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Consumer acceptance of insect-based foods in the Netherlands: Academic and commercial implications

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ABSTRACT

Despite growing interest in the use of insects as food, uptake of insect-based foods in Europe is low. Existing research into Western consumer acceptance of insects as food tends to emphasise the role of individual cognition in food choice at the expense of social or contextual factors, and typically frames consumer acceptance as a general issue, rather than relevant only for relatively few early adopters. This paper outlines empirical work, theoretically and methodologically informed by a critical appraisal of previous research, with consumers of insect-based convenience foods in the Netherlands. Reported initial motivations for trying insect foods are shown to be substantially different from factors – such as price, taste, availability, and 'fit' with established eating practices – which affect repeat consumption. Such factors are congruent with those affecting routine consumption of more conventional foods, indicating that insect foods should be analysed according to similar criteria and should be designed with more practical considerations in mind. Further, a reorientation of consumer acceptance research is proposed. Research should shift from attempts to forecast acceptance and engage with 'actual' examples of insect consumption; social, practical and contextual factors affecting food consumption should be emphasised; and – following work on the establishment of other novel foods – early adopters, rather than general populations, should receive greater analytic attention.

1. Introduction

In the face of growing threats to global food security, insects are being considered as a new source of human food and animal feed in Europe and the US (henceforth 'the West') (van Huis et al., 2013). The reported benefits of the human consumption of insects as an alternative to conventional food animals are numerous, including comparable levels of protein (Testa et al., 2016), and relatively high – although variable – levels of nutrients and unsaturated fat (Belluco et al., 2013; van Huis et al., 2013) coupled with a lower environmental impact due to lower emissions of greenhouse gases (Oonincx and de Boer, 2012; Testa et al., 2016) and lower land requirements during production (Oonincx and de Boer, 2012). Yet despite the apparent viability of insects as a sustainable alternative to conventional protein sources, a number of obstacles to their widespread use as human food in the West remain. The ecological benefits (Lundy & Parella, 2015) and 'healthiness' (Payne, Scarborough, Rayner, & Nonaka, 2016) of food insects relative to conventional sources of animal-based protein are debated; further research into the nutritional content (Shockley & Dossey, 2013; Payne, Scarborough et al., 2016; Testa et al., 2016), safety, and allergenicity of food insects is needed (Belluco et al., 2013; Finke, Rojo, Roos, van Huis, & Yen, 2015; Testa et al., 2016); development and automation of rearing and processing technologies is required (Rumpold & Schlüter, 2013); and current EU legislation is prohibitive[1] (Belluco et al., 2013; Finke et al., 2015). In addition, the issue of consumer acceptance remains problematic.

Existing research on Western consumer acceptance of insects as food is largely situated within consumer psychology (or cognate disciplines), and generally proceeds from the epistemological position that predominates within that intellectual tradition: that is,

[1] Currently the sale of products which contain processed insects is prohibited in most EU countries, as insects fall within the remit of pre-existing EU legislation designed without explicit reference to them. Following industry lobbying (C. Kyndt, personal communication, 29 September 2015) and subsequent consideration by national food safety authorities, The Netherlands and Belgium currently both permit the sale of foods containing certain processed insect species (Bureau Risicobeoordeling & Onderzoeksprogrammering, 2014; Ngonlong, Bergen, & Keppens, 2014).

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an emphasis on the individual as the locus of 'food choice', a corresponding lack of emphasis on the role of social, practical and contextual factors, and the employment of research methods which assume that people have relatively stable attitudes, values and preferences which exert a significant influence on food consumption across a range of social contexts.

This paper argues that research into Western consumer acceptance of insects as food would benefit from a considerable shift in emphasis if it is to more fully elucidate the factors affecting such acceptance. In what follows, existing research in the area is critically assessed, and two main limitations are identified. Empirical material from a study of consumers of insect-based convenience food in the Netherlands is presented, and used to substantiate the central arguments of the paper: that present research is epistemologically and methodologically limited in its focus on the individual, rather than social, practical and contextual factors, and requires a reorientation in order to more fully explain Western consumer acceptance of insects as food; that future research should not focus on levels of acceptance in general populations, but rather on the factors affecting uptake of insects as food in those who are already willing to eat them; and that 'acceptance' is not simply a case of getting people to try insects once but rather to integrate them into their diets, which requires attention to a number of factors that are not fully addressed in current research or by current commercial efforts to introduce insect-based foods.

So far the majority of consumer research in the West has focused on consumer acceptance as primarily a psychological or sensory issue. Research has investigated Westerners' general reluctance to consume insects or insect-based foods (Hartmann, Shi, Giusto, & Siegrist, 2015; Ruby, Rozin, & Chan, 2015) or willingness to adopt them as a meat substitute (Hartmann et al., 2015; Schösler, de Boer, & Boersema, 2012; Vanonhacker, van Loo, Gellnyck, & Verbeke, 2013; Verbeke, 2015), typically in relation to traits such as disgust sensitivity or food neophobia, characteristics such as demographics, and other attitudes, both food-related and more general. This type of research identifies those who are more sympathetic to the use of insects as food as being low in disgust sensitivity and food neophobia (Hartmann et al., 2015; Ruby et al., 2015; Verbeke, 2015), higher in 'sensation seeking' traits (Ruby et al., 2015), male (Hartmann et al., 2015; Ruby et al., 2015; Schösler et al., 2012; Verbeke, 2015), already familiar with eating insects (Hartmann et al., 2015; Verbeke, 2015), and having a relatively high convenience orientation (Verbeke, 2015). Those with an expressed intention to reduce meat consumption have been found to be more likely to report willingness to consume insects (Verbeke, 2015), as have those with an interest in the environmental and health aspects of their diets (Verbeke, 2015) or a belief that insects are good for the environment and relatively healthy or nutritious (Sogari, 2015; Ruby et al., 2015). Curiosity is also reported as a strong motivating factor (Sogari, 2015).

Levels of acceptance of insects as a human foodstuff are generally found to be low (Schösler et al., 2012; Vanonhacker et al., 2013; Verbeke, 2015), other than in Ruby, Rozin and Chan's (2015) study, which found that 64% of American research participants were reportedly willing to consume some form of insect-based food. Studies have also identified contradictory findings relative to age, with youth predicting acceptance in some cases (Verbeke, 2015) but not others (Hartmann et al., 2015). Substantial differences in findings are possibly attributable to differences in the country of study and research design (Payne, Dobermann et al., 2016).

Existing research also investigates how the sensory properties of different insect foods affect their acceptance in the West. Survey-based research identifies a poor expected sensory experience as a factor behind the rejection of insects as food (Hartmann et al., 2015; Ruby et al., 2015) and a greater anticipated acceptance of foods in which insects are incorporated as a processed ingredient rather than presented whole (Gmuer, Nuessli Guth, Hartmann, & Siegrist, 2016; Hartmann et al., 2015; Ruby et al., 2015) or which resemble familiar foods (Hartmann et al., 2015).

Studies that engage participants in the consumption of insect-based foods also find that acceptance is higher when insects are concealed (Lensvelt & Steenbekkers, 2014; Schouteten et al., 2016; Sogari, 2015; Tan et al., 2015) or presented in familiar forms (Tan et al., 2015) and flavours (Caparros Megido et al., 2013), when participants have eaten insects previously (Lensvelt & Steenbekkers, 2014; Verneau et al., 2016) and in males (Verneau et al., 2016). A prominent argument in the field is that taste is likely to be of substantial importance in determining whether insect-based foods are accepted or not (Deroy, Reade, & Spence, 2015; Hartmann et al., 2015; Schouteten et al., 2016; Tan et al., 2015), with poor taste being found to have a negative impact on acceptance in sensory research (Schouteten et al., 2016). Tan, Fischer, van Trijp, and Stieger (2016), however, found that the cultural 'appropriateness' of insect-based burgers appeared to exert a greater influence on willingness to consume them again than factors such as taste, neophobia or gender.

The effect of cultural context on people's amenability to consume insects has received more limited engagement in recent scholarship. Cross-cultural consumer studies do exist (Hartmann et al., 2015; Lensvelt & Steenbekkers, 2014; Tan et al., 2015; Verneau et al., 2016), but as the primary focus of these studies is on individual psychological factors and associations, or sensory evaluations, the influence of the socio-cultural environment is generally explored only through its hypothesised reflection in individual responses towards attributes of insects as food, rather than being systematically investigated (e.g. Verneau et al., 2016, p. 5–6). An exception is a study by Tan et al. (2015), which goes into greater depth in tracing the specific ways in which one's socio-cultural environment affects acceptance of insects as food, and elucidates interesting socio-cultural differences related to exposure to insects, both edible and non-edible. For example, rejection of mealworms as food by research participants in rural Thailand due to associations with decaying matter was not reflected in accounts from Dutch participants. The latter group were instead generally more resistant to whole insects due to their relative lack of cultural exposure, both culinary and otherwise.

Research outside the discipline of consumer psychology tends to position consumer acceptance of insects as food within the broader question of 'edibility', which encompasses a wide range of factors. Stock, Phillips, Campbell, and Murcott (2016), for example, demonstrate how the positioning of insects as edible in Western markets must arise out of a web of contingent and often supra-individual factors, including conventional food-related concerns such as supply, distribution, and retail, as well as factors such as the material properties and regulatory position of food insects. Sexton (2014) discusses how the edibility of cultured meat and edible insects may be achieved, suggesting this is likely to arise from an assemblage of material and immaterial factors including preparation, transport, and retail methods of products, prevailing trends in public taste, and the design of products, spaces, and packaging. Edibility is co-produced by a range of actors in the agri-food network: it is not a fixed or inherent property, but rather something that is constructed and negotiated (Sexton, 2014; Yates-Doerr, 2015).

Socially contextual research into the consumption of insects tends to be confined to historical or anthropological studies into non-Western areas, such as the Asia Pacific region (Durst, Johnson, Leslie, & Shono, 2010; Yen, 2015), South America (Onore, 1997; Ramos-Elorduy, 1997), or sub-Saharan Africa (Ayieko, Ndonga, & Tamale, 2010; Raffles, 2010). A recent review of North American