not only to the acceptance of novel food products, but also to the acceptance of new technologies used in food production and processing (Backstrom et al., 2004; Grunert et al., 2003; Lähteenmäki et al., 2002). It is necessary to distinguish between acceptance of new food and acceptance of food produced by new technologies, because technologies may be rejected outright, without regard to the product in which they are embodied. Examples of technologies that have been subject to outright consumer rejection, no matter which type of food they were used for, include genetic modification (e.g., Grunert et al., 2003) and irradiation (see Frewer et al., 2011, for this and other examples).

The last two decades have seen considerable research and development dedicated to new food technologies. One of the reasons for such interest in new food technologies is the anticipated range of benefits they can bring to the consumer and the food sector (Rollin, Kennedy, & Wills, 2011). While technology has emerged in response to problems identified by scientists and consumers alike, it is well documented that consumers are increasingly wary of new technologies because of the perceived risks and a perceived lack of consumer benefits (Cox, Evans, & Lease, 2007; Frewer et al., 2011; Rollin et al., 2011). Nowadays consumers are exposed to several applications of emerging technologies including genetic modification technology, food irradiation technology and nanotechnology (Rollin et al., 2011; Siegrist, 2008). Indeed, foods and food packaging involving nanotechnology are already being commercialized, though the number of products is still low. In the near future, nanotechnology may become increasingly important in the food sector, with governmental agencies and industry investing considerable resources in its development and implementation (Frewer et al., 2011). This is true not least in South America, where governments also are pushing the development of this new technology (Kay & Shapira, 2009). While some studies on consumer acceptance of nanotechnology have been carried out in Europe and North America (see Frewer et al., 2011; Rollin et al., 2011; Siegrist, 2008, for an overview), no such research has been carried out in South America. Recent studies conducted in European countries indicate that consumers are still sceptical about buying foods produced using nanotechnology (Bieberstein, Roosen, Marette, Blanchemanche, & Vandermoere, 2013; Siegrist, Cousin, Kastenholz, & Wiek, 2007; Siegrist, Stampfli, Kastenholz, & Keller, 2008; Stampfli, Siegrist, & Kastenholz, 2010), although there is evidence to suggest that acceptance of nanotechnological applications differs from country to country (Bieberstein et al., 2013).

Past research has focused on the neophobic's reluctance to try new foods (Pliner & Salvy, 2006), but the behavior of the neophobic

might differ in many other ways (King et al., 2008). Present day society is characterized by a growing awareness of the role played by food in improving consumers' well-being (Chern & Rickertsen, 2003). The subjective well-being (SWB) construct is commonly viewed as a tripartite phenomenon, which includes emotional responses (i.e. positive affect (e.g. joy, optimism) and negative affect (e.g. sadness, anger), domain satisfactions and global judgments of life satisfaction (Diener, Suh, Lucas, & Smith, 1999). The concept of satisfaction with life has been defined as a positive evaluation which a person makes of his life in general, or of particular aspects (family, studies, work, health, friends, free time) (Diener et al., 1999). The best known measure of the cognitive component of subjective well-being is the Satisfaction with Life Scale (SWLS), developed by Diener, Emmons, Larsen, and Griffin (1985). In general, positive evaluations of life satisfaction are linked with happiness and the achievement of the 'good life', whereas negative evaluations of life satisfaction are associated with depression and unhappiness (Proctor, Linley, & Maltby, 2009). Recent studies conclude that food is among the important domains of life which affect the subjective well-being of individuals (Grunert, Dean, Raats, Nielsen, & Lumbers, 2007; Schnettler, Miranda, Sepúlveda, Denegri, Mora, & Lobos, 2012a; Schnettler et al., 2013), although the mechanisms by which food affects subjective well-being are not spelled out in detail. Grunert et al. (2007) developed and tested the Satisfaction with Food-related Life scale (SWFL) in three studies in eight European countries, showing adequate levels of internal consistency (Cronbach's α varying between 0.81 and 0.85). These authors determined relationships between SWFL and other quality of life indicators, including satisfaction with life. Schnettler et al. (2012a) found a positive relation between people's food-related satisfaction and their satisfaction with life. Also, Schnettler et al. (2012a) and Schnettler, Miranda, Sepúlveda, and Denegri (2011a) reported the existence of a relation between satisfaction with life and preferences for certain foods. It has also been reported that there is a relation between satisfaction with food-related life and preferences for different foods (Schnettler et al., 2010, 2011b). Schnettler et al. (2013) evaluated the psychometric properties of the SWFL and its relation to the Satisfaction with Life Scale (SWLS) using a confirmatory factor analysis. The results obtained showed an adequate level of internal consistency and a good fit to the SWFL data. The evaluation of a causal covariance structure analysis model composed of the SWFL as the antecedent construct and the SWLS as the consequent construct indicates a medium level of relationship between the two constructs.

In this study, we will distinguish types of consumers that differ according to their satisfaction with life, satisfaction with their food-related life and food neophobia, and characterize these types with regard to their acceptance of foods and packages produced with nanotechnology, as well as some other demographic and psychographic criteria.

Based on previous studies (Grunert et al., 2007; Schnettler et al., 2012a), we expect to confirm the existence of a positive relation between satisfaction with life and satisfaction with food-related life. It has been reported that satisfaction with life and food-related life are associated with the preference for certain foods (Schnettler et al., 2012a, 2011a,b, 2010), i.e., people with a positive subjective well-being overall and in the domain of food have different eating habits than those who are unsatisfied with their life and their food-related life. The former, in general, is characterized as enjoying their food. One particular way in which food can be expected to contribute to overall well-being is by food-induced emotional responses, in particular negative emotions like neophobia and disgust (Raudenbush & Frank, 1999). Considering that neophobics tend to display negative attitudes and less pleasure in relation to food (Nordin, Broman, Garvill, & Nyroos, 2004; Arvola, Lähteenmäki, & Tuorila, 1999) and SWB is an evaluation which people make of