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Short Communication

Does food disgust sensitivity influence eating behaviour? Experimental validation of the Food Disgust Scale

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ABSTRACT

Tools that specifically measure food disgust sensitivity are scarce. This gap has been successfully filled with the recently developed eight-item version of the Food Disgust Scale (FDS short). In the present study, we tested the validity of this measure with three behavioural tasks that we designed. Participants ($N = 108$) filled in questionnaires before they tried three products as part of a behavioural task covered as tasting experiment. We presented these products with written scenarios, which aimed to induce disgust. For all three tasks, we found a significant correlation between the amount participants consumed and their FDS short score. In the first task, we presented participants with a meat product ($r = -0.34, p < .001$); in the second task, it was a banana juice ($r_s = -0.26, p < .01$); and in the final task, we presented participants with an insect product ($r_s = -0.51, p < .001$). A regression analysis confirmed that participants' FDS short score acted as a significant predictor for eating behaviour in the meat ($\beta = -0.26, p < .05$) and the chocolate task (odds ratio = 0.51), however, it did not reach statistical significance in the juice task (odds ratio = 0.66). In this paper, we present two important findings. First, we provide evidence for the influence of food disgust sensitivity on people's eating behaviour as measured by the amount they consumed. Second, and more importantly, our data support the incremental validity of the FDS short as assessed through its correlation with three behavioural tasks and provide evidence for the suitability of self-report measures such as the FDS short.

1. Introduction

Disgust plays an important role in our everyday lives. For instance, disgust can influence hand washing (Pellegrino, Crandall, & Seo, 2015) and eating behaviour (Eickmeier, Hoffmann, & Banse, 2017) and have an impact on food waste production (Egolf, Siegrist, & Hartmann, 2017). Researchers have tried to capture general disgust sensitivity by developing several scales (e.g., Eickmeier et al., 2017; Tybur, Lieberman, & Griskevicius, 2009). The newly developed eight-item version of the Food Disgust Scale (FDS short, Hartmann & Siegrist, 2018) is the first scale that specifically puts the spotlight on food-related disgust and thereby fills an important gap in the current body of literature. In the present study, we validated the FDS short by correlating it with behavioural measures, thereby demonstrating the scale's suitability for the prediction of food-related behaviour. We investigated whether people who have a high food disgust sensitivity, as measured by the FDS short, are more reluctant to try a potentially disgusting food product.

The FDS short is a self-report measure of individual differences in food disgust sensitivity, which covers food-related disgust elicitors.

Researchers developed and tested the scale through a set of five studies (Hartmann & Siegrist, 2018). However, limited evidence is available for the scale's suitability for the prediction of behavioural responses to potentially disgusting food items. Hartmann and Siegrist (2018) conducted one study where participants were offered an insect product. They found that the FDS short explained a significant amount of variance in participants' willingness to eat insects over and above the variance explained by food neophobia. In the present study, we wanted to demonstrate the incremental validity of the FDS short by using a behavioural task containing various food items.

Researchers have proposed behavioural measures as a complement to self-report measures of disgust (Olatunji & Cisler, 2009). They reasoned that behavioural assessment of disgust sensitivity might help to assess the same processes more sensitively and that combining both measures is one way for researchers to reduce questionnaire-specific method variance (Olatunji & Cisler, 2009). Rozin, Haidt, McCauley, Dunlop, and Ashmore (1999) provided a comprehensive assessment of 32 behavioural tasks, most of which aimed to assess disgust sensitivity using various disgust elicitors. Food-related tasks for instance included sucking a lollipop with a worm inside or drinking juice from a bedpan.

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Using the Disgust Scale (DS, Haidt, McCauley, & Rozin, 1994), they found a positive association between self-reported disgust sensitivity and disgust-related behavioural tasks. They concluded that the DS can act as predictor for actual behaviour. When they examined the data concerning disgust-related behavioural tasks, two factors emerged. One factor was food-related disgust and the other was disgust elicited by death and body violations (Rozin et al., 1999). The present study focused on food disgust, aiming to validate and corroborate findings that suggest there is a correlation between self-report and behavioural measures.

In the present study, our primary objective was to validate the FDS short by correlating it with a behavioural measure. In pursuit of this goal, we designed a tasting experiment. We anticipated that when we elicited disgust through a product or a written description, this would influence participants' subsequent eating behaviour. We hypothesised that we would be able to predict participants' willingness to try the food we offered and the amount they consumed on the basis of their food disgust sensitivity as measured by the FDS short (Hartmann & Siegrist, 2018).

2. Methods

2.1. Participants

In February and March 2017, we recruited 110 people through online advertisements and from our experimental panel consisting of people who had participated in an earlier study and who had stated their willingness to return for future studies. Participants knew from the advertisement that the study would include eye tracking and food tasting. Our exclusion criteria comprised veganism, vegetarianism, and food allergies. We excluded participants who appeared to have trouble understanding the questionnaire from the analysis due to data quality concerns ($n = 2$). The final sample contained 108 people (66 female, 42 male) with an age range from 19 to 71 years ($M = 32$, $SD = 13$). Participants gave their written informed consent and received 20 Swiss Francs (20.5 USD) for taking part. The study was approved by the Ethics Committee of ETH Zurich (application 2016-N-79).

2.2. Questionnaires

To measure food disgust sensitivity, we used the eight-item Food Disgust Scale (FDS short, Hartmann & Siegrist, 2018). It contains eight items depicting food cues that are considered to be potential disgust elicitors, and asks participants to rate them on a 6-point scale from 1 (not disgusting at all) to 6 (extremely disgusting). Sample items are: "To put animal cartilage into my mouth" or "To eat brown-coloured avocado pulp".

To assess whether participants tended to avoid unfamiliar foods, we used a German version of the Food Neophobia Scale (FNS, original by

Pliner & Hobden, 1992; translation by Siegrist, Hartmann, & Keller, 2013). The FNS is a robust and widely used measure (e.g. Knaapila et al., 2011). On a scale from -3 (do not agree at all) to 3 (totally agree), participants indicated the extent to which they agreed with ten scenarios. Sample items are: "I do not trust new foods" or "I will eat almost anything".

2.3. Procedure

We informed participants that they would get the chance to try and rate three novel products. To control for hunger effects, participants were instructed not to arrive hungry for this study. Furthermore, we asked participants at the beginning of the study to indicate their current hunger state on a scale from 1 (not hungry at all) to 7 (very hungry).

In the first task, we gave participants five pieces of a commercial meat product (beef chips, Migros, Switzerland). We informed them that this product was the result of a new process that aimed to reduce the amount of food waste in the meat industry. In the second task, we gave participants a glass of banana juice that we purchased online (Pago banana juice, drink-shop.ch, Switzerland). The questionnaire accompanying the product contained a picture of a brown banana and a description explaining that the juice was made from very ripe bananas. In the third task, we gave participants a piece of chocolate with mealworms visible on top. Again, this was a commercially available product that we ordered online (Dschungelade, wuestengarnele.de, Germany). We presented all products one at a time with a short description and three product-related questions. Upon completion of this part, participants were debriefed, thanked, and paid.

For the sake of completeness, we wish to note that in a first part of the experiment, participants were asked to fill in the questionnaires. Then, participants completed a picture rating task on an eye tracking device, during which they looked at neutral pictures of non-food objects and disgusting food pictures. The eye tracking data are part of another, unrelated study and therefore we have not reported them here. Finally, we gave participants the three food products for the tasting experiment.

2.4. Behavioural measures

We designed three food-related tasks, illustrated in Fig. 1, with which we aimed to cover various disgust elicitors. Researchers have argued that participants' disgust reactions depend on the information they receive and the sensory channel through which disgust elicitors are delivered (Croy et al., 2013). In the meat task, we aimed to induce disgust through a written scenario that suggested to participants that the product contained meat parts that are usually discarded. In the juice task, we combined a visual cue with a written scenario. The questionnaire included a picture of a brown banana to accentuate its decay and the scenario made it clear that the juice was made from these kinds of bananas. In the chocolate task, we used mealworms as disgust elicitor

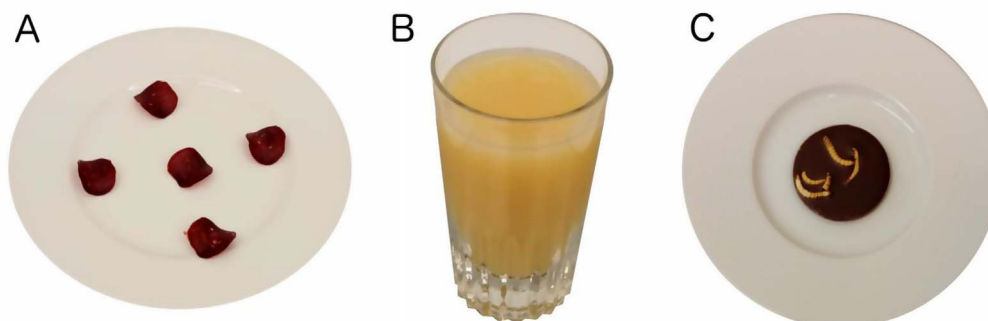


Fig. 1. Behavioural tasks as we presented them to the participants, presentation order from left to right. A: beef chips (meat task), B: banana juice (juice task), C: chocolate with mealworms on top (chocolate task).

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