



How people's food disgust sensitivity shapes their eating and food behaviour

Aisha Egolf*, Michael Siegrist, Christina Hartmann

ETH Zurich, Department of Health Science and Technology (D-HEST), Consumer Behaviour, Universitätstrasse 22, Zurich 8092, Switzerland



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ABSTRACT

Although research regarding disgust has increased enormously in the last decades, to date there is a lack of published research about the influence of food disgust on various food-related behaviours. Our study aimed to provide an understanding about the relationships between food disgust sensitivity and eating preferences (texture-based food rejection), habits (variety seeking), and behaviours (picky eating) as well as food waste frequency. Additionally, sociodemographic characteristics associated with food disgust sensitivity were examined. German-speaking Swiss adults ($N = 1181$) completed a paper-and-pencil questionnaire. Next to the Food Disgust Scale (FDS), the questionnaire included several established eating behaviour scales, such as the Adult Picky Eating Questionnaire, a scale regarding seeking food variety and a food frequency questionnaire. In addition, food waste frequency was also assessed by self-report. Multiple regression analyses showed that with increasing age, food disgust sensitivity scores increased and women showed higher FDS scores than men. Moreover, while picky eating and the rejection of certain food textures were both positively associated with higher FDS scores, seeking variety in foods was negatively associated with food disgust sensitivity. Significant correlations between FDS scores and the frequency of consuming certain foods were observed (e.g. vegetables, seafood). Finally, people with higher FDS scores reported a higher frequency of wasting food than people with lower FDS scores. The results indicate that individual food disgust sensitivity plays a role in various food domains.

1. Introduction

1.1. Disgust

In the last two decades, scientific interest in disgust and its impacts on human attitudes and behaviours has increased rapidly. Disgust is defined as a broad adaptive functional system protecting against pathogen infections (Curtis, de Barra, & Aunger, 2011) and is therefore also called the behavioural immune system (Terrizzi, Shook, & McDaniel, 2013). Even though disgust is seemingly elicited by many different vectors like rotten foods, bodily liquids, and faeces (Curtis et al., 2011; Rozin, Haidt, & McCauley, 2008), it is assumed that the disgust function originated in the prevention of oral ingestion of toxic or offensive agents (Darwin, 1872; Rozin & Fallon, 1987). On the one hand, disgust has a functional effect on eating behaviour that prevents the eating of risky foods like foods with a potential high pathogen load. On the other hand, it is conceivable that a high disgust sensitivity is associated with more restrictive eating behaviour. In line with this assumption, it was shown that disgust is related to eating disorders like anorexia nervosa and bulimia (Aharoni & Hertz, 2012; Davey, Buckland, Tantow, & Dallos, 1998; Troop, Treasure, & Serpell, 2002).

Interestingly, no one has yet systematically examined how disgust influences everyday eating behaviour in a general non-clinical population. One reason for this lack of this research has been the unavailability (until recently) of a domain-specific disgust scale focusing on food (Hartmann & Siegrist, 2018). Commonly-used disgust scales (e.g. the Disgust Scale by Haidt, McCauley, & Rozin, 1994) include many different domains such as disgust related to sex, animals and rotten foods. By contrast, Hartmann and Siegrist's (2018) recently-developed Food Disgust Scale (FDS) measures domain-specific food disgust sensitivity, that is people's sensitivity to react with disgust to certain food-related (offensive) stimuli. Next to that the FDS includes items related to pathogens, to poor hygiene and human contamination, it also includes non-pathogen items that are, for example, related to the process of aging (e.g. "To eat apple slices that turned brown when exposed to air") and thus enable measurement of food disgust oversensitivity. Because of its focus on food items, the FDS seems better suited to investigate eating and food behaviours than other disgust scales. In a validation study of the FDS by Ammann, Hartmann, & Siegrist, (in press) food disgust sensitivity predicted the amount of consumption for different food products (e.g. meat) presented with written scenarios aiming to induce disgust. The present study aimed to examine whether

* Corresponding author. ETH Zurich Department of Health Science and Technology (D-HEST), Consumer Behaviour Universitätstrasse 22, CHN J75.2 CH-8092, Zurich Switzerland.
E-mail address: aisha.egolf@hest.ethz.ch (A. Egolf).

food disgust has functional or dysfunctional effects on eating habits (variety seeking), preferences (texture-based food rejection), behaviours (picky eating), actual food choices, and food behaviours like food waste frequency. In addition, we investigated the associations between food disgust sensitivity and predictive factors like sociodemographic variables and digestive complaints.

1.2. Predictors of food disgust sensitivity

Previous studies have shown that disgust seems to decrease with age and is more pronounced in women than in men (Curtis, Aunger, & Rabie, 2004; Fessler, Arguello, Mekdara, & Macias, 2003). However, it is unclear if these associations hold true for the domain-specific food disgust or only for an overall disgust measure. Other demographics, such as education or income, have rarely been investigated in relation to disgust. Results of a previous study indicated negative associations with overall disgust, but the effects were rather small (e.g. Berger & Anaki, 2014). Income and education are assumed to result in more exposure to various foods (e.g. Meiselman, King, & Gillette, 2010; Siegrist, Hartmann, & Keller, 2013). Therefore, such individuals are likely used to having contact with a greater variety of food disgust-elicitors, which also might lead to lower food disgust sensitivity. According to this explanation income and/or education are negatively associated with food disgust sensitivity. Another possibility could be that people with higher incomes can afford to be disgust sensitive. For example, they are economically capable of throwing away foods that are no longer absolutely fresh; they have no financial need to eat them and therefore do not get used to disgust cues. In this case, income would be positively associated with food disgust sensitivity.

Furthermore, food disgust sensitivity may be influenced by experiences with food-related diseases or digestive complaints after eating certain foods. Taste aversions to foods that have caused nausea have been reported in humans (Pelchat & Rozin, 1982). Animal studies indicate that such conditioned taste aversions are accompanied by conditioned disgust reactions to the aversive foods (Garcia, 1989; Parker, 2003). Conditioned taste aversions seem to develop prominently after eating animal-based foods (Fessler & Arguello, 2004; Logue, Ophir, & Strauss, 1981), which might be due to a higher risk of bacterial contamination of animal-based foods compared to plant-based foods. It comes as no surprise that food poisonings after eating animal-based foods are more common than after eating plant-based products (Sockett, 1995). Independent of the food source, Hartmann and Siegrist (2018) found a positive correlation between food disgust sensitivity and people's reported number of food poisoning incidents within the last five years. However, it cannot be determined from that study whether past food poisoning experiences increased food disgust sensitivity or whether people with a higher food disgust sensitivity have a physical vulnerability to infections transmitted by foods. Therefore, as a next step in this line of research, we examined whether food disgust sensitivity is associated with frequent or regular digestive problems like having a sensitive stomach. We hypothesised that these frequent experiences with digestive complaints are positively linked to food disgust sensitivity.

1.3. Eating habits, preferences and behaviours

Disgust prevents an organism from coming in contact with potential harmful objects. Correspondingly, food disgust prevents ingestion of potential harmful foods. Thus, it is reasonable that it interferes with habits that promote risk taking like *variety seeking* in foods. Van Trijp and Steenkamp (1992) define the concept as a tendency to seek variation in stimulation through variation in food consumption. Next to eating new and unfamiliar food products, seeking variety in foods also includes looking for diversity by often alternating the consumption of familiar foods (Lähteenmäki & Arvola, 2001). Generally, dietary variety increases the probability of adequate nutrient intake (Foote, Murphy,

Wilkins, Basiotis, & Carlson, 2004) and variety seeking is positively related to variations in consumption of fruits, vegetables and all kinds of foods (Van Trijp & Steenkamp, 1992). Haidt et al. (1994) observed a negative association between the overall Disgust Scale and experience seeking. They argued that disgust is a defensive emotion that makes people cautious of new foods, sexual activities or any new unusual experience that could pose a risk of contamination. Likewise, each additional unfamiliar food source may potentially increase the risk of eating harmful, contaminated foods (Al-Shawaf, Lewis, Alley, & Buss, 2015; Rozin, 1976; Scheibehenne et al., 2014). Therefore, we hypothesised that food disgust sensitivity is a negative predictor for variety seeking, which has not been examined so far.

In terms of food preferences, we investigated whether food disgust is associated with texture-based food rejection since that seems to be an important reason for experiencing disgust in the general population (Kushner, 2011). The texture of food can indicate a state of decay that is potentially harmful (Martins & Pliner, 2006; Szczesniak & Kahn, 1971). A crispy texture usually elicits the perception of freshness, whereas softness is associated with decay and spoilage (Szczesniak & Kahn, 1971). Oaten, Stevenson, and Case (2009) found that the tactile sense by which texture is experienced has a privileged connection to the brain region (the insula) associated with disgust. People high on the FDS may be more sensitive to the textural properties and reject foods because of certain textural characteristics. We hypothesise that food disgust sensitivity is a positive predictor of food rejection due to certain textural properties.

Picky eating behaviour is defined as an aversion to a variety of either familiar or unfamiliar foods which results in limited dietary variety (Dovey, Staples, Gibson, & Halford, 2008; Mascola, Bryson, & Agras, 2010; for a review, see; Taylor, Wernimont, Nothstone, & Emmett, 2015). For a long time, picky eating was researched only in children, but studies examining adult picky eating are slowly emerging in published research. Initial results indicate that adults who are picky eaters report having a restricted diet and strong dislikes of certain foods, especially fruits and vegetables (Thompson, Cummins, Brown, & Kyle, 2015; Zickgraf & Schepps, 2016). Furthermore, adult picky eaters claim to prefer sweet, salty, junk food, fried food and other energy-dense foods (Kumar et al., 2016) and describe themselves as unhealthy eaters (Kauer, Pelchat, Rozin, & Zickgraf, 2015). Next to the described specific food choices, picky eating was consistently shown to be associated with texture-based food rejection (Kauer et al., 2015; Van der Horst, Deming, Lesniasukas, Carr, & Reidy, 2016; Zeinstra, Koelen, Kok, & de Graaf, 2010) as well as food neophobia – the aversion of eating new foods (Dovey, Staples, Gibson, & Halford, 2008; Kauer et al., 2015; Zickgraf, Franklin, & Rozin, 2016); the latter has already been shown to be correlated with domain-specific food disgust sensitivity (Hartmann & Siegrist, 2018). Nevertheless, it is unclear what specific factors underlie the manifestation of picky eating behaviour. Certain factors, such as sensory hypersensitivity and parental pressuring feeding style, are discussed for children and adults (Galloway, Fiorito, Lee, & Birch, 2005; Kauer et al., 2015). Previous studies also reported that overall disgust sensitivity (Kauer et al., 2015), food disgust sensitivity (Hartmann & Siegrist, 2018) and picky eating in adults are positively associated. However, the picky-eating construct in the studies of both Kauer et al. (2015) and Hartmann and Siegrist (2018) was assessed only with four items each and in the latter case, only a correlational analysis was carried out. Therefore, another aim of the present study was to examine the predictive power of food disgust sensitivity on picky eating with a newer, comprehensive picky eating measurement tool (Ellis, Galloway, Webb, & Martz, 2017) in a multiple regression analysis that enables to control for sociodemographic variables.

1.4. Food choices

The study examined whether food disgust sensitivity was associated not only with specific psychological eating constructs, such as picky

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